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Socio-demographic correlates of late treatment initiation in a cohort of patients starting antiretroviral treatment in Mali, West Africa

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The objective of this study was to investigate factors correlated with late treatment initiation in a cohort of patients starting treatment in Mali, West Africa, while focusing on the role of sex/gender. This study consisted of a cross-sectional analysis of baseline data from a prospective, observational cohort of patients initiating antiretroviral treatment in Mali. Patient data were analyzed with a gender perspective to examine factors correlated with late treatment initiation, defined as having a CD4 count below 100 cells/\(\mu\)l. Aday and Andersen’s conceptual framework of access to medical care was used to classify baseline participant characteristics associated with late treatment initiation. Logistic regression was used to evaluate the modifying effect of sex/gender. Results show that 39% of patients initiated treatment late; significantly more of these were men than women. Sex/gender, marital status, and education were associated with late treatment initiation. Unmarried men and uneducated women were significantly more likely to initiate treatment late. Programs need to target unmarried men while being cognizant that uneducated women are arriving late as well.

Keywords: antiretroviral treatment; late treatment initiation; access; gender; West Africa

Introduction

Ever more antiretroviral treatment (ART) programs are being successfully scaled-up in sub-Saharan Africa. These programs have shown that immunologic and virologic responses are good and that mortality reductions in low-income countries can be similar to those achieved in high-income countries (Bekker, Egger, & Wood, 2007; World Health Organization, 2006). However, there is concern that mortality immediately after starting ART is several-fold higher than in similar patients initiating treatment in industrialized countries (Bekker et al., 2007; Braitstein et al., 2006). Late initiation of treatment is considered an important factor behind these higher rates of mortality.

Early deaths on ART occur predominantly in those with advanced disease, with risk factors for death being CD4 counts <100 cells/\(\mu\)l, prior AIDS diagnosis, and older age (Bekker et al., 2007). Across sub-Saharan Africa, studies demonstrate that patients start treatment at lower CD4 cell counts than recommended by the WHO. Data pooled across sites estimated that 77% of patients initiating treatment in 2005–2006 had CD4 counts below 200 cells/\(\mu\)l and 42% had CD4 counts below 100 cells/\(\mu\)l. Women, however, have higher baseline CD4 cell counts than men, which may reflect a marginal biological advantage (Keiser et al., 2008; Nicastri et al., 2005; Prins et al., 1999).

Because late treatment initiation is associated with early mortality on ART, it is important to explore what factors may be influencing patients’ access to treatment. The conceptual framework developed by Aday and Andersen (1974) has been used extensively to investigate the use of healthcare services in a variety of populations. This behavioral model proposes that the utilization of health services is a function of predisposing factors in the use of those services, factors that enable or inhibit utilization, and health needs. As such, this framework organizes determinants of use into three components: predisposing, enabling, and need. Predisposing components include those variables that influence an individual’s propensity to use services. These properties exist before the onset of an illness episode and here, refer to characteristics present before an individual decides to seek care leading to ART initiation. They include characteristics such as age and sex. The enabling component describes the means available to individuals to use services and includes both resources available to the individual (e.g., income and material resources) and attributes of the community in which the individual lives (e.g., location of residence and travel costs). Finally, the need component refers to illness level and can include factors such as perceived health and illness severity (Aday & Andersen, 1974).

The question of which factors influence access to treatment becomes all the more relevant as increasing

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evidence indicates that women are over-represented in treatment programs (Braitstein et al., 2008; Muula et al., 2007; Nattrass, 2008), despite initial concerns that men would disproportionately benefit from ART services. At present, very little is known as to how gender shapes access to ART programs (Muula et al., 2007; Nattrass, 2008). The objective of this research is to investigate factors correlated with late treatment initiation in a cohort of patients without previous experience with ART and initiating treatment at four centers in Mali, West Africa. We pay special attention to the role of gender in influencing access to treatment.

Methods

This study is a part of a prospective, observational cohort of patients initiating ART in four health centers (two community-based organizations and two public hospitals) in Mali, West Africa. Three of these centers were located in the capital, Bamako, and one center was in the city of Sikasso, in southern Mali. At recruitment, patients completed a questionnaire and received a clinical examination and laboratory monitoring. Patients were followed up every three months for a year. Antiretroviral drugs, medical consultation and basic laboratory monitoring (blood counts, serum chemistries, and CD4 counts) for all HIV positive individuals in Mali were provided free of charge during the course of the study.

Patients were eligible to participate in this study if they had an ELISA-confirmed HIV diagnosis, were 18 years or older, were antiretroviral naïve, and provided informed consent. Women who were pregnant at baseline were excluded.

This study uses baseline data obtained upon entry to the cohort to evaluate characteristics associated with late treatment initiation (study outcome). Because early deaths on ART occur predominantly in those with advanced HIV disease, late treatment initiation was defined as having a CD4 count of 100 or fewer cells/μl, as very low CD4 counts are an important risk factor for early mortality (Bekker et al., 2007).

As stated in the introduction, we used Aday and Andersen’s (1974) conceptual framework to select characteristics potentially influencing access to medical care. Predisposing characteristics considered in this study were gender, age, education, being married, and having children. Religion was not analyzed because of a lack of variability in this characteristic (99% of participants were Muslim). All predisposing characteristics were categorical and education was coded as “educated versus uneducated” because of low overall levels of education in Mali. Enabling characteristics include both resources available to the individual (income, property ownership, and material resources) and the attributes of the community in which the individual lives (city size, travel time, and cost). Material resources were measured on a scale of 1–12 using an asset index that included items such as whether the participant owned a car, had electricity, or had running water. For each asset that the participant had, a point was assigned for a total of 12 possible points. Travel costs were measured continuously and reflect what the participant estimated to be the travel costs, in local currency, associated with going to the health centre. The final component, need, was measured by the characteristic of perceived patient health. Severity was not considered, as the study outcome, low CD4 count, is also a measure of disease severity.

A gender perspective was taken in analyzing characteristics hypothesized to be related to late treatment initiation. Consistent with a gender perspective, we sex-stratified the bivariate statistical analyses (chi-square for categorical variables and student’s t-test for continuous variables) (Ruiz-Cantero et al., 2007). To assess whether independent variables (characteristics described in the paragraph above) were associated with late treatment initiation (CD4 count of 100 or fewer cells/μl), interactions by gender were assessed with multiple logistic regression.

Results

We recruited 271 patients to the cohort. One hundred and ninety-three were women (71.2%) and 78 were men (28.8%). The average age of a participant was 35 years old; male participants were significantly older than female participants (41 versus 33 years old, p < 0.001).

Table 1 presents the characteristics of the participants in the sample, stratified by gender. In addition to age, there were significant differences between men and women in terms of education, marital status, income, transport costs, and perceived health. Women were younger, less educated, and had lower incomes than male participants. Men were more likely to be married, incur greater travel costs, and have poor perceived health. Nearly 18% of men had poor perceived health compared to 5% of women. This is likely because significantly more men started treatment late compared to women.

The cohort median CD4 count was 161 (minimum one and maximum 687). However, men had lower median CD4 counts than women (118 versus 176). A total of 104 (38.4%) participants initiated treatment late (had a CD4 count of ≤100 cells/μl). Of these, 38
were men and 66 were women. Of all men starting treatment, nearly half (48.7%) initiated late compared to approximately a third of women (34.2%). Men were significantly more likely to initiate treatment late than women (OR 1.8; \(p < 0.03\)).

Table 2 presents categorical variables associated with late treatment initiation by gender, as well as the \(p\)-value for the interaction test. The only characteristic significantly associated with late treatment initiation in men was not being married, while for women, no education was associated with late treatment initiation. The test for interaction with gender was significant for both of these terms (\(p < 0.05\)).

In both men and women, there were no significant differences in continuous variables (age, material resources, and transport costs) and late treatment initiation. In other words, there were no significant differences in age, material resources, and transport costs for those who initiated treatment late versus those who did not. Likewise, the test for interaction with gender was non-significant for each of these characteristics (results not shown).

**Discussion**

This study looked at characteristics associated with late treatment initiation while focusing on differences between men and women. In our West-African cohort of patients, only predisposing factors (gender, marital status, and education) were associated with late treatment initiation. As would be expected for both genders, perceived health correlated with CD4 count, although the association was not significant, probably due to small sample size.

Women in our cohort initiated treatment in greater numbers than men (2.5 women to each man).
it is possible that education of women, particularly wives, could have an impact on health service utilization of men.

Of interest, but not statistically significant, similar proportions of women initiated treatment late, irrespective of the size of their city/town of origin. However, in our sample, men living in large cities were more likely to start treatment late (50% versus 33%) despite little difference in the proportion of married versus unmarried men between city types. It is possible that there is a type of “selection pressure” in rural regions whereby the truly sick die before accessing treatment. In contrast, the greater proximal access to treatment in the city allows these very sick individuals to access treatment. However, the reasons why this may affect men disproportionately deserve further attention.

Conclusions

Our results have important implications for public health. Unmarried men and uneducated women
disproportionately access treatment late, a finding that should be explored elsewhere. Both of these groups may need more intense follow-up after diagnosis to assure that they start treatment earlier. Our results reinforce the consideration of gender in the context of treatment. We show differences between men and women that deserve further explanation. For example, could the education of wives be responsible for encouraging husbands to start treatment before they become very ill? Or, why do women have an advantage in accessing treatment in the city, but not in towns/villages? An in-depth, qualitative look into gender roles may help elucidate these questions.

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