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Impact of personality disorders on leaving hospital against medical advice among people living with HIV in British Columbia, Canada

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Abstract

Purpose Leaving hospital against medical advice (AMA) is a significant source of morbidity, mortality, and a major burden to the healthcare system. Studies have indicated that marginalized populations, including people living with HIV (PLHIV) and those living with a personality disorder (PD), experience high hospitalization rates. We sought to identify whether being diagnosed with a PD was associated with leaving hospital AMA among PLHIV in British Columbia (BC), Canada.

Methods Data were derived from the STOP HIV/AIDS in BC cohort, a provincial-level linkage of a series of surveillance, laboratory, and health administrative databases of all identified PLHIV in BC. Using multivariable generalized estimating equations (GEE), we examined the relationship between diagnoses of PD and premature hospital discharge among PLHIV.

Results Among 8763 PLHIV included in the study sample, 1321 (15%) were diagnosed with a PD. The prevalence of leaving hospital AMA at least once during the study period was 9%. In multivariable GEE analyses, after adjusting for a range of demographic and clinical confounders, there remained a positive association between being diagnosed with a PD and leaving hospital prematurely. Results showed a significant and independent association between a PD diagnosis and leaving AMA among PLHIV.

Conclusions These findings underscore the importance of identifying and addressing specific PD-related behaviour which negatively impact inpatient treatment completion among this subpopulation of PLHIV. Furthermore, these findings suggest a need to develop novel health system interventions to minimize AMA discharge among this population.

Keywords HIV · Personality disorder · Against medical advice · Discharge · Canada

Introduction

Leaving hospital against medical advice (AMA) remains a common phenomenon often resulting in a number of negative health- and system-related consequences. For example,

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there is evidence to suggest that leaving hospital AMA is a significant predictor of readmission and longer readmission stays—suggesting that those who leave hospital AMA often return with a more serious manifestation of the acute illness(s), and/or a new comorbid condition [1–3]. Studies have also demonstrated that discharge AMA is associated with an increased risk of mortality [4–6]. Findings from a retrospective cohort study involving 148,810 individuals discharged from an urban, academic health system in the United States (US) found that premature hospital discharge was associated with approximately double the risk of 30-day mortality when compared with planned discharge [4].

Predictors of leaving hospital AMA generally fall into one of two categories: (1) presence of a substance use disorder (SUD) and (2) psychiatric disorder [2, 7–11]. A prospective cohort study conducted in Vancouver, Canada, showed that among 488 people who use illicit drugs (PWUD) who were hospitalized, 212 (43%) left hospital AMA, so those individuals with active addiction and those who experienced socioeconomic marginalization more likely to leave hospital AMA than their counterparts [1]. Other factors known to be associated with leaving AMA among PWUD include leaving on weekends, welfare check day (i.e., the last Wednesday of the month when individuals receive income assistance from the BC provincial government), and Aboriginal ancestry [3]. In relation to psychiatric disorders, it is clear that personality disorders (PDs) are a particularly important predictor of AMA discharge. A retrospective study conducted by Martínez-Raga et al. involving 470 admissions to an alcohol-inpatient unit found that those who left AMA were significantly more likely to have a diagnosis of antisocial personality disorder (ASPD), or borderline personality disorder (BPD) [12]. A review of the literature conducted by Brook et al. suggests that paranoid and schizoid PD may be associated with leaving AMA as well [8, 13].

There has been considerable interest in the association between PDs and HIV in recent years, partially due to the high co-occurrence of these conditions [14]. Findings from a case–control study involving 58 PLHIV and 53 HIV-negative homosexual men found a significantly higher prevalence of PDs among PLHIV (33%), compared with their HIV-negative counterparts (15%) [15]. Few studies suggest that the prevalence of BPD and ASPD is disproportionately high among PLHIV compared to the general population [16, 17]. This is likely attributable to increased risk behaviours associated with blood-borne virus infections in the setting of severe psychiatric disorders [17–19]. A study involving 333 cocaine users found that those with ASPD showed significantly increased rates of injection drug use and needle sharing, and greater incidence of risky sexual behaviour compared with those without ASPD [20]. Consistent with these findings, Gill et al. found that methadone maintenance therapy (MMT) clients with ASPD appear to be at increased

risk for contracting and transmitting HIV due to increased rates of needle sharing and risky sexual behaviour, compared to MMT clients without ASPD [19].

Despite the growing body of evidence that has characterized HIV seropositivity and PDs as predictors of AMA discharge separately, the potential intersections of these predictors and how they impact premature hospital discharge remain unclear. We hypothesized that PLHIV and PDs would be at substantially greater risk of leaving hospital AMA, as compared with either disorder alone. Thus, in a setting where HIV care is publicly available at no cost [21], and there are reduced financial barriers to evidence-based PD care, we sought to examine the impact of PDs on leaving hospital AMA among PLHIV in British Columbia (BC), Canada from 1996 onwards.

Methods

Study design and population

Data for this study were derived from the Seek and Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS) cohort of all identified PLHIV in BC from 1996 onwards. The cohort was formed through a provincial-level linkage of a series of surveillance, laboratory, and health administrative databases (including the Drug Treatment and Laboratory database [22], the HIV/AIDS Surveillance database [22], the Medical Service Plan database [22], the Discharge Abstract database [DAD] [22], the PharmaNet database [22], and the Vital Statistics database [22]). Further details regarding cohort construction and membership are described in detail elsewhere [23, 24]. Ethics approval for this study was provided by Providence Healthcare and the University of British Columbia.

Study sample

For the present analysis, the sample was restricted to those who: (1) had a hospital record in the DAD at least once during the study period; (2) were not transferred out of province during their hospitalization; and (3) did not die during their hospitalization. For those with more than one hospital record, their first hospitalization was included as baseline.

Variable selection

The primary outcome of interest was having left hospital AMA using data derived from the DAD. Reasons for hospital admission were also derived from the DAD and grouped according to a case mix grouping technology designed by the Canadian Institute for Health Information. Consistent with existing literature, the primary explanatory variable

was a PD diagnosis, defined as any of the following criteria over a 12-month period: one or more hospitalization or physician billing code with an ICD-9 or -10 code for a PD (i.e., ICD-9: 301.0, 301.2, 301.22, 301.7, 301.83, 301.5, 301.81, 301.82, 301.6, 301.4, 301.8, 301.9; ICD-10: F60.0, F60.1, F21, F60.2, F60.3, F60.4, F60.81, F60.6, F60.7, F60.5, F60.8, F60.9) [25, 26].

For sub-analysis, ICD-9 or -10 codes were stratified by cluster: (1) cluster A (including paranoid, schizoid, and schizotypal categories) [25]; (2) cluster B (including ASPD, BPD, histrionic, and narcissistic categories) [25]; (3) cluster C (including avoidant, dependent, and obsessive–compulsive categories) [25]; and (4) other (e.g., haltlose and psychopathic categories). We also considered a selection of possible confounders, including: age (per 10-year increase); sex (male vs. female); calendar year (per year increase), a SUD within the last 12 months of hospital discharge; Charlson comorbidity index closest and prior to or on the admission date (per unit increase) [27]; viral load closest and prior to or on the admission date (per log10 copies/mL increase); and CD4 cell count closest and prior to or on the admission date (per 100 cells/mm^3 increase).

Statistical analyses

As a first step, we descriptively examined demographic and clinical characteristics of the sample, stratified by having left hospital AMA at least once during the study period. Next, we used univariable generalized estimating equations (GEE) to estimate the relationship between the outcome (i.e., having left hospital AMA) and all explanatory variables, including diagnoses of a PD. Subsequently, a full model was fit, where all potential confounders were included. Using backwards elimination in a stepwise manner, the secondary explanatory variable corresponding to the smallest relative change in the effect of a PD diagnosis on leaving hospital AMA was removed from further consideration. This iterative process was continued until the minimum change of the value of the coefficient for having a PD diagnosis from the full model exceeded 5%. The 5% change is based on the original estimates of the coefficients rather than the odds ratio. Remaining variables were considered confounders in the multivariable analysis [28]. Multicollinearity was assessed using the variance inflation factor (VIF). Finally, to assess the effect of residual and unmeasured confounding, the e value was estimated.

As a sub-analysis, we were interested in stratifying PD into the three clusters of PDs (i.e., clusters A, B, and C) [25], to determine whether leaving hospital AMA differed between clusters among those with a PD diagnosis, which we felt was appropriate given that certain cluster B PDs are characterized by emotional dysregulation often resulting in high impulsivity, recurrent self-harm and suicidal tendencies

(e.g., BPD). We generated a new PD variable with the following levels: (1) co-occurrence between clusters; (2) cluster A only [25]; (3) cluster B only [25]; (4) cluster C only [25]; and (5) other. Missing classifications were excluded. To begin, we examined frequencies to determine whether patients diagnosed with certain PD clusters had higher prevalence of leaving hospital AMA. Finally, univariable GEE models were constructed to determine the relationship between each PD cluster designation and leaving hospital AMA, as compared with all other PD cluster designations (e.g., cluster A vs. B, C, and 'other'). No multivariable models involving the cluster variables were constructed. All p values were two-sided and all analyses were performed using SAS version 9.4.

Results

The top three reasons for admission to hospital were diseases and disorders of the digestive system (16.72%); mental diseases and disorders (10.33%); and multisystemic or unspecified site infections (8.85%). Baseline descriptive and sociodemographic characteristics, stratified by leaving hospital AMA at least once during the study period are presented in Table 1. Of the 8763 participants in the study, 1320 (15%) were diagnosed with a PD. Among all study participants, nineteen hundred and forty-five (22%) were female and the median age at baseline was 39 years [interquartile range (IQR) $47 - 32 = 15$ years). Of the 8763 participants in the study, 771 (9%) left hospital AMA at least once during the study period. Of which, the median number of times a participant left hospital AMA during the study period was ten times (IQR $18 - 4 = 14$ times). Of the participants diagnosed with a PD, 271 (21%) left hospital AMA at least once during the study period.

As presented in Table 2, univariable GEE analyses indicated a positive relationship between diagnoses of a PD and leaving hospital AMA. In multivariable GEE analysis, after adjusting for various confounders (Table 2), there remained a positive association between PD diagnosis and leaving hospital AMA.

Among those diagnosed with a PD, 33 (3%) were diagnosed with cluster A PD at some point during the study period; 352 (27%) were diagnosed with cluster B PD at some point during the study period; 44 (3%) were diagnosed with cluster C PD at some point during the study period; and 395 (30%) were diagnosed with other PD at some point during the study period (these categories do not add up to 100% given that they were not mutually exclusive levels). Co-occurrence with at least two clusters were common among those diagnosed with a PD, with 326 (25%) being diagnosed with at least two clusters at least once during study period. The odds of leaving hospital AMA were significantly higher

Table 1 Baseline characteristics stratified by having left hospital against medical advice among people living with HIV in British Columbia, Canada (*n*=8763)

	Total *n*=8763, *N*(%)	Left hospital against medical advice at least once during the study period		*p* value
		Yes *n*=771, *N*(%)	No *n*=7992, *N*(%)	
Characteristic				
Age				
Median	39.0	33.0	40.0	<0.0001
IQR	(32–47)	(27–39)	(32–48)	
Gender				
Male	6818 (78)	484 (7)	6334 (93)	<0.0001
Female	1945 (22)	287 (15)	1658 (85)	
Calendar year				
Median	2002	1997	2002	<0.0001
IQR	(2007–1998)	(1998–1996)	(2007–1999)	
Personality disorder				
Yes	1320 (15)	271 (21)	1049 (79)	<0.0001
No	7443 (85)	500 (7)	6943 (93)	
Schizophrenia-related disorder				
Yes	914 (10)	166 (18)	748 (82)	<0.0001
No	7849 (90)	605 (8)	7244 (92)	
Substance use disorder				
Yes	4436 (51)	727 (16)	3709 (84)	<0.0001
No	4327 (49)	44 (1)	4283 (99)	
Anxiety disorder				
Yes	1561 (18)	271 (17)	1290 (83)	<0.0001
No	7202 (82)	500 (7)	6702 (93)	
Mood disorder				
Yes	2640 (30)	394 (15)	2246 (85)	<0.0001
No	6123 (70)	377 (6)	5746 (94)	
Organic disorder				
Yes	228 (3)	20 (9)	208 (91)	0.9886
No	8535 (97)	751 (9)	7784 (91)	
Charlson comorbidity index				
Median	4	4	4	0.0002
IQR	(4–6)	(4–5)	(4–6)	
Viral load (log 10 copies/mL)				
Median	2.7	2.7	2.7	<0.0001
IQR	(2.7–2.7)	(2.7–2.7)	(2.7–2.7)	
CD4 cell count (cells/mm3)				
Median	350	290	360	<0.0001
IQR	(190–540)	(120–440)	(190–550)	

IQR interquartile range, *mL* milliliter, *CD4* cluster of differentiation 4, *mm^3* cubic millimeter

among those diagnosed with a cluster B PD, as compared with all other PD cluster designations [(OR)=1.54; 95% CI 1.05–2.25]. The odds of leaving hospital against AMA were also significantly higher among those with an 'other' PD diagnosis, as compared with all other PD cluster designations [(OR)=1.97; 95% CI 1.36–2.86].

Discussion

In the present study, a high prevalence of SUD-PD co-occurrence was observed. This finding is consistent with existing literature [29–31]. For example, a recent nationwide study in Denmark involving 463,003 participants found that among those diagnosed with a PD, 46% were also diagnosed with a SUD [31]. A strong and independent association between SUD and leaving AMA was also observed, consistent with general population literature [1, 3, 30, 32]. It is noteworthy that in our study, even after adjusting for SUD, there still remained a positive association between PD and leaving hospital AMA. We found that a significant proportion of PLHIV in our sample had been diagnosed with a PD. We also found a positive and independent relationship between diagnoses of PD and leaving AMA among PLHIV, after adjusting for various confounders. Additionally, cluster B, and other designations were found to be positively associated with leaving hospital AMA among PLHIV with a PD diagnosis.

Our findings suggest that PDs are commonly diagnosed among PLHIV, with approximately 15% identified in our cohort [33, 34]. It is also concerning that AMA discharge occurs frequently among this subpopulation given the known adverse health outcomes associated with premature hospital discharge, increased healthcare utilization and expenditure. This phenomenon is likely perpetuated by a limited evidence base informing effective interventions and treatment options for PDs [35, 36], combined with multi-layered forms of stigma—which may further compel PLHIV to leave hospital AMA. The majority of existing evidence has been focused on the treatment for BPD, but even this is limited by methodological constraints (e.g., insufficient sample size, inadequate follow-up and poor control of comorbidities) [35]. Nevertheless, hospitals may benefit from consulting liaison teams with specialized skills in effectively identifying and managing PDs [35, 37]. The challenge will be to advance an evidence base for PDs, develop and implement clinical guidelines for the treatment of PDs among PLHIV, and develop and implement novel health system interventions (e.g., patient advocacy programs) [38] to minimize AMA discharge among this population. Regardless, it is important to consider that specialized healthcare provider training (e.g., anti-stigma interventions and contact-based education approaches) which enhance provider comfort and skills in treating those with PD(s), may help to combat stigmatized attitudes towards those with PD(s) [39]. This may be an especially important consideration for those diagnosed with BPD given that BPD is associated with higher rates of stigmatization among healthcare providers, compared with

Table 2 Univariable and multivariable generalized estimating equation modeling of the relationship between diagnosis of a personality disorder and leaving hospital against medical advice among people living with HIV in British Columbia, Canada (*n* = 8763)

Characteristic	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	*E* value (CI)
Main exposure			
Personality disorder (yes vs. no)	1.60 (1.14–2.23)	1.51 (1.20–1.91)	1.76 (1.42)
Confounders			
Age (per 10-year increase)	0.87 (0.74–1.01)	0.72 (0.66–0.79)	1.64 (1.51)
Gender (male vs. female)	1.60 (1.15–2.23)		
Calendar year (per 1-year increase)	0.63 (0.59–0.68)		
Substance use disorder (yes vs. no)	10.80 (6.51–17.91)	16.22 (10.72–24.54)	7.52 (6.01)
Charlson comorbidity index	1.00 (0.96–1.06)		
Viral load (log 10 copies/mL)	1.26 (1.16–1.37)		
CD4 cell count (cells/mm3)	0.97 (0.93–1.00)		

OR odds ratio, *CI* confidence interval, *mL* milliliter, *CD4* cluster of differentiation 4, *mm³* cubic millimeter

other highly stigmatized mental disorders such as schizophrenia and affective disorder [40–44]. Future research should explore the impact of these diverse and innovative strategies on AMA discharge among this population.

In line with previous findings, we found a high prevalence of cluster B PDs (e.g., ASPD and BPD) among PLHIV [45–47]. As mentioned previously, this association may be partially attributable to the fact that specific types of cluster B PDs, which have shown to be characterized by emotional dysregulation, often result in high levels of impulsive behaviour, placing individuals at increased risk of HIV exposure, infection, and hospitalization [48]. The finding that a strong association exists between cluster B PDs and leaving hospital AMA is also consistent with previous studies [8, 12]. One explanation for this may be that traits more commonly observed among those diagnosed with a cluster B PD (e.g., a history of numerous inpatient admissions, high impulsivity, co-morbid SUD, antisocial tendencies, suicidal tendencies, and/or functional impairment) predict an increased likelihood of leaving AMA [8, 9]. A contributory factor could be the distinct variance in attitudes and a preference for social distance (an important dimension of stigma) across more highly stigmatized disorders (such as BPD) among healthcare providers [49]. It is likely that high perception of stigma and social undesirability is associated with leaving hospital AMA. While novel treatment strategies have proven useful for cluster B PDs [50, 51], further research should seek to tease out various dimensions of behaviours associated with cluster B PDs (e.g., emotional dysregulation), which permits staff involved in the treatment to identify and target these behaviours in an appropriate manner.

Additionally, our findings add to the existing literature by suggesting a significant association between other PDs and leaving hospital AMA. It could be that certain other PDs such as psychopathy (which has also been characterized by high impulsivity, antisocial tendencies, and other traits more commonly observed among those diagnosed with a cluster B PD) [52, 53] are prevalent among PLHIV. However, little is

known regarding the pathways and mechanisms that explain this particular association. The present study only looked at univariable associations between PD cluster designation and leaving hospital AMA due to small sample sizes in the sub-analysis; thus, future research should seek to unravel the precise dynamics underlying these associations.

There are several limitations to this study. First, the study cohort was defined on the basis of health administrative data; therefore, it is possible that some PDs could have been misclassified, and/or undiagnosed. Second, given that the cohort relies on administrative data, the available set of variables may not capture all confounding factors found in previous research to be associated with PDs and leaving hospital AMA, such as homelessness, employment status, incarceration, and specific drug use behaviour; therefore, our results may be subject to underlying residual and unmeasured confounding factors. Third, these data are observational, thus we were unable to draw conclusions regarding causality. Finally, these results may not be generalizable beyond PLHIV in BC.

Overall, our findings underscore the importance of identifying specific PD-related behaviour which negatively influence inpatient treatment completion. Hospital policies and interventions tailored to address leaving hospital AMA (e.g., implementation of counselling/behaviour support, medications to manage emotional crisis) are urgently needed for this subpopulation of PLHIV. Furthermore, these findings suggest a need to develop novel health system interventions to minimize AMA discharge among this population.

Compliance with ethical standards

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