

Overweight and Obesity Status in an Urban Canadian HIV Outpatient Population

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Worldwide rates of obesity have more than doubled since 1980 (World Health Organization [WHO], 2006). The prevalence of overweight and obesity has also increased significantly in the general population of Canada and the United States, although rates are lower in Canada than in the United States (Shields, Carroll, & Ogden, 2011). Current studies of people living with HIV (PLWH) have indicated that the incidence of overweight and obesity is growing in that population and is now more prevalent than underweight status (Hendricks, Willis, Houser, & Jones, 2006). A number of American studies have investigated the association of weight and HIV status and have revealed that obesity and overweight rates are approaching those of the general population (Amorosa et al., 2005; Crum-Cianflone et al., 2010; Crum-Cianflone, Tejedor, Medina, Barahona, & Ganesan, 2008). Due to the beneficial effects of effective antiretroviral therapy (ART) regimens, HIV-infected people are living longer, experiencing lowering rates of HIV-related wasting syndrome, and becoming more overweight and obese. Consequently, PLWH are now experiencing medical comorbidities related to excess weight (Crum-Cianflone et al., 2010).

In PLWH, elevated body mass index (BMI) is associated with a number of chronic conditions such as diabetes, hypertension, and dyslipidemia (Brar, Shuter, Thomas, Daniels, & Absalon, 2007; Crum-Cianflone et al., 2008; Danoff et al., 2005). A higher BMI is also associated with a number of demographic factors including non-White and African

American races, shorter duration of HIV infection, female gender, nonsmoking, lack of an AIDS diagnosis, and CD4+ T cell counts greater than 200 cells/mm³. Studies on overweight and obesity published thus far have primarily focused on U.S. PLWH. To our knowledge, no similar studies have examined overweight and obesity status in Canadian PLWH. We conducted this study to determine the prevalence of overweight and obesity in Canadian, urban, HIV-infected outpatients and the clinical and demographic factors associated with each condition.

Methods

This was a cross-sectional, descriptive, retrospective study using an established British Columbia Centre for Excellence in HIV/AIDS database that was maintained by the Immunodeficiency Clinic at St. Paul's Hospital in Vancouver, British Columbia (BC). The data used for our study were de-identified. Ethical approval was obtained from the University of British Columbia and Providence Health Care.

The Immunodeficiency Clinic is an outpatient clinic that cares for more than 1,500 PLWH. Patients are primarily from the lower mainland of British Columbia, including Vancouver's downtown eastside,

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an area of the city that is predominantly populated by persons with addiction and mental health issues. All patients seen in the clinic were included in the database, and clinicians collected a variety of demographic and clinical information, which was routinely updated during each medical visit. Inclusion criteria for the study were patients who had a recorded height (ever) and weight between June 2011 and June 2012. The primary outcome of our study was BMI, which was categorized into four groups using the WHO classifications for BMI in kilograms divided by meters squared. BMI classifications were: (a) less than 18.5 kg/m² was underweight, (b) 18.50–24.99 kg/m² was normal weight, (c) 25.00–29.99 kg/m² was overweight, and (d) 30 kg/m² or more was obese (WHO, 2006).

Demographic and clinical characteristics of interest included: gender, ethnicity, age, CD4+ T cell count (at time of BMI assessment and nadir), viral load (at time of BMI assessment), and history of an AIDS-defining illness. We also looked at ART history, including years on ART, current ART (protease inhibitor vs. nonnucleoside reverse transcriptase inhibitor), hepatitis C status, history of injection drug use, and illicit drug use, including marijuana. The objective was to determine the prevalence of each BMI group and factors associated with being overweight or obese.

Comparisons were made between those classified as obese BMI versus overweight BMI versus normal BMI. In bivariate analysis, differences across groups were assessed using chi-squared test (or Fisher's Exact test) and Cochran-Armitage Trend test for categorical variables and Wilcoxon rank-sum test for continuous variables. Regression with a backward-selection procedure based on the Akaike Information Criterion was used to select the variables to be included in a final adjusted model. The appropriate regression (logistic or ordinal) was used depending on whether the groups were analyzed as they were or were further combined.

Results

The cohort consisted of 886 patients, of which 28 (3%) were underweight. Of the remaining 858 patients, 448 (52%) were normal weight, 294 (34%)

were overweight, and 116 (14%) were obese. The majority of patients in our study were male (90%) and the average age was 47 years. With respect to race, 61% were reported as Caucasian and 39% as an ethnic minority (13% reported Aboriginal ancestry, 7% African/Black, and 10% Asian). In terms of substance use, 35% had a history of injection drug use, 15% were current marijuana users, and 15% were currently using illicit drugs. Thirty-two percent of the participants were hepatitis C virus co-infected and 24% had a history of an AIDS-defining illness. The majority of study participants (89%) were on ART, with most (63%) on protease inhibitors.

We found a series of demographic and clinical factors to be statistically significant. Those with an obese BMI were more likely to report being African or Black ($p = .02$). Those who were either overweight or obese were more likely to have a CD4+ T cell count of more than 350 cells/mm³ ($p = .005$) and a viral load of less than 50 copies/mL ($p = .021$). Those with a normal weight were more likely to have a history of injection drug use ($p = .025$), to have hepatitis C virus co-infection ($p = .009$), and to report that they currently used marijuana ($p = .020$). No relationship was found between overweight and obesity and being on ART or type of ART used (see Figures 1 and 2). Our model combined the overweight and obese groups into one category and compared that to the normal BMI group using

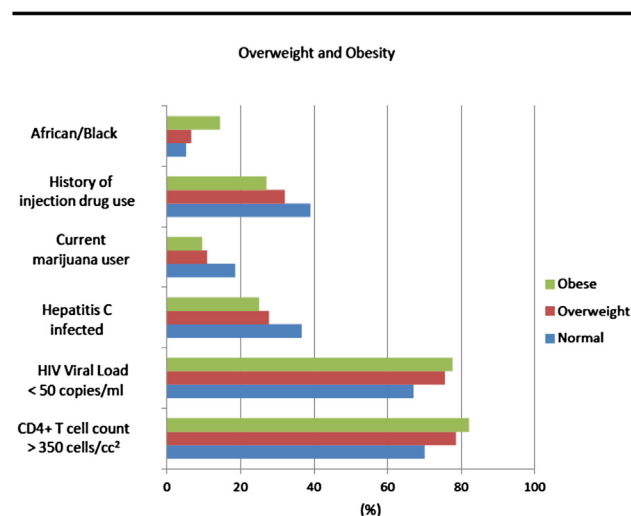


Figure 1. Illustrated statistically significant differences across body mass index (BMI) groups ($p = .05$).

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