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## CLINICAL ARTICLE

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# Seroprevalence of HIV in acute orthopaedic trauma at the Charlotte Maxeke Johannesburg Academic Hospital

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### Abstract

#### Aim

The aim of the study was to establish the human immunodeficiency virus (HIV) seroprevalence in an acute orthopaedic trauma setting in an urban teaching hospital.

#### Methods

All patients admitted at the Orthopaedic Trauma Unit of the academic hospital during a six-month period from 1 July 2008 to 31 December 2008 were counselled and an informed consent for HIV testing was obtained. Only acute orthopaedic trauma patients aged 18 years and above, with a Glasgow Coma Scale of 15/15 and competent to give consent were recruited for the study. Where the consent was given blood samples were analysed by way of a rapid HIV test followed by a confirmatory ELISA when the rapid HIV tested positive. Those patients who tested positive for the virus were then counselled and offered referral to an HIV centre for follow-up.

#### Results

A total of 797 patients were admitted during the study period. One-hundred-and-fifty-nine patients (20%) did not meet the inclusion criteria. A total of 638 patients were therefore eligible for recruitment. Two-hundred-and-forty-six patients (38%) consented and signed the informed consent form. Of those that were tested, 57 (23%) tested positive and were followed up accordingly.

#### Conclusion

Seroprevalence in an acute orthopaedic trauma setting in an urban teaching hospital was found to be high in this study. The power of this study was weakened by the low percentage of eligible patients who consented to be tested.

**Key words:** HIV seroprevalence, acute orthopaedic trauma

## Introduction

The UNAIDS/WHO AIDS epidemic update of December 2009 reported that a total of 33.4 million people were living with HIV in the world.<sup>1</sup> The sub-Saharan region was most affected with 22.4 million estimated to be living with HIV, 1.4 million having Aids-related deaths and 1.9 million new HIV infections in 2008. South Africa is home to the world's largest population of people living with HIV (5.7 million).

In South Africa, most HIV epidemiologic studies have extrapolated data from antenatal clinic (ANC) surveys for national prevalence estimates. The South African Department of Health Study conducted in 2009 estimates that 29.4% of pregnant woman were living with HIV.<sup>2</sup> Connolly *et al* reported on a community-based study of 10 197 randomly selected households; 7 249 (71.1%) of the selected households were included in their study.<sup>3</sup> One child, one youth and one adult were randomly selected from each household. They selected 13 518 individuals but only interviewed 9 963. Of those, 8 428 (62.3%) individuals agreed to be tested.<sup>3</sup> Their findings suggested a general population seroprevalence of 11.4% (12.8% in females and 9.5% in males). Incidentally, Africans had the highest prevalence of 12.9% compared to 1.8% Indians and 6.2% whites. These reflect the racial demographics of South Africa. The conclusion from this report suggested that community-based surveys are superior to ANC-based estimates. Neil Martison *et al* sampled 537 patients out of a possible 1 000 surgical patients at the CH Baragwanath Hospital in Soweto, South Africa.<sup>4</sup> The study reported a 32.8 % rate HIV in this group. Bowley *et al* in 2002 reported a 27% rate of HIV rate in major trauma patients admitted to the level 1 Trauma Unit at the CM Johannesburg Hospital.<sup>5</sup> From a rural setting of Hlabisa Hospital in South Africa in 2000, a prevalence study was undertaken under the auspices of the Centre for Epidemiological research in Southern Africa by Yeung *et al*.<sup>6</sup> In that study they reported on 281 consecutive children admitted to the hospital over a 4-month period. They reported a seroprevalence rate of 26%.

To the best of the authors' knowledge, at the beginning of this study there had not been any reports on the epidemiology and rate of HIV in an acute orthopaedic trauma setting in South Africa. This was the reason for the commission of this study.

## Materials and methods

This study was carried out in the Orthopaedic Trauma Unit at the Charlotte Maxeke Johannesburg Academic Hospital from 1 July 2008 to 31 December 2009. Patients were recruited to the study after admission to the Orthopaedic Trauma Unit or to the Surgical Trauma Unit (in cases of polytrauma). The inclusion criteria were:

- acute orthopaedic trauma patients requiring admission
- Glasgow Coma Score of 15/15
- age above 18 years and competent to give consent for the study

The patients' cognitive function was assessed using the Glasgow Coma Scale and documented to be 15/15. The aims and the need for the study were explained to the patient and pre counselling for HIV testing was offered by the first author. A wish to know or be blinded to the result was communicated and documented. A successful recruitment was then followed up by a signed and witnessed consent form and blood sampling. Samples were analysed by way of a rapid HIV test and a confirmatory ELISA if positive. Those patients who tested positive for the virus were then counselled and offered referral to an HIV centre for treatment and follow-up.

## Results

A total of 797 patients were admitted to the Orthopaedic Trauma Unit during the study period. One-hundred-and-fifty-nine patients were excluded because they did not meet the inclusion criteria. That left 638 patients eligible for the study. The average age of the eligible patients was 37 years with an age range of 18 to 92 years. Sixty-five per cent (414) were male and 35% (224) were female. Of the 638 eligible patients only 246 (39%) agreed to be tested. The reasons given for refusing to test were:

- Already tested and negative
- Can we do this once we have treated the injury?
- Have to think about it
- Don't want to know
- Too painful to consider
- Of the 246 patients who agreed to be tested, 71 (27%) said they did not want to know the results. Fifty-seven (23%) of the patients who were tested were found to be HIV seropositive.

## Discussion

HIV seroprevalence in South Africa is high.<sup>1-5</sup> Many studies of prevalence are hampered by the low recruitment rate (*Table I*). This can have a bearing on the interpretation of results obtained. The prevalence will be different in different population groups (*Table II*). High risk groups have been reported as young women and men between the ages of 20 and 49 years with a mean age of 34. This is the population group that normally would present to a casualty after an acute traumatic event. This study and the reports from Martison<sup>4</sup> and Bowley<sup>5</sup> show a high seroprevalence in a trauma setting. From this evidence one would extrapolate that almost a quarter of all patients that present to casualties after a traumatic episode are likely be HIV positive.

Since 1986 when Aids was first identified, and the isolation of the virus thereafter, every medical discipline has been faced with challenges in managing HIV/Aids patients. HIV/Aids presents specific challenges in the discipline of orthopaedics.<sup>7,8</sup> Patients who are HIV positive have been shown to develop aggressive malignant tumours affecting bones.<sup>9</sup> The prevalence of TB in HIV-positive patients has been reported to be 500 times greater than in HIV-negative individuals.<sup>10</sup>

**Table I: Recruitment rates in HIV prevalence reports**

Study	Group	Numbers	% recruitment
This study 2008	Orthopaedic Trauma, Johannesburg	261	38%
Martison <i>et al</i> 2007	General Surgery, Baragwanath Hospital	537	53.7%
Bassett <i>et al</i> 2007	Durban OPD	1414	48.6%
Kalichman <i>et al</i> 2003	Cape Town		47%
Peltzer <i>et al</i>	VCT		73%

**Table II: HIV prevalence rates studies**

Study	Group	Participants(n)	Prevalence
Bowley <i>et al</i> 2002	Jhb Hospital, Trauma patients		28%
Martison <i>et al</i> 2007	Baragwanath Hospital, Surgical patients	537	32.8%
This study 2008	Orthopaedic trauma, Jhb Hospital	261	22%
Department of Health 2008	Antenatal Clinics		29%

The incidence of osteonecrosis or avascular necrosis (AVN) of the hip in HIV-positive patients is reported to be 45 times greater than in the normal population.<sup>11</sup> HIV-positive patients have also been reported to be at higher risk of developing deep vein thrombosis. The risk of viral transmission can be expected to be higher in orthopaedic procedures due to the bony spikes and sometimes prolonged surgery.

In orthopaedic trauma the biggest concern is postoperative infection. The infection rate of open fractures in HIV-positive patients has been reported to be as high as 42%.<sup>12</sup> Late infections around implants following trauma surgery have also been reported in HIV-positive patients.<sup>13</sup> Early outcomes of providing antiretroviral medications in HIV-positive patients with a low CD4 count have been shown to be effective in decreasing the risks to the same level as HIV-negative patients.<sup>14</sup> To improve treatment outcomes it would therefore be important to know the HIV status of patients managed for orthopaedic injuries in order to be able to add antiretroviral and prolonged prophylactic antibiotic treatment in those who are HIV-positive and have a low CD4 count.

In this study 62% of eligible patients did not consent to be tested. This low recruitment rate was experienced in a number of other studies (*Table I*). Several factors have been postulated and they range from indifference, the stigma attached to seropositivity, inadequate counselling and apathy. The national drive to know your HIV status and the utilisation of trained counsellors may improve the acceptance rate for testing. There have been several studies that have reported on the efficacy of voluntary counselling and testing (VCT) but the main problem has always been the low rate of recruitment of eligible candidates who are prepared to offer informed consent. Hutchinson and Mahlalela 2006,<sup>15</sup> in a population-based survey and a government clinic in the Eastern Cape

Province, found that utilisation of VCT services was positively associated with age, education, socio-economic status, proximity to clinics, availability of rapid testing and lower levels of HIV/AIDS stigma. Bassett *et al* 2007<sup>16</sup> in an outpatient-based study in kwaZulu-Natal reported a response rate of 48.6% (n=1414). Kalichman *et al* 2003<sup>17</sup> recorded a response rate of 47% in a study on HIV-testing attitudes in Cape Town, South Africa. Karl Peltzer *et al* reported a 73% capture.<sup>18</sup> *Table I* clearly shows the huge discrepancies in the response rate between studies that were VCT aligned and those in which the researcher also doubled as the counsellor. Rate (of non-response) from this study is a case in point: a 38% recruitment rate compared to 73% in the Karl Peltzer study.

## Conclusion

There was a high HIV seroprevalence (23%) in our academic hospital's Orthopaedic Trauma Unit. The low recruitment rate decreased the power of this study.

VCT is a gateway to both prevention and treatment of HIV. VCT interactions can also serve as important conduits of health information and promotion, encouraging changes in risky behaviours for those not infected and modifications in behaviour for discordant couples and those already infected.

*Approval for the study was obtained from the Human Research Ethics Committee. The content and preparation of this paper is the sole work of the authors. The study is part of the MMed dissertation submitted to the University of Witwatersrand by the first author. No benefit of any form was or will be received from a commercial party related directly or indirectly to the subject of this article.*

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