A high rate of Human Immunodeficiency Virus infection among suspected Tuberculosis cases in Western Kenya

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SUMMARY

Background: Kenya is a high HIV/AIDS prevalence country and the epidemic has been declared a national disaster, and is at top of the government's agenda.
Objective: To determine the prevalence of HIV infection among suspected tuberculosis (TB) cases seeking healthcare at chest and paediatric clinics in Western Kenya.
Methods: This cross-sectional study was done between 2007 and 2009. A total of 695 suspected TB cases (388 males and 312 females) were screened for HIV infection using Trinity Biotech Uni-Gold™ test and positives confirmed with the enzyme linked immunosorbent assay. A questionnaire was used to collect demographic data of the participants.
Results: In total, 272 (39.1%) of the suspects were HIV infected 50.7% females and 48.3% males. Females were significantly affected than males [OR = 0.69; 95% CI: 0.51-0.94; P = 0.02]. The majority (39.3%) of the HIV cases were in the 25-34 age-group followed by the 35-44 (24.6%) and 15-24 (15.8%) age-groups respectively. Only 16.9% of HIV-infected cases were on antiretroviral therapy.
Conclusions: The prevalence of HIV infection among suspected TB cases was 39.1%, which was relatively lower than 48%, 45% and 44% prevalence rates reported by Division of Leprosy Tuberculosis and Lung Disease (DLTLD) in the annual reports of 2007, 2008 and 2009, respectively. However, it was much higher the current national average HIV prevalence of 7.2%.

Key words: HIV prevalence; healthcare seekers; chest and paediatric clinics; suspected TB cases.

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Introduction

Human Immunodeficiency Virus (HIV) is one of the world's leading cause morbidity and mortality [1]. The HIV spreads silently and unnoticed before it wreaks havoc and devastation; HIV/AIDS kills people, tears apart families, destabilizes communities, slows economies, disrupts social services, and weakens democracies. It has a cross-generational impact, denying many children their parents' guard, guidance, protection and love [2]. The global HIV morbidity at the end of 2009 stood at 33.4 million people, with more than 95% of them being in developing countries [1]. Sub-Saharan Africa, the epicentre of the global pandemic remains the region with highest burden, accounting for over two thirds, (67%) of the people living with HIV and for 72% of HIV/AIDS related deaths (UNAIDS and WHO, 2009). An estimated 1.9 million people were newly infected with HIV in sub-Saharan Africa in 2008, bringing to 22.4 million the number of people living with HIV in this region. By 2008, more than 14 million children in sub-Saharan Africa had lost one or both parents to HIV/AIDS [3].Although men basically drive the pandemic, women and girls make 60 % of those infected in sub-African, with an average of three women infected for every one man [3]. The ratios are even more lop-sided between the sexes for the 15-24 age-groups, where 76 % of the infected are women. Some population-based studies indicate that on average 36 women in this age-group are living with HIV for every 10 infected young men [4]. Young people remain at the heart of the disease's effects, yet all too often at the periphery of the world's response. Almost every minute of every

day, another two young people are infected with HIV. Young women remain particularly vulnerable to HIV; of the 5.5 million young people aged 15–24 with HIV, about two thirds are female [5]. Kenya has also been hard-hit by the HIV/AIDS pandemic, which reduced live expectancy from 60 years in 1990 to 45.5 years in 2002. More than 1.5 million Kenyans live with HIV/AIDS [6], the adult prevalence currently standing at 7.2 % down from 13 % three years ago. About 59 % of the HIV cases in Kenya are women [6]. However, the prevalence is higher (about 20%) among girls and young women who are more vulnerable to infection [3]. On overage, 71,000 Kenyans die annually from HIV/AIDS and related conditions, and on average almost every minute 2 people are infected [7]. This study was carried out to determine HIV infection rate among healthcare seekers at the chest and paediatric clinics in Western Kenya.

Materials and methods

Study Design: A cross-sectional study was conducted between September 2007 and September 2009.

Study site and population: The study was done at chest and paediatric clinics at one provincial and nine district hospitals in western Kenya. These were Busia, Bungoma, Kisumu, Migori, Kisii, Narok, Kericho, Uasin Gishu and Lodwar district hospitals, and Nakuru Provincial General Hospital. Western Kenya includes the expansive former Rift Valley, Nyanza and Western Provinces, with a cumulative population of about 19.8 million people. This constitutes about 52.1% of the Kenyan population.

Sampling frame and patient characteristics: Participants suspected of having TB were included at random if they sought healthcare services at the chest and paediatric clinic between September 2007 and September 2009. They had to be resident in western Kenya for at least six months and consented to participate in the study.

Collection of demographic data: A questionnaire was used to obtain participant demographic data. Data collected included age, gender, previous anti-TB treatment, HIV status, and antiretroviral therapy (ART).

Collection of blood samples: A total of 695 out of the 872 participants consented phlebotomy for HIV testing. The blood was delivered into Vacutainer Brand STERILE interior EDTA (K3) tubes and stored at $-20^{o}C$ awaiting processing. The samples were transported in cool boxes to Moi Reference Laboratory (MRL), Moi University School of Medicine (MUSOM), Eldoret, and processed within two weeks.

HIV testing: Screening for HIV infection was done by screening serum/plasma by the Trinity Biotech Uni-Gold^{TM} [8] test and positives confirmed with the enzyme linked immunosorbent assay [9].

Data analysis: Data was entered in MS Excel 8.0 and analysed using Epi Info version 3.5.1. Descriptive statistics were used to summarize data and proportions compared using chi-square (χ^2) testing. Univariate odds rations (OR) with 95% confidence intervals (CI) were calculated to assess risk factors (gender and age-group) with regard to HIV infection. Logistic regression was used to analyze multivariate data.

Ethical issues

The proposal for this study was approved by Institute of Tropical Medicine and Infectious Diseases (ITROMID) / Kenya Medical Research Institute (KEMRI)'s Scientific Steering Committee (SSC) and Ethical Review Committee (ERC). It was also approved by Moi University School of Medicine (MU-SOM) / Moi Teaching and Referral Hospital (MTRH) Institutional Research and Ethics Committee (IREC). Clearance was also obtained from respective district health authorities and hospital administrations. Informed consent was obtained from candidates or their guardians before they were enrolled into the study. The purpose of the study was explained to the candidates in English, Kiswahili or local language before consent was sought. Code numbers rather than names were used to identify candidates in order to maintain confidentiality. The study did not expose candidates to any unusual risks as competent hospital staff obtained sputum and blood specimens from candidates using standard procedures.

Results

A total of 872 participants suspected of having TB were enrolled into the study at the 10 study sites, 54.9% (477) males and 45.1% (393) females. Their ages were between 9 months and 80 years, the median age being 32 years. The majority (33.1%) of the participants were in the 25-34 age-group, followed by those in the 35-44 (21.8%) and 15-24 (18.7%) age-groups respectively. Paediatric cases (0-14 age-group) were the lowest with 4.6%, with children 5 years and below contributing 0.6% (Table 1)

Table 1: Study population and gender-age distribution

Age-group	N (%)	Males (%)	Females (%)
0-14	39(4.5)	22(2.5)	18(2.1)
15-24	163(18.7)	80(9.2)	83(9.5)
25-34	288(33.1)	162(18.6)	126(14.4)
35-44	190(21.8)	108(12.4)	82(9.4)
45-54	89(10.2)	108(12.4)	36(4.1)
55-64	54(6.2)	29(3.3)	25(2.9)
> 64	48(5.5)	25(2.9)	23(2.6)
Total	**872(100)**	**479(54.9)**	**393(45.1)**

A total of 695 (79.7%) of the 872 clients requested to join the study accepted HIV testing, and 39.1% (272/695) were sero-positive. Females constituted 44.9% (312/695) of which 43.9% (137/312) being sero-positive. Males constituted 55.1% (388/695), with 34.8% (135/388) being infected. Overall females constituted 50.7% and males 48.3% of the HIV cases. There was a significant difference in HIV infection rate between gender, females being more vulnerable [OR = 0.695; 95% CI: 0.512-0.945; P = 0.020]. The majority (39.3%) of the HIV cases were in the 25-34 age-group followed by the 35-44 (24.6%) and 15-24 (15.8%) age-groups respectively. The 0-14 year age-group had 2.9% if the HIV cases (Table 2). Only 16.9% (46/272) of the HIV/AIDS cases were on antiretroviral therapy (ART), 65.2% females and 34.8% males.

Table 2. HIV and gender-age distribution

Age-group	N (%)	Males (%)	Females (%)	OR	95%CI	P-value
0-14	8(2.9)	3(1.1)	5(1.8)	0.215	0.032-1.411	0.109
15-24	43(15.8)	21(7.7)	22(8.1)	0.752	0.360-1.570	0.447
25-34	107(39.3)	53(19.5)	54(19.9)	0.707	0.422-1.834	0.187
35-44	67(24.6)	32(11.8)	35(12.9)	0.549	0.288-1.047	0.068
45-54	24(8.8)	12(4.4)	12(4.4)	0.533	0.195-1.456	0.220
55-64	14(5.1)	10(3.7)	4(1.5)	3.864	0.967-15.443	0.056
> 64	9(3.3)	4(1.5)	5(1.8)	0.518	0.114-2.362	0.395
Total	**272(100)**	**135(49.6)**	**137(50.4)**	**0.695**	**0.512-0.945**	**0.020**

Discussion

The HIV/AIDS and associated tuberculosis (TB) are robbing many countries of resources and capacities on which human security and development depend. Dozens of resource-poor countries are already in the grip of serious epidemics [10]. Tuberculosis is the most common opportunistic infection in HIV/AIDS patients, and the commonest cause of hospitalization and death in HIV/AIDS patients [11]. Although overall national HIV/AIDS prevalence in Kenya has shown a steady decline [6], the scourge continues to afflict the youth and young adults and the poor. This report (2007 national survey) indicates the national HIV prevalence among the 14-49 age bracket to be between 8-9% in the urban areas and 6-7% in the rural areas. This gave a national combined prevalence of 7.5%. This is in agreement with the present study in which close to 80% of the HIV infections were in the 15-44 year age-group. However, the high overall HIV prevalence (39.1%) in present study could be attributed to the study having been done among high risk groups. The HIV prevalence is higher among TB cases compared to the general population, and is currently the greatest risk factor for the progression of latent TB infection to active TB, and rapid progression of new TB infection. It is also a potential risk for recurrence of TB [11, 12]. However, high HIV prevalence reported in this study is comparable with the 2007, 2008 and 2009 DLTLD annual reports give co-infection prevalence rates of 48%, 45% and 44%, respectively [13, 14, 15].

The National Aids Control Council/National AIDS and STDs Control Programme (NACC/NASCOP) [6] in the 2007 survey reports males to constitute about 41.4% (570947/1377472) of the cases compared to females (58.6%). The HIV sero-prevalence was 3.7%, and 6.7% among males and females respectively. In the present study, the HIV sero-prevalence in males was 34.8% compared to 43.9% in females is fairly in agreement with the NACC/NASCOP [6] report, which is in agreement with the NACC/NASCOP report, in terms of females being more vulnerable. The plausible

explanation for the higher rates of HIV infection observed in this study could be attributed to the study having been done among high risk groups. This study shows that majority (64%) of the HIV infected cases were in the 25-44 age-group, the most productive group in the community. Since HIV infected individuals are more vulnerable to TB infection in high-burden countries like Kenya, this will undermine the small gains in economic development that has been achieved. By affecting the 25-44 age-group so heavily, HIV/AIDS is not only hitting adults in their most economically productive years, but also removing the very people who could be responding to the HIV/AIDS crisis [16], meaning that HIV/AIDS will continue to adversely affect socio-economic development in resource-poor countries for many years to come.

Stigma associated with HIV/AIDS infection continues to be an impediment to the war against HIV/AIDS as evidenced by 20.3% of candidates declining to undergo HIV testing in the present study. The non-consenting population was represented across all the age-groups except the 0-14 age-group, where the guardians assented the HIV test. Fear of discrimination often prevents people from getting tested, seeking treatment and admitting their HIV status publicly. Many countries have legislated laws and policies against discrimination, but this alone cannot reverse the stigma that surrounds HIV infection. HIV/AIDS education in Africa needs to be scaled-up to combat the ignorance that causes people to discriminate. The fear and prejudice that lies at the core of HIV and AIDS discrimination needs to be tackled at both community and national levels [16, 17]. Only 16.9% (46/272) of the HIV cases were on antiretroviral therapy (ART), 65.2% females and 34.8% males. However, the number of HIV cases needing to be put on ART could not be established in the present study. Nationally, however, of the 1.4 million Kenyans infected with HIV, about 42.6% (243,000/570,000) of those needing ART are on ARVs [18]. This means that Universal Access to ART in Kenya remains a big challenge.

Conclusion

The HIV/AIDS continues to predominantly affect young adult Kenyans in their most productive years of life. Almost three decades into the HIV/AIDS epidemic, much more effort needs to be directed to prevention of new HIV infections among the youth and young adults and campaign against stigma and discrimination.

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