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Seroprevalence of HIV in acute Orthopaedic trauma at the Johannesburg Hospital

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Seroprevalence of HIV in acute Orthopaedic trauma at the Johannesburg Hospital

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Original research submitted as partial fulfilment of the requirements for the Masters in Medicine degree in Orthopaedic Surgery at the University of the Witwatersrand, Johannesburg. 2011

Declaration

I Tatolo Ishmael Sefeane do hereby declare that this report is my own work. It is being submitted for the degree of Master in Medicine (Orthopaedics) at the University of the Witwatersrand Johannesburg and it has never been submitted for any exam at this or any other University.

Ethics clearance for this study was granted by the ethics committee of the University of the Witwatersrand as a preliminary study to another study: The role of antiretrovirals in the management of high grade open tibial fractures.

_____

Signature

12th of April 2011

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Abstract

The principal aim of the study was to establish the HIV Seroprevalence in an acute Orthopaedic trauma setting in an urban teaching hospital. Secondary aims were (i), to establish if the seroprevalence compares with the national averages and findings from other similar studies, and (ii), to establish the effect of informed consent on the response rate to recruitment in HIV related studies.

Methodology

All illegible patients (able and qualified to give an informed consent for HIV testing) admitted to the Orthopaedic trauma unit at the Johannesburg hospital, were pre-counselled and tested for HIV after admission. Those that tested positive were then counselled again and referred accordingly to the HIV clinics for follow up.

Results

A total of 797 patients were admitted during the period. 159 (20%) did not meet the inclusion criteria, declined counselling or could not be counselled for various reasons. The main reason for non response was cited as a need to wait until after the acute event before they considered the test.

A total of 648 patients were therefore eligible for recruitment. All patients were pre-counselled for the test and 246 (39%) consented and signed the informed consent form. Of those that were tested, 57 (23%) tested positive and were followed up accordingly.

This result was then compared with previous non Orthopaedic studies on the HIV Seroprevalence.

The rate of HIV infection in our acute orthopaedic trauma setting was found to be 23%. This is higher than the national averages but compares with other studies.
Most acutely traumatized patients are not willing to be tested for HIV in the acute setting. This has a huge bearing on recruitment of suitable candidates for future studies in HIV in an acute trauma setting.

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Higher response rates to recruitment in HIV studies are directly proportional to the use of qualified counsellors in organized centres like the Voluntary Counselling and Testing centres.

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List of abbreviations

1. VCT - Viral Counselling and Testing centre
2. ANC – Antenatal Clinic
3. HIV – Human Immunodeficiency Virus
4. ARV – Antiretrovirals
5. AIDS – Acquired Immunodeficiency Syndrome
6. ARDS – Acute Respiratory Distress Syndrome
7. SIRS – Systemic Inflammatory Response Syndrome
8. WHO – World Health Organization
9. CDC – Centre for Disease Control USA
10. SADDC – Southern African Development Coordination Conference
11. HAART- Highly accelerated anti retroviral treatment

Chapter 1 - Introduction and Literature review

Immune deficiency syndrome as an entity was first described in 1981 in the United states of America and the causative retrovirus was identified in Paris in 1983 (1). The musculoskeletal manifestations especially in trauma were first articulated by JE Jellis in his 'HIV and the musculoskeletal system' report from Zambia in 1996 (2)**.** He reported that most HIV positive patients admitted to the trauma units are not a homogenous group with almost half not showing any clinical signs of HIV according to the WHO classification, and only 13% showing early disease while an insignificant number showed moderate to severe disease.

In recent years reports have increasingly shown that HIV infection has significant relevance to outcomes in patients with bone and joint afflictions. Govender et al in 2008 described a spectrum of skeletal manifestations in HIV positive patients (3.)

- Bone and joint trauma- open or closed injuries
- Joint conditions – Osteonecrosis and Haemophilia
- Skeletal infections – Spine, joint and long bone infections as well as bacillary angiomatosis
- Neoplastic conditions including Non Hodgkins lymphomas, Kaposi's sarcoma and metastases
- Myopathies including polymyositis, pyomyositis and AZT myopathy
- Inflammatory arthropathies like painful articular syndrome, acute symmetrical polyarthritis, HIV-associated arthritis, Psoriatic arthritis and Reiter's syndrome

Orthopaedic trauma and HIV

Orthopaedic trauma itself has far reaching implications in patients arriving in the orthopaedic unit and the management thereof. The Orthopaedic surgeon managing these patients is always faced with a multitude of challenges. There will always be concerns about the risk of post operative wound infections as a result of the inferior immune system as well as the fact that organisms involved in this infections are usually atypical and difficult to treat. An infection rate of 24 % (4) to 42 % (2) was determined by studies in 1991 and 1996 respectively for open Tibial fractures.

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Other challenges in Orthopaedic trauma include among others concerns about an increased risk of late implant sepsis and whether implants should be removed routinely after fracture union. Osteoporosis in HIV (31) has been described and there are implications regarding fracture fixation methods, further fracture prevention as well as delayed fracture union. To the orthopaedic surgeon, maybe the most important consideration is the personal lifetime risk of viral transmission during surgery

Risks of Viral Transmission

The Orthopaedic Surgeon is inherently at a higher risk of exposure to the HI Virus compared to most Surgeons. This is due to among others; extensive haemorrhage associated with orthopaedic trauma and surgery, large incisions, bony spikes, and most of the time prolonged operating times.

A 1996 American study claimed that Orthopaedic Surgeons practicing in areas with high prevalence of HIV infection may expect that up to 7% of their patients who undergo emergency procedures and 1% to 3% of those who undergo elective surgery will be HIV positive (5).

The risks of intra operative HIV transmission has been described as relatively low and is best described as a cumulative risk over the surgeon's lifetime. Wright and McGee reported a life time risk of between 1 and 4% (6). The reported risk for HIV-1 transmission associated with a percutaneous exposure to blood from an HIV-1-infected patient was reported by Henderson et al as approximately 0.3% per exposure (32). With the advent of post operative prophylaxis, a 79% reduction in risk of viral transmission has also been reported (6)

Consten et al 1995 reported that figures from a western setting will always differ significantly with those from an African setting ; (0.1% and 1.5% respectively) from a report in Zambia(7). This difference was described as being due to the higher population seroprevalence. (22.3% in Zambia compared with 0.23 % in the Western setting).

Polytrauma

A poly traumatized seropositive patient presents with a unique and significant problem to the orthopaedic Surgeon and indeed the receiving trauma Surgeon. The main considerations are the initial severe insult itself,

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severe blood loss, fat embolism and possible wound contamination. Most of these patients will end up in intensive care units where a significant number of them will develop secondary problems as a result of the initial insult.

Afessa and Green, in a 2000 American study on HIV in an ICU setting, reported that ARDS developed in 22% of patients, pneumocystis carinii pneumonia in 14%, SIRS in 75% and one or more organ failures developed in 78%. The actual and predicted mortality rates were 29.6% and 45.2%, respectively. The most frequent immediate cause of death was bacterial infection (8).

Closed fractures

The main concern with closed fractures in the HIV setting is the risk of post operative wound infection if the treatment of choice is internal fixation. Harrison in 2005 revisited two earlier studies which had showed post operative infection rates of up to 40% in HIV positive patients by standardizing pre and intra operative routine.

These standardized procedures included the use of prophylactic antibiotics and meticulous aseptic techniques pre and intra operatively. He reported a post operative infection rate of 3.5% which was significantly lower than the initial 40% previously reported (1). He concluded that surgical wound contamination, not the immune status of the patient, informs more on the rate of post operative infection in closed fractures requiring surgical intervention.

Open Fractures

Open fractures inherently present with higher infection rates in the immunocompromised. This is mainly due to wound contamination at the time of injury. The rate of contamination is directly proportional to the magnitude of the fracture.

Employing the standardized Gustillo Anderson open fracture grading, Harrison et al in 2004 reported infection rates of 1 out of 10 Gustillo grade II fractures and 8 out of 18 Gustillo grade III fractures. Incidentally, of the 18 grade III fractures, all 4 HIV positive, and 4 out of 14 HIV negative patients had infections.

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Harrison (1) in an earlier paper reported figures as high as 42% rate of sepsis in HIV positive patients compared with 11% in controls. The determination here is that fracture type (open) and grade is a bad prognostic factor in HIV positive patients.

Fracture healing

There is an increased incidence of delayed healing and non union in patients with HIV. Earlier reports specifically looking at Antiretrovirals (ARVs) since their increased use in HIV infected patients, suggested that the main etiologic factor in the pathogenesis of delayed bone healing and non unions is indeed the Antiretrovirals themselves.

Richardson et al recently suggested that there are other more important factors which act directly to influence the inflammatory response and therefore the bone healing process. These factors include the Cytokine levels especially the TNF-a, direct inhibition of bone formation by the virus and compromised blood supply (9) (HIV has been proven to be etiologic factors in osteonecrosis**)** (33).

Staging

In order to effect comprehensive management of the epidemic by all stake holders, it is pertinent to use one of two staging systems for the HI virus infection: The American Centre for Disease control classification, or the World health Organization classification.

HIV disease staging and classification systems are critical tools for tracking and monitoring the HIV epidemic and for providing clinicians and patients with important information about HIV disease stage and clinical management(10).The CDC staging system assesses severity of the HIV disease according to the CD4 count and the presence of specific HIV related conditions while the WHO classification can be used readily in resource-constrained settings without access to CD4 cell count measurements or other diagnostic and laboratory testing methods. The WHO system classifies HIV disease on the basis of clinical manifestations that can be recognized and treated by clinicians in diverse settings, including resource-constrained settings, and by clinicians with varying levels of HIV expertise and training (10).

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HIV Epidemiology Studies

The Global rates of HIV (12)

According to the WHO/UNAIDS report of 2008, the global estimates of people living with HIV was 33, 000, 000 in 2007, up from 29 500 000 in 2001. Sub Saharan Africa accounted for almost 66% of the whole estimate in 2007 at 22, 000, 000

The Southern Africa rates of HIV

The UNAIDS/ WHO report of 2002 (11) on the HIV prevalence revealed that 5 countries with the highest HIV seroprevalence are in Southern Africa. The recent 2008 WHO/UNAIDS report on the global HIV epidemic reported two estimates from 2001 and 2007. (12) These estimates included all adults living with HIV regardless of whether they had clinical symptoms clinical symptoms or not.

According to these estimates, there has been a general increase in the total numbers of people living with AIDS in Southern Africa. In the 5 years between 2002 and 2007 all countries recorded an increase except Zimbabwe. The reason for Zimbabwe could be high rate immigration as a result of socioeconomic factors in the period. WHO emphasizes that due consideration should always be taken in interpreting the results as they (results) are estimates and should be treated as such.

South Africa has the highest number of people living with HIV due to its large population size and maybe better statistical management of data. Botswana has the highest rate per capita. (19%) compared to (12%) in South Africa (13)

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The South African HIV epidemiologic studies

HIV Prevalence

HIV Prevalence		
Year	**HIV Prevalence (%)**	**95% CI**
2002	**11.4**	**10.0 – 12.7**
2005	**10.8**	**9.9 – 11.8**
2008	**10.9**	**10.0 – 11.9**

Table 1 The South African HIV prevalence (2002 to 2008) (18)

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In South Africa, most HIV epidemiologic studies have extrapolated data from Antenatal clinic (ANC) surveys for national prevalence estimates. More recently however, there have been community based epidemiologic studies to inform on the prevalence, and this proof to be more accurate and representative.

According to the South African department of health report of 2000 (14), 80% of pregnant women attend public ante natal clinics. A recent (2007) report on blood samples of 33,488 women attending 1,415 antenatal clinics across all nine provinces, estimates that 28% of pregnant women were living with HIV in 2007 (20).

Shisana et al 2004 reported on a community based study of 10, 197 randomly selected households including 8428 individuals. Their findings suggested a general population seroprevalence of 11.4% (12.8% in females and 9.5% in males) (15). 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.

Another community based study by Sishana et al 2005 reported on a seroprevalence of 10.8% (16). Table 2 compares the various national estimates.

Study	*Type*	*Numbers*	*Prevalence*
Department of health 2007	Antenatal Survey	33,488	28%
Sishana et al 2005	Community based survey		10.8%
Sishana et al 2004	Community based	8428	11.4%
WHO/UNAIDS 2007			18.1%

Table 2 – Estimated incidence of HIV in South Africa

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Rates among health care workers

Motivated by the fact that most HIV epidemiology studies in healthcare workers generally focussed on the occupational exposure risk than the actual Seroprevalence, Sishana et al 2004 undertook a study at a few (5%) healthcare facilities in South Africa and reported a 15.7% rate. (20.3% in non professionals and 13.7% in professionals) (17). Connelly et al 2007 reported an overall incidence of 11.5% in health care workers in two Johannesburg teaching hospitals (18).

Rates in Medical students

A recent study at the University of the Witwatersrand among 5th year medical students revealed a 0% Seroprevalence though the sample was low (39%) with a total number of 74 responders out of a possible 190 (19).

Rates in Surgical admissions

Martison et al 2007sampled 537 patients out of a possible 1000 surgical patients at the Baragwanath Hospital Soweto South Africa (a teaching hospital of the University of the Witwatersrand). The study reported a 32.8 % rate of HIV in this group (20).

Bowley et al 2002 reported a 27% rate of HIV in major trauma patients admitted in the trauma unit at the Johannesburg Hospital trauma unit (A level l trauma Unit at a teaching hospital of the University of the Witwatersrand) (21).

Rates in Paediatric admissions in Hlabisa Hospital

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. Yeung at al reported on 281 consecutive children admitted in the hospital over a 4 month period. They reported a seroprevalence rate of 26% (22).

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Rates of most at risk persons in South Africa

Trauma of whatever sort, invariably affects the young, economically active persons with a higher propensity of multiple sexual contacts. Simbayi et al 2009 collated certain specific groups as most at risk groups. The most at risk are young African males and females between the ages of 20 and 49(23). (See table 3)

Most at risk population	*n*	*HIV+%*	*95% CI*
African females 20-34	**1395**	**32.7**	**29.7-36.0**
African males 25-49	**944**	**23.7**	**20.1-27.7**
Males 50 years and older	**946**	**6.0**	**4.4-8.1**
Men who have sex with men	**86**	**9.9**	**4.6 to 20.2**
People who are high risk drinkers	**965**	**13.9**	**10.4-18.2**
People who use drugs for recreational purposes	**490**	**10.8**	**7.2-15.8**
People with disabilities	**458**	**14.1**	**9.9-19.6**

Table 3 - HIV prevalence among the most at risk populations (23)

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Response rates to recruitment for HIV testing

Voluntary Counselling and testing (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 (24).

There have been several studies that have reported on the VCT efficacy but the main problem has always been low rate of recruitment of eligible candidates who can offer informed consent. Several factors have been postulated and they range from indifference, the stigma attached to seropositivity, inadequate counselling to apathy. A 2005 study by Shisana et al is a case in example (See table 4) (25).

Reason for not testing	*Numbers*	*%*
Apprehension about Blood sampling	1560	57.9
Religious believes	422	15.7
Not want to know result	195	7.2
Not willing to participate	104	3.9
Fear of breach of confidentiality	86	3.2

Table 4. Reasons for non response to interview and HIV Testing

Bassett et al 2007 in an outpatient based study in Kwazulu Natal reported a response rate of 48.6% (n = 1414) (26). Kalichman et al 2003 recorded a response rate of 47% in study on HIV testing attitudes in Cape Town South Africa (27).

Community based studies recorded superior recruitment rates mainly because of more information being given to potential participants and the employment of VCTs. Karl Peltzer et al in 2009 reported a capture rate of 73% in their study; Determinants of knowledge of HIV in South Africa (28) while Sishana et al reported a 55% rate in their report on National HIV incidence in 2005 (24).

In 1997, thirteen studies located in west (Abidjan, Bobo-Dioulasso), east (Addis Ababa, Nairobi, Mombassa, Dar Es Salaam) and southern Africa (Blantyre, Lusaka, Harare, Soweto, Durban) were included in a cross-sectional mailing survey about the acceptability of VCT and interventions in antenatal clinics. The median overall acceptability of VCT was 65%, ranging from 33% to 95% overall (29).

From the available literature, one can conclude that most people will voluntarily consent to HIV testing if there are proper and coordinated Structures like VCTs. The question that still remains however is; would most people consent to HIV testing after an acute traumatic event (in this case an Orthopaedic traumatic event)

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Chapter 2 – Research Question

Background

The Johannesburg Hospital trauma unit (a level 1 trauma centre) caters for mainly the suburban and inner city apartment areas of the city of Johannesburg South Africa. It is one of three major referral centres in the South Gauteng area receiving patients from throughout the province, neighbouring provinces and neighbouring countries. In 2006 the unit had an annual workload of about 20 000 patients including an excess of 2000 admissions and 1700 major resuscitations (28). A sizeable number of these admissions are referred for management in the Orthopaedic trauma unit.

The rate of HIV trauma admissions in this unit (Johannesburg hospital trauma unit) for major trauma was determined in 2002 to be almost a third of all admissions (27%) (21). An almost similar result was revealed for surgical admissions at the Baragwanath Hospital, another Johannesburg based Wits University teaching hospital, in 2007(20). The seroprevalence in the Orthopaedic trauma unit has thus far not been determined.

Currently in the teaching hospitals of the faculty of health sciences, Antiretrovirals are offered to selected patients who present with an absolute CD4 count of less than 200. Figures of these groups of patients in our department have never been determined as trauma does not form part of the WHO criteria for HIV (29) hence most of these patients who qualify for treatment have never been determined and are lost only to present later with complications.

Objectives

Numerous epidemiology studies have been undertaken in various departments and units in South Africa but non in the acute Orthopaedic trauma setting. The objectives of this study are:

To firstly determine the seroprevalence of HIV in our setting (acute orthopaedic trauma)

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To establish how the prevalence compare to the national averages and rates in other similar studies

To establish if informed consent has a bearing on the response rate to recruitment for future research in HIV

Research Question

Main Question

What is the rate of HIV infection in an urban Orthopaedic teaching hospital setting.

Secondary Questions

Do these rates compare with other studies in more or less the same settings or other settings.

What are the implications of informed consent on future HIV related research

Significance

As far as the author has researched, there haven't been any reports on the epidemiology and rate of HIV in an acute Orthopaedic trauma setting in South Africa. Most studies have been based on data from ANC clinics, their supporting VCTs and recently from community based studies where most national estimates are extrapolated from.

Orthopaedic trauma units have to formulate protocols in managing acute trauma cases in view of the current HIV epidemic. These protocols should among others take into consideration the current seroprevalence, the risks to the Orthopaedic Surgeon and other care givers and most importantly the rates of complications that occur in the immunocompromised.

Future studies in HIV will have to consider improvements in patient's response rate to recruitment, hence a need for baseline results and evaluation which this study will offer.

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Chapter 3 – Study design and Methodology

An audit carried out in the Johannesburg Hospital Orthopaedic Trauma Unit in a six month period including June and December 2008 to determine the seroprevalence of HIV in this group of patients.

All patients admitted to the Orthopaedic trauma unit who could consent to HIV testing were eligible for inclusion in the study.

Inclusion criteria

Acute Orthopaedic trauma patients requiring admission
Glasgow Coma Scale of 15/15
Age above 18 – able to consent to HIV testing

Exclusion Criteria

Age less than 18
GCS < 15/15

Methodology

Patients were recruited to the study after admission to the Orthopaedic trauma unit or to the surgical trauma Unit (in cases of Poly trauma).

The Patient's cognitive function was assessed by 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 an HIV testing was offered.
A wish to know or be blinded to the result was communicated and documented.
Successful recruitment was then followed up by a signed witnessed consent form and blood sampling.
Samples were analyzed by way of a rapid HIV test and a confirmatory Eliza if positive. This was undertaken by the NHLS laboratories at the Johannesburg Hospital.

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Those patients that tested positive for the virus and had expressed the wish to know the result were then counselled and offered referral to an HIV centre for follow up
In most cases of a positive result, a CD4 count was determined and those that qualified for treatment were referred to their local HIV clinics for follow up after discharge from the hospital. Patients that tested negative were not retested

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Chapter 4 - Results

This chapter will demonstrate the demographic details of the participants in total, the recruitment rate and reasons for non recruitment and the seroprevalence of HIV from this study.

Total number of patients admitted (June to December 2008) = 797

Total number of patients excluded = 159

Total number of patients eligible for study = 638

Total number of patients who declined testing = 392 (61%)

Total number who participated in the study = 246 (39%)

Demographics of participants

Age distribution: 18 to 92 years

Average age: 37

Gender:

Male: 66% (n = 414)

Female: 34% (n = 224)

Overall rate of HIV infection

Total tested =246

Total Seropositive = 57 (23%)

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Chapter 5 - Discussion

Overview

According to the UNAIDS/WHO report, the five countries in the world with the highest HIV prevalence are in Southern Africa, and South Africa has the highest estimated number of patients living with HIV (5,600,000)

This unfortunate data however puts South Africa in a unique position to lead the world in terms of research and output in dealing with the epidemic. Epidemiologic studies however have really been limited to extrapolations from data derived from women attending public Antenatal clinics in South Africa. Due to the entrenched human rights legislation in South Africa, research in HIV/AIDS can be hampered by issues of informed consent in obtaining suitable numbers of HIV patients for research.

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Comparison with similar studies

Study	*Group*	*Participants(n)*	*Prevalence*
Bowley et al 2002	**JHB Hospital Trauma patients**		**28%**
Martison et al 2007	Baragwanath Hospital Surgical patients	537	32.8%
This study 2008	**Orthopaedic trauma JHB Hospital**	**246**	**23%**
Yeung et al 2000	Hlabisa Hospital South Africa rural)	281	26%
Department of health 2007	**Antenatal Clinics**	**33,488**	**28%**

Table 5 – HIV prevalence rates studies

Recruitment rates with informed consent

Many studies on prevalence and epidemiology of HIV, are hampered by the low response rate to recruitment (see Table 6)

Study	*Group*	*Numbers*	*% recruitment*
This Study 2008	Orthopaedic Trauma Johannesburg	246	39%
Martison et al 2007	General Surgery Baragwanath Hospital	537	53.7%
Bassett et al 2007	Durban OPD	1414	48.6%
Kalichman et al 2003	Cape town		47%
Karl Peltzer et al	VCT		73%
Keller et al 2009	Medical Students Johannesburg	74	39%
Connolly et al 2007	Helen Joseph/ Coronation		
	Overall	1813	82.3%
	Doctors	49	24.9%
	Nurses	708	91%
	Allied Workers	278	88.8%
	Community based		55%
Cartoux M et al 1998	13 Centres in Africa		65%

Table 6: Recruitment rates in HIV Seroprevalence studies

HIV seroprevalence

HIV seroprevalence in South Africa 2008 stands at 10.9 % of the population at large. This prevalence will however be different in different population groups. High risk groups have been reported as young women and men between the ages of 20 and 49 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 Bowley (21) and Martison (20) show a seroprevalence of over twice the national averages. One would from this evidence extrapolate that; almost a quarter of all patients that present to casualties after a traumatic episode will most likely be HIV positive.

The role of Voluntary Counselling and Testing Centres

HIV testing is a critical entry point to life-sustaining care for people living with HIV. HIV testing should entail a confidential dialogue between client and care provider. The expected outcome of this should be the client being able to cope with the stress and make personal decisions related to HIV and AIDS. Combined with Testing (VCT) one would then be in a position to amplify the benefits of both (30).

It has been proven that this strategy if used in focused dedicated settings is extremely successful (see chart 1).

In the initial VCT strategy implementation, there is a lot of none acceptance (of VCTs) in many communities. After this initial apathy, there is progressive acceptance over the years and the benefits are tangible and there are specialized individuals who are trained for the purpose.

Table 6 clearly shows the huge discrepancies in the response rate between studies that were VCT aligned and those that the researcher also doubled as the counsellor. Rate (of non response) from this study is a case in point. (39%) recruitment rate compared to 65% in a 13 centre study by the Cartoux group in 1998) (29). Future HIV studies should therefore be aligned to VCTs to maximize the recruitment rate.

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Chart 1– Benefits of VCT (30).

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Response to recruitment analysis

From this study, there is a very high rate of non response to recruitment (61%). This can have a bearing on the interpretation of results obtained. According to Sishana, non response may or may not bias HIV prevalence estimates specifically on population based surveys. The important factor that would determine bias would be the type of sample. If it is a truly random sample, then there will be no bias. Whether this is true for other non community based surveys is not clear (16).

Table 4 suggests various reasons for non response but more relevant to this study, there are other possibilities which need to be taken into consideration. Some patients would most likely already know their status and others could believe, fairly on unfairly that they couldn't possibly be exposed to the virus. This can clearly be seen in the low response rates of doctors and medical students in the studies by Connelly (18) and Keller (19) respectively. The fear of compounding the acute traumatic episode and the emotional burden of a positive result cannot be overemphasized. Many non responders in this study cited the need to go though the traumatic event before considering testing.

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Limitations of the study

The most significant limitation was a low response rate to recruitment which has a bearing in drawing accurate conclusions from our results. There was a high turnover of patients such that a lot of patients were discharged before getting an opportunity to be recruited.

The lack of qualified, dedicated counsellors was an important factor in the low response rate to recruitment.

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Chapter 6 - Conclusions and recommendations

Conclusion

The seroprevalence of 23% in our Orthopaedic trauma unit is relatively high and carriers with it an increased lifetime risk of HIV transmission to the Orthopaedic Surgeon.

This study shows a higher seroprevalence compared to the national averages.

Proper, dedicated counselling in VCT centres is superior to individual researcher counselling in improving the response rate to recruitment for studies in HIV

Recommendations

Orthopaedic Surgeons should improve their efforts in protecting themselves against accidental viral transmission during operations. They have an increased cumulative lifetime risk in view of this high seroprevalence.

Orthopaedic units should consider teaming up with HIV research units and establish in house VCTs. This in the interest of improved successful recruitment to future musculoskeletal HIV research.

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