



Full length article

Prevalence and patterns of cigarette smoking among patients co-infected with human immunodeficiency virus and tuberculosis in Tanzania



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ABSTRACT

Introduction: Cigarette smoking is one of the major risk factors for non-AIDS related morbidities and is highly prevalent among HIV infected people. However, no reports exist from Tanzania, one of the countries highly affected by the HIV pandemic and one of Africa's biggest tobacco producer.

Methods: We examined the patterns and prevalence of cigarette smoking among HIV and TB co-infected adult patients in Dar es Salaam using a cross sectional study design. Proportions were used to describe the pattern of cigarette smoking. Logistic regression was used to assess the association of various participant characteristics with smoking.

Results: Out of the 518 participants, 17 (3.3%) were current smokers, 96 (18.5%) were ex-smokers and the rest (78.2%) denied ever smoking. Male sex ($p < 0.001$), alcohol ($p < 0.001$), and illicit substance use ($p < 0.001$) were significantly associated with cigarette smoking.

Conclusions: The study indicates that, the level of current cigarette smoking among HIV/TB co-infected patients in Dar es Salaam is low. Nevertheless, the preponderance of cigarette smoking among men, alcohol drinkers, and those who use illicit substances provides a unique opportunity for targeting such population with smoking cessation interventions; HIV care and treatment clinics are uniquely positioned to provide such interventions.

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1. Introduction

Availability of effective antiretroviral drugs has transformed HIV infection from an incurable to a chronic, manageable disease. Indeed, there has been a significant reduction in AIDS-related mortality rates among HIV infected people worldwide (Murray et al., 2013; Palella et al., 2006). As a result, the relative importance of traditionally non-AIDS-related morbidities has increased (Palella et al., 2006; Sackoff et al., 2006; Smith et al., 2014) and threatens to reverse the gains attained.

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Cigarette smoking is one of the major risk factors for cardiovascular (Ezzati and Lopez, 2003; Palella et al., 2006) as well as pulmonary diseases (Diaz et al., 2000; Palella et al., 2006) and is associated with increased mortality in both HIV infected and HIV uninfected persons (Burns et al., 1996; Crothers et al., 2005, 2009; Helleberg et al., 2013). In addition, cigarette smoking weakens the immune system, thereby increasing the risk of certain infections, including bacterial pneumonia (Hirschtick et al., 1995; Kohli et al., 2006), pneumocystis pneumonia (Crothers et al., 2006), tuberculosis (Miguez-Burbano et al., 2003), and oral candidiasis (Burns et al., 1996; Conley et al., 1996). Furthermore, HIV infected patients who smoke may experience a poorer viral and immunologic response to antiretroviral therapy (Feldman et al., 2006), as well as increased risk of malignancies (Newell et al., 1985; Sun et al., 1997).

Several reports show that, at least 50% of HIV infected people currently smoke in different regions of the world (Crothers

et al., 2009; Burkhalter et al., 2005; Capili et al., 2011; Mamary et al., 2002). In Africa, the region most affected by the AIDS pandemic, the prevalence of cigarette smoking among people living with HIV has been sparingly reported. Previous studies from West Africa have reported the prevalence of current tobacco use ranging from 7.8% to 46.2% (Desalu et al., 2009; Iliyasu et al., 2012; Jaquet et al., 2009). In the Eastern Africa region, a study among adults initiating treatment for HIV infection in rural Uganda found that 10% of study participants were current tobacco users (Kruse et al., 2014). Another study from South Africa reported a prevalence of current tobacco to be 21.5% (Louwagie and Ayo-Yusuf, 2013). Most of the previous studies on tobacco use among HIV-infected people were conducted outside the East African region. Furthermore, no reports on prevalence of cigarette smoking among HIV-infected people exist from Tanzania, one of the countries highly affected by the HIV pandemic and among the biggest tobacco producers in Africa. Past studies on smoking in Tanzania have been on the general population (Bovet et al., 2002; Jagoe et al., 2002; Kitange et al., 1993; Siziya et al., 2007). The objective of this study was, thus, to determine the pattern and prevalence of cigarette smoking among HIV and TB co-infected patients in Dar es salaam, Tanzania.

2. Methods

2.1. Design, settings and population

This cross sectional analysis was done from data from a study that was conducted in Dar es Salaam, a commercial city of about four million inhabitants (NBS, 2013) and estimated HIV prevalence of 6.9% (TACAIDS, 2013). Participants were part of a cohort study conducted to examine the treatment outcome of patients with pulmonary TB (PTB) between October 2010 and December 2011. Details of the study design have been published elsewhere (Nagu et al., 2014). Briefly, this was a multi-center observational study conducted in Dar es Salaam city. At the time of this study there were 54 TB clinics in Dar es Salaam, and 14 largest of these 54 clinics formed the study sites for this report. These clinics were purposively selected because they had reported the highest numbers of TB cases in Dar es Salaam. Patients attending these fourteen clinics were considered heterogeneous group of patients in terms of socio-economic status since the study involved all the three municipalities of Dar es Salaam. Patients were included if they were 15 years of age or older, with at least two positive acid fast bacilli (AFB) sputum smears on microscopy, and attending one of the study clinics and were willing to provide a written consent. Patients with previous use of anti-TB drugs or who intended to move out of Dar es Salaam before completing TB therapy were excluded. Study participants were consecutively sampled from consenting PTB patients until the sample size was attained.

2.2. Measurements

A structured questionnaire was administered by trained study staff. The questionnaire included questions on socio-demographic characteristics, general medical history including HIV diagnosis and treatment, illicit substance, and alcohol use. Specifically, for cigarette smoking, illicit substances, and alcohol use, participants were asked to report on their status and there were three options, never, yes but quit and currently smoking, using illicit substances or drinking alcohol. In addition, participants were asked to estimate how many cigarettes they ever or were currently smoking per week and for how long they had been smoking. The intensity of cigarette smoking was indicated by pack-years, calculated by multiplying the number of cigarettes smoked per day by the number of years the person has smoked divided by 20. For alcohol data, mod-

erate drinking was defined as drinking no more than 1 drink per day for women and no more than 2 drinks per day for men while heavy drinking was defined as drinking more than 1 drink per day for women and more than 2 drinks per day for men. For analysis of factors associated with cigarette smoking, cigarette smoking, illicit substance use, and alcohol use were treated as a binary variables (never vs. current or past user).

2.3. Ethical consideration

The study was reviewed and approved by the Muhimbili University of Health and Allied Sciences (MUHAS) ethical review board. Furthermore, permission to conduct the study was obtained from the respective municipal authorities. In addition, written informed consent was sought from all participants. Patients aged 15–17 years gave assent to participate, in addition to their parents or guardians signing a written consent. All patients were managed according to the Tanzanian national TB management guidelines.

2.4. Data analysis

Data from patient case report forms was double entered into Epi6 statistical software. Data analysis was performed using SAS version 9.3 statistical software (SAS Institute, Cary, NC, USA). Proportions or medians and interquartile ranges (IQR) were used to describe the basic characteristics of the study participants and the pattern of cigarette smoking. Logistic regression was used to assess the association of various participant characteristics with smoking. Variables with a p-value equal or less than 0.20 in the univariate analysis were included in the multivariate model. In addition, age was added into the final model *a priori*.

The outcome in this study was cigarette smoking, defined as ever, current or past cigarette smoking. For analysis of associated factors, cigarette smoking was treated as a binary variable (never vs. current or past smoking). Various demographic, social, economic, and behavioral characteristics were assessed as potential determinants of interest. Statistical significance was considered when the respective p value was less than 0.05.

3. Results

The general characteristics of the 518 study participants are summarized in Table 1. The median age was 37 years (IQR, 30–43 years). Approximately 90 percent of participants were 50 years old or younger. Two hundred and eighty participants (54.1%) were men and 240 (45.9%) were women. The majority of participants (48.5%) were married or cohabiting. Seventy four percent of participants had primary school education while about 17.4% had secondary or post-secondary education. Two hundred and thirty four (45.2%) participants were private sector employees and about 35% earned less than 100 United States Dollar per month. The prevalence of ever use of alcohol was 42.6% of which 38 (7.3%) were current drinkers. In addition, 6.4% of past or current drinkers were heavy drinkers; defined as drinking more than 1 drink per day for women and more than 2 drinks per day for men. History of illicit substance abuse was low, with 23 patients (4.5%) being ever users including 1.2% current users.

Table 2 shows the pattern of cigarette smoking among the study participants. Out of the 518 participants, 17 (3.3%) reported that they were current cigarette smokers, 96 (18.5%) were ex-smokers and the rest (78.2%) denied ever smoking. None of the current cigarette smokers were women. Sixty one percent of current and past cigarette smokers smoked 20 or more pack-years of cigarette. Of the 104 current and former smokers who had information on duration of smoking, 71 (68.3%) had been smoking for at least five years.

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