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The socio-demographic characteristics of employees who had HIV testing in 2005 within selected companies on the Direct AIDS Intervention Programme.

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A research report submitted to the University of Witwatersrand, Faculty of Health Sciences, School Of Public Health in fulfillment of the requirements for the degree of Master of Public Health.

Abstract

Background and Objectives: South African businesses are feeling the brunt of HIV & AIDS and experiencing losses in productivity and profitability due to high levels employee absenteeism, sick leave and disability as well as the added costs of recruiting and retraining. These losses have had a negative impact on the national economy and in response some employers have agreed to recognize that HIV is a business issue and introduced HIV workplace programmes. It is not really known whether the employees that are most at risk are actually testing through these employer funded programmes in order for them as well as the employer to gain maximum benefit. There is a need to identify barriers to HIV testing so that workplace programmes can design better targeting strategies.

Methods: This study was a retrospective review and analysis of the 2005 records of tested and untested employees in 8 companies registered on the Direct AIDS Intervention (DAI) Programme.

Results: Overall there was very poor utilization of Voluntary Counselling and Testing (VCT) services with an average uptake of 13%. Multivariate logistic regression analyses showed that race, sex, period of employment and sector were significantly associated with HIV testing while there was no association with age and marital status. In general, Blacks were more likely to be tested for HIV (OR(95%CI)1.47(1.24 – 1.74);p<0.0001) and so were Coloureds (OR(95%CI) 1.79;(1.48 – 2.18); p<0.0001) and Indians(OR(95%CI)1.35(1.04 – 1.76);p=0.03) when compared to Whites. Males were less likely to have an HIV test (OR 0.69;p<0.0001) compared to female employees. Those who had been employed for more than one year were more likely to test (OR(95%CI); 1.83(1.37 – 2.43);p<0.0001) than newer employees. Employees who worked within a manufacturing company were more likely to have an HIV test (OR(95%CI)

2.39(1.96 – 2.92);p<0.0001) and so were those employed by a health/research companies (OR(95%CI) 2.83(2.11 – 3.81);p<0.0001) compared to those that were employed by a services sector company.

Conclusions: The low uptake of VCT in this study is attributed to stigma which if not addressed will to continue to have a negative impact on the success of workplace programmes. Employers need to develop specific education activities in order to protect employees from discrimination and thus build confidence in the independence of the programmes thereby encouraging utilization.

Declaration

I, Thembisile Lynette Xulu declare that this research report is my own original work. It is submitted to the University of Witwatersrand, Faculty of Health Sciences' School of Public Health, in fulfillment of the requirements for the degree of Master of Public Health. It has not been submitted before for any degree or examination in any other University.

_____ _____

Signature Date

Dedication

To GOD almighty, through HIM all things are possible.

To the South African workforce which continues to work tirelessly towards improving our country's economy despite this ravaging pandemic. To the hundreds of employers who have done the right thing allocated time and resources towards the fight against HIV and AIDS not only in their workplaces but also in their communities.

To my family and friends who have always believed in me.

To Musawenkosi Xulu, my dear husband, my friend, my personal advisor, the roadmap of my life. I would not have completed this without his encouragement.

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To Dr Ian Sanne for identifying the talent, for giving me a chance, and for being such a great mentor.

To Babatyi Malope who only became part of this work in May 2008, this would not have been possible without her.

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Chapter 1. Introduction

1.1 Background

The Joint United Nations Programme on HIV & AIDS (UNAIDS) reported that by 2005 there were 40.3 million people living with Human Immunodeficiency Virus (HIV) worldwide, of which 64 % (25.8 million) were in sub-Saharan Africa. About 5 million of these were new infections and 3.2 million of these incident cases were reported to be in sub-Saharan Africa. Overall, 3.1 million AIDS (Acquired Immune Deficiency Syndrome) related deaths were recorded in 2005. Between 1981 and 2005 HIV & AIDS had killed more than 25 million people globally. In South Africa, the national HIV prevalence increased from less than 1% in 1990 to an overwhelming 25 % by 2000 (UNAIDS, 2005). The huge bulk of people living with HIV & AIDS (PLWHAs) are in economically active age either as employees, managers or employers (SABCOHA, 2008). HIV & AIDS has been linked to increasing labour costs in South Africa which threatens the competitiveness of African businesses in the global marketplace and has a negative impact on national economic and social development (Rosen et al., 2004).

This impact of HIV & AIDS combined with the recent national downturn in the South African economy threatens to overthrow South African confidence in terms of global economic stability. Currently the national business newspapers highlight an increase in the shortage of business and technical skills and that companies find it difficult to replace personnel with these qualities within a short period of time (Business Times Careers, Sunday Times Newspaper, Sunday June 8, 2008). It is assumed that South Africa is facing its worst economic slump in the past 10 years and this threatens to prevail for some time. If workplace interventions on HIV & AIDS are not properly implemented and responses to available programmes are minimal it can further impact on the current unsteady economic status.

There is increasing global awareness of HIV & AIDS; however it is emphasized that knowledge and education about HIV & AIDS at community levels remains inadequate. Education will have a significant impact in reducing HIV transmission (UNICEF, 2004) and will promote changes in sexual practices. Prevention programmes have been promoting HIV testing as one possible way to combat the spread of the disease. The idea is that HIV testing will hopefully lead to behavior and attitude change. With the advent of antiretroviral therapy (ART), HIV testing has become even more important for early diagnosis and intervention. HIV infected individuals who are diagnosed early can be educated and counseled and have good quality of life. They can also be given medication to help them prevent opportunistic infections. Thus, knowing one's HIV status is important not only to protect oneself and others and but also to ensure early access to comprehensive support and treatment services where necessary.

The South African government has recently launched a National Strategic Plan (NSP) for HIV and AIDS, Sexually Transmitted Infections (STIs) and Tuberculosis (TB) for the years 2007 to 2011. The interventions needed to reach the goals of the NSP are structured under 4 key priority areas and these are:

- Prevention
- Treatment, Care and Support
- Research, Monitoring & Surveillance
- Human Rights and Access to Justice

The aim is to reduce the rate of incident HIV infections by 50% by 2011 and to therefore ensure that the bulk of South Africans keep their current HIV negative status. Under the priority area of prevention there is emphasis on the creation of atmospheres that allow easy access of HIV testing and increased implementation of HIV and AIDS interventions in the workplace. Priority number 2 of the NSP is treatment, care and support and this aims to increase the number of people reached with Voluntary Counselling and Testing (VCT) activities by using diverse VCT models to fit different settings and thus increase the uptake of VCT and promote frequent HIV

testing. Rapid scale up of HIV testing is of utmost importance if the commendable goals set by the NSP are to be met (National Department of Health, 2007).

HIV has had such a negative impact on workforces in certain countries that employers have recently started to introduce HIV workplace programmes. These are interventions which are responding to the call by organizations such as the International Labour Organization (ILO) that HIV & AIDS is a business issue and that it needs to be addressed with the same importance as any other risks which a business may face (McDonald, 2004). One reason for introducing such interventions is to allow staff to get access to antiretrovirals at no extra cost to the individual, and that the business in return gains a near maximally productive employee who is well and at work for a longer period of time. This employee would have otherwise been sick or absent, costing the company time and money. When the employee eventually goes on disability or dies, the employer would have to replace the employee, resulting in the extra cost of recruitment and retraining (Rosen et al., 2007).

1.2 Problem Statement and Justification for the Study

A major component of HIV Workplace Programmes is the prevention of rapid disease progression and the prevention of incident infections, an important part of which is access to VCT. HIV testing is important within workplace programmes not only because it is the entry point to antiretroviral therapy (ART) and a better quality of life for the employees but also because it is essential to programme success from the employer's viewpoint in terms of reducing labour costs. There is a need to identify the barriers to HIV testing so that HIV workplace programmes can design better targeting strategies. Improving the targeting strategies will likely result in a higher uptake of VCT and this is most important since VCT will continue to act as an important point of entry to a range of support and treatment services for people living

with HIV & AIDS (PLWHA). Within the Direct AIDS Intervention (DAI) Programme, it is not really known who gets tested and why they choose to test, nor is it known who does not test and why they choose not to. Are those who are most in need of this service accessing it? Are those who are considered to be at highest risk being tested?

An attempt to answer some of these questions will be made by reviewing the records of the employees who tested in 2005 on the Direct AIDS Intervention (DAI) workplace programme. This study intends to describe the socio-demographic characteristics of employees who had HIV testing VCT within private sector workplace programmes in a South African setting. The study will then attempt to assess whether there is an association between these socio-demographic characteristics and HIV testing. The study also aims to identify whether there are any significant differences between those people who test with early stage HIV disease (CD4 $\geq$350) vs. those with late stage disease (CD4 < 350).

1.3 Literature Review on Uptake of VCT

This review covers relevant and recent publications relating to the uptake of VCT within different settings in Southern Africa and outside countries. Several studies have looked at the characteristics of people who come forward for testing as well as the barriers to HIV testing.

1.3.1 Uptake of VCT in other workplace HIV programmes

In 2003, gold mine workers in South Africa (Welkom) were interviewed to identify the attitudes that influence the uptake of VCT. About 33% of the miners had undergone HIV testing and issues related to physical well being were considered to be most important in making the decision to go for HIV testing. The major barriers to HIV testing were fear of turning out to be HIV positive and the consequences i.e. stigmatization, disease and death. It is important to note

that this was prior to the government roll out of an ART programme but some companies were already starting to offer VCT and basic HIV care services to their employees. Only 14% of the sample agreed that they would be more likely to test for HIV if ART became available. This suggested that high impact community education programmes are essential if the introduction of ART is expected to encourage the uptake of VCT (Day et al., 2003).

In 2000 to 2001 workforces in South Africa, Botswana and Zambia were surveyed to determine HIV prevalence among the employed sector which is largely comprised of male populations. The average HIV prevalence in the sample was 16.6% and for South Africa the estimated prevalence was 17.9%. Among industrial sectors, mining and metal processing had the highest infection rates. The vast majority (85%) of the employees of known sex who tested were male and they were more likely to be infected than were females. Contract, unskilled and semi-skilled workers were much more likely to be infected than were skilled workers and managers. The researchers concluded that among the formally employed workers in Southern Africa, the prevalence estimates show different patterns to antenatal surveys and these could still be used to strengthen HIV workplace programmes (Evian et al., 2003).

A Zimbabwean study looked at the uptake of workplace VCT and company employees could either have testing on-site (i.e. within their occupational health clinic) or off-site testing (i.e. obtain a coupon and get tested in an external facility). The finding was that there was a higher utilization of on-site services with a mean uptake of 51% while this was 19.2% for off-site testing. Multivariate analysis showed that the factors which were significantly associated with HIV testing were: being 24 years or younger or being 45 years or older, being unmarried, having previous exposure to TB at home, being a manual laborer and a low scoring of one's own health. HIV positive employees were less likely to be tested on site and were more likely to take

coupons to use for off-site testing compared to their HIV negative counterparts. Only 20% of the employees who took the vouchers actually used these to test. The authors concluded that in order to curb the rapid rise of the HIV pandemic in Africa, highly effective VCT strategies were necessary and that workplace offered VCT which is linked to a care programme could result in much higher coverage (Corbett et al., 2006).

Heineken's Operational Companies in Rwanda identified 109 HIV positive individuals after four years of VCT. Results of a seroprevalence survey which was performed with an overall participation rate of 69.4% for employees suggested that 90% of HIV positive employees had been reached through the 4 years. The program was successful because even though VCT uptake was initially low, targeted education and awareness campaigns turned this situation around and lead to confidence that employment was not at risk and that testing opened doors to care, treatment and support services. Stigma and mistrust were major factors influencing uptake of VCT services and these were considered to be more significant than factors such as fees and convenience. The main barriers to HIV testing for employees were real and perceived breaches of confidentiality in the workplace programme as well as fear of losing one's job if one was found to be HIV positive. Losing rank or being demoted because of HIV status were key concerns for managers. The employees who came forward for testing in the first 2 years of the programme had much lower CD4 cell counts than those that were tested last 2 years *(Five Years Experience of VCT: Heineken's HAART Programme in Rwanda, 2005).*

1.3.2 Uptake of VCT in HIV programmes outside the workplace

Utilization of public sector VCT services in the township areas of Cape Town i.e. Masiphumelele Clinic, Khayelitsha Site B General Clinic and Langa Clinic has been studied. The predominant finding was that the majority of people who test at state facilities are lower income earners and

very few high income earners use government facilities for VCT. Three out of four of VCT clients came from the poorest 40% of South Africa's urban population, while one in ten clients belonged to the urban population's highest 40%. In general, VCT clients tended to be of a lower socio-economic status on average than patients attending these clinics for other reasons (Thiede et al., 2004).

At the 2004 XVth International AIDS Conference in Bangkok, a mobile HIV testing model that helped to eradicate the barriers to HIV testing in Africa was presented. The study was done in Epworth and Seke in Zimbabwe where a mobile testing vehicle routinely rotated around six market places in villages and townships offering free VCT and using the rapid HIV test. Prior to the study, the researchers had identified logistical factors such as paying for the test and the cost and convenience of travelling to the city as significant structural barriers to HIV testing. The identified psychological barriers were the social stigma associated with being seen to be going into an HIV testing site, the assumption that testers were themselves HIV positive and the fear of learning that one is HIV positive. Community Advisory Boards (CAB) were initiated to manage these concerns and communities actively participated in discussions around HIV testing through interaction with the members of the CAB who were educating them. The idea of having a rotating mobile testing van in busy areas then became very familiar and acceptable to the community and thus helped to reduce stigma (Khumalo-Sakutukwa et al., 2004).

In Jamaica, a questionnaire measuring many aspects of HIV awareness as well as related behaviours and attitudes was administered to a large sample of university students to examine the correlates of HIV testing. Logistic regression analyses showed that youth, those who were married, those who had been to an HIV information session, and those who had a known contact with HIV & AIDS were more likely to report having undergone HIV testing previously. The conclusion was that even though there was no direct association between risky behaviours

and HIV testing, testing is still very important as an initial step for individuals to protect themselves (Norman & Gebre, 2005).

In Los Angeles County, the prevalence and predictors of HIV testing in a probability cluster sample of homeless women was studied. This group of women had a prevalence of >1% and HIV testing within the previous year was most strongly associated with a pregnancy in that year and with having routinely accessed health care services. Previous work on HIV testing among other sub-groups of the poor based in urban settings suggested that being young, of non-minority race/ethnicity, having a history of risk taking behaviours and having a regular source of care may be noteworthy predictors of HIV testing (Herndon et al., 2003).

In California, runaway adolescent youth who were homeless were interviewed on their knowledge, attitudes and behaviours related to HIV & AIDS including the experience of having had an HIV test. More than half of these young people had tested and it was found that a history of a sexually transmitted infection, 5 or more years of being sexually active, use of intravenous drugs, and age were independent predictors of HIV testing among this group(Goodman & Berecochea, 1994).

In summary, illness, manual labour, sex, age and marital status have been identified by different researchers as significant predictors of HIV testing. Cost, convenience, stigma and fear of losing employment or being demoted have been reported as barriers to VCT. The results of this study are expected to have some similarities to SA workforces that have been studied previously, but some differences are expected due to the unique study setting. There are some similar predictors reported in the United States, however they should be carefully considered for applicability to other parts of the world where the disease pattern is different and the prevalence is higher including South Africa.

1.4 Aim of the Study

1. The main aim of this study is to describe the social and demographic characteristics of employees who had HIV testing in 2005 in comparison to the untested group within selected companies on the DAI Programme.

1.5 Study Objectives

1. To describe the socio-demographic characteristics of the employees who tested and those who did not test in 2005, including age, sex, race, marital status, years employed by the company, employer and sector of employment.
2. To assess whether these socio-demographic characteristics are associated with HIV testing and in addition to asses which socio-demographic variables have a significant impact on HIV testing.
3. To assess whether there are any socio-demographic differences between HIV positive people who test in early stages of HIV disease (high CD4 counts) and those who test with late stage HIV disease (low CD4 counts).

Chapter 2. Methodology

This chapter describes the study design, company selection methods, sample sizes and statistical methods used for analysis of data in this study. There were 34 companies enrolled on the DAI programme at the end of 2005 but we have only analyzed the data of 8 companies and the reasons for that will be explained in this chapter.

2.1 Study Design

This is a retrospective, cross sectional study involving a record review of the overall workforce data and the VCT records (which include CD4 counts for people who test HIV positive) of all employees who had access to testing via the Direct AIDS Intervention programme in 2005. Only companies who had sufficient employee information where included in the final analysis (section 2.3).

2.2 Study Setting

DAI is a comprehensive workplace disease management programme established in 2002 managed by a division of Alexander Forbes Financial Services and Right to Care (RTC), a non-profit HIV treatment provider. This programme services private companies who can afford to be on an HIV workplace programme. Most of the companies are large corporate clients that have operations nationally and some are multinationals. They comprise mainly of a skilled workforce with unskilled or semiskilled services mainly being contracted out. The contractors in some companies are allowed to access HIV testing at the employers' cost but they do not have access to the benefits of the comprehensive package of care which includes ART.

Within the DAI workplace programme employees can get access to the following services via VCT:

a) **Medical care**: includes antiretroviral therapy, prevention and treatment of opportunistic infections and other HIV associated conditions.
b) **Counselling**: involves continuous support in terms of nutritional advice, adherence, coping with side effects, disclosure issues and general family counselling on any health issues.
c) **Social support**: access to available support structures within DAI and the company Employee Assistance Programmes (EAP) which may include legal advice. The counsellors also refer to structures outside DAI/EAP when necessary (e.g. legal aid and social welfare department).

RTC maintains a database of all the employees of all the client companies as well as a database of all HIV tests done by the employees of these companies. This database is necessary to verify that employees who wish to register on the programme are actually employed by the client companies and for continuous support of the employees.

2.3 Selection of Companies for Analysis

At the end of 2005 there were 34 companies enrolled on the DAI Programme that could be analyzed for this study. Of the 34 companies, 4 did not have an electronic human resource database in 2005 and 7 did not have any workplace VCT in the same year. This left 23 companies with databases that could be analyzed. The study initially involved describing the following 8 variables: - age, sex, race, marital status, employment category, years employed in the company, employer and sector of employment for all the employees. Companies which did not have sufficient information on most of these variables were excluded.

The format of the company databases kept by their human resources department varied throughout the companies. On further examination of the employee databases, very few

companies had all of the required socio-demographic characteristics available as fields for analysis. Fifteen of the companies had between 2 and 5 of the required fields missing and were excluded from the study. The “employment category” variable was mainly not available in most company employee records and was totally excluded from the analysis. Eventually, a total of 8 companies that had most of the required socio-demographics in the company databases were analyzed. More details about the companies that were excluded from the analysis can be found in Appendix Tables A-1 and A-2

2.4 Study Population and Sample

The target population was all people who were in the employ of the 34 companies on the DAI Programme in the year 2005. This population included 73 305 employees of whom 14 771 tested for HIV and 58 534 were untested. As explained above, only data of companies which suited the eligibility criteria were included for analysis in this study. Eight of the 34 companies were included in this study. These 8 companies employed an inclusive total of 11 126 employees in 2005. Data were analyzed for all the 11 126 employees, of whom 1 488 were tested and 9 638 were untested. Therefore, the population studied, which is a census of the employees of the companies included, also represents a sample of 15.2% of the total target population; 16.5% of the untested and 10.1% of the tested employees. Data were analysed anonymously and therefore all employee identifiers were removed and new study identifiers were created. Also, to keep the companies anonymous in this study report, the companies were recoded as A, B, C, D, E, F, G and H. The employee populations for the companies were as follows: 509 for A, 454 for B, 273 for C, 2 386 for D, 1 983 for E, 663 for F, 1 052 for G and 3 806 for H.

2.5 Data Sources and Data Collection

The main source of data was the overall workforce database as well as the records of VCT for the 8 companies for whole of 2005. The workforce database gave information on all the employees, some of whom had an HIV test in 2005 and some who had not tested. The information on the tested individuals was taken from the electronic VCT records kept by RTC. All the data were already available in Excel format and only the fields which had the variables required for analysis were extracted.

2.6 Data Analysis Plan

Descriptive analysis of all variables was done using EPI info and the SAS V9 statistical package. The employers were grouped into the sectors of employment in order to reduce the number of variables going into the analyses and thereby avoid dilution of the results. The sectors were redefined according to the JSE industry classification as follows:

Manufacturing A- household goods and textiles

Manufacturing B- furnishings and floor coverings

Health/Research C- research and development -biotechnology

Health/Research E- Laboratory

Health/Research F- research- pharmaceutical and biotechnology

Service Sector G- Leisure, entertainment and hotels

Service Sector H- Telecommunications

Service Sector D- Financial services sector.

The analysis involved a summary descriptive of continuous variables by reporting total number of observations (n), mean and standard deviation (SD), median and inter-quartile range (IQR), minimum (min) and maximum (max) values. Frequency distributions of categorical variables were also summarized using number of observations (n) and percentages (%).

All categorical variables were analyzed and chi-squared tests with a p-value of < 0.05 were used as a measure of significance and evidence of an association between the socio-demographic variable of interest and the HIV testing. Odds ratios (OR's) and 95% confidence intervals (95% CI) were also reported. Logistic regression analyses were performed to determine which socio-demographic variables (risk factors) had a significant impact on HIV testing. The outcome variable in the regression model was HIV testing (Yes or No). Firstly, a univariate regression analysis of the association of the socio-demographic variables to HIV testing was performed and then a multivariate regression analysis.

2.7 Ethical Considerations

2.7.1 Risks to Employees

There was no direct interaction with the employees and no biological specimens were collected. Also there was no risk of individual employees being penalized or losing benefits because the individual data were not and will never be given to the employer. This study posed a minimal but potential risk of breach of confidentiality to the employees since it was a review of their already existing records and an accidental breach could have occurred.

2.7.2 Benefits to Employees

There were no direct benefits resulting from the study to specific study employees. There may be potential benefits for the untested employees if barriers to HIV testing can be identified and targeting strategies are improved, thus increasing uptake of VCT and subsequent transition to care and treatment. There may also benefits for the employees who have already tested because a higher uptake of VCT will encourage employers to continue to provide the services and this may reduce overall levels of stigma.

2.7.3 Informed Consent

Informed consent from the study employees was not sought because no identifiers were collected. Also, all employees who have HIV testing done through the DAI programme sign an informed consent form allowing DAI to use their data for research purposes in an unlinked manner. Permission to use the data was obtained from Alexander Forbes on behalf of the companies.

2.7.4 Confidentiality

All individual records were kept in a safe database which can only be accessed by registered users. The computers which housed the data were within locked rooms which could only be accessed by the Right to Care clinical team who are all sworn to confidentiality. The review was done by the clinical team members and all individual records were treated with the strictest of confidentiality. All records were allocated study numbers for the purposes of the research and any information enabling personal identification of employees was recoded prior to use. All data files were password protected.

Chapter 3. Results

3.1 Description of General Employee Population and Individual Companies

In total, 11 126 employee records from 8 companies were included during the statistical analyses. The company names were redefined to avoid direct reference as information was used anonymously. The larger of the 8 companies included in this study were service sector companies H and D contributing 34.2% (3 806) and 21.5% (2 386) of the total study population respectively. The smaller companies were health/research C and manufacturing B contributing only 2.5% (273) and 4.1% (454) of employees respectively for this study (Table 3-1).

For all the companies, the youngest employees were 18 years old. The overall mean (SD) age for all the employees was 36(9) years, with manufacturing A and health/research C employing older people than the other companies while companies G and H had younger personnel (Table 3-1). For Manufacturing A the mean (SD) was 44.6 (10.2) and Health/Research C was 42.0(10.2) while Service Sector H was at 34.2(7.5) and G at 32(9.2) with the younger employees. Four of the companies had employees who were past pension age i.e. over 70 years old and the oldest employee was 89 years of age. Manufacturing A had 79% of its employees being older than 35 years followed by Health/Research C at 69%. The company with the highest percentage of employees being younger than 35 was Service Sector G (70.9%) followed by Service Sector H (63.5%).

The overall average year-period that employees were employed by their current company was 6 years. The shortest time an employee was employed by their current company was one month (by Health/Research E) and the longest was 43 years from Service Sector D. Service Sector H however had 12 years as being the longest time an employee had been with the company. All the other companies had a history of retaining employees for an average of more than 22 years but all

Table 3-1: Descriptive statistics of socio-demographic variables by company

	A	B	C	D	E	F	G	H	Total
Total (n)*	**509**	**454**	**273**	**2386**	**1983**	**663**	**1052**	**3806**	**11126**
Age (years)**									
Mean	44.58	36.11	41.95	35.85	37.97	39.02	31.94	34.23	36.05
SD	10.24	9.25	10.16	8.66	9.78	10.25	9.19	7.48	9.24
Minimum	23.22	21.1	24.14	19.7	18.39	21.62	18.02	20.21	18.02
Maximum	66.63	64	74.34	71.79	89.16	77.71	69.21	67.65	89.16
Time employed by company (years)**									
Mean	16.35	6.9	6.54	6.55	4.19	6.78	4.27	5.34	5.98
SD	9.41	6.4	7.07	5.64	5.12	7.3	3.87	2.76	5.63
Minimum	1.5	0.58	1.25	0.63	0.08	0.19	0.14	0.52	0.08
Maximum	40.97	30.46	31.75	42.91	37.06	33.3	22.05	12.26	42.91
Marital status N%***									
Divorced	14 (2.75)	10 (2.20)	18 (6.59)	109 (4.57)	-	-	27 (2.57)	186 (4.89)	364 (4.29)
Married	341 (66.99)	130 (28.63)	136 (49.82)	1099 (46.06)	-	-	251 (23.86)	1736 (45.61)	3693 (43.55)
Single	113 (22.20)	310 (68.28)	118 (43.22)	1164 (48.78)	-	-	762 (72.43)	1601 (42.07)	4068 (47.97)
Widowed	1 (0.21)	4 (0.88)	1 (0.37)	14 (0.59)	-	-	12 (1.14)	25 (0.66)	57 (0.67)
Unknown	40 (7.86)	0 (0.00)	0 (0.00)	0 (0.00)	-	-	0 (0.00)	258 (6.78)	298 (3.51)
Race**									
Black	290 (56.97)	400 (88.11)	109 (39.93)	510 (21.37)	688 (34.69)	276 (41.63)	424 (40.30)	1108 (29.11)	3805 (34.19)
Colored	53 (10.41)	3 (0.66)	34 (12.45)	216 (9.05)	110 (5.55)	136 (20.51)	180 (17.11)	1028 (27.01)	1760 (15.81)
Indian	20 (3.93)	1 (0.22)	0 (0.00)	190 (7.96)	434 (21.89)	93 (14.03)	69 (6.56)	438 (11.51)	1245 (11.19)
White	143 (28.09)	50 (11.01)	104 (38.09)	1470 (61.61)	751 (37.87)	158 (23.83)	379 (36.03)	1231 (32.34)	4286 (38.52)
Unknown	3 (0.59)	0 (0.00)	26 (9.52)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.03)	30 (0.27)
Sex**									
Female	74 (14.54)	72 (15.86)	153 (56.04)	1416 (59.35)	1333 (67.22)	439 (66.21)	573 (54.47)	1738 (45.66)	5798 (52.11)
Male	432 (84.87)	382 (84.14)	120 (43.96)	970 (40.65)	650 (32.78)	224 (33.79)	479 (45.53)	2068 (54.34)	5325 (47.86)
Unknown	3 (0.59)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (0.03)
Age **									
< 35 years old	109 (21.41)	240 (52.86)	84 (30.77)	1295 (54.27)	872 (43.97)	274 (41.64)	739 (70.85)	2417 (63.50)	6030 (54.27)
≥35years old	400 (78.59)	214 (47.14)	189 (69.23)	1091 (45.73)	1111 (56.03)	384 (58.36)	304 (29.15)	1389 (36.50)	5082 (45.73)
Time employed by company**									
< 1 year	0 (0.00)	51 (11.23)	0 (0.00)	207 (8.68)	669 (33.74)	124 (18.70)	311 (29.56)	226 (5.94)	1588 (14.27)
≥ 1year	509 (100.00)	403 (88.77)	273 (100.00)	2179 (91.32)	1314 (66.26)	539 (81.30)	741 (70.44)	3580 (94.06)	9537 (85.73)

*Total number of employees per company ** some information was missing. *** Information on marital status is not collected by companies (E and F).

had recruited new employees within the previous 18 months (Table 3-1). All the employees in manufacturing A and health/research C (100%) were employed for more than a year and health/research E had the highest proportion of employees who had been employment for less than one year (i.e. 33.7%).

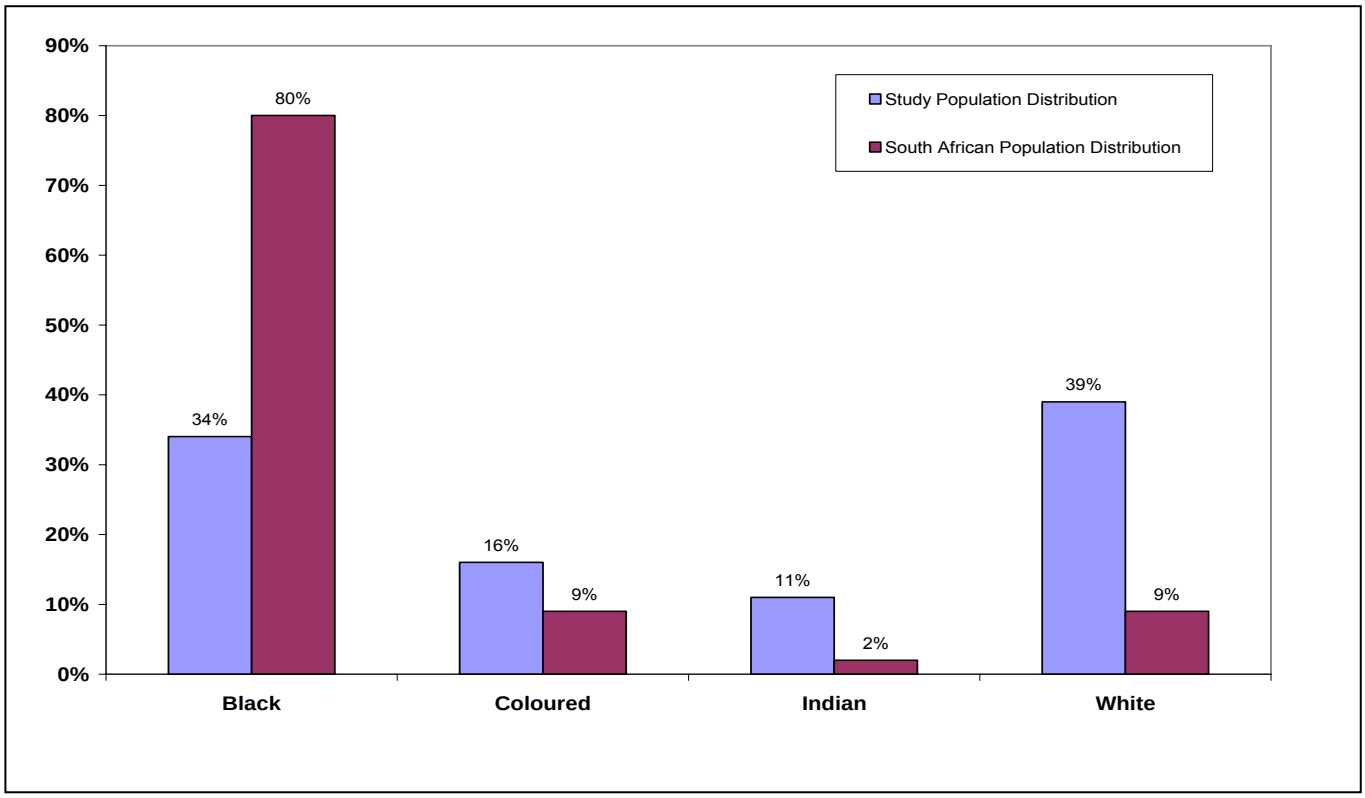


Figure 3-1: Racial distribution of all employees in the study parallel to the national population distribution

Manufacturing A had the highest percentage (67.0%) of employees who were married and Service G had the highest proportion of single employees with 72.4% of the employees being single. The overall divorce rate was 4.2%. In total, 38.5% of the employees were White, 34.2% of employees were Black, 15.8% were Coloured and 11.2% were Indian (Figure 3-1). Service D had the highest percentage of white employees at 61.6% and Manufacturing B had the highest number of Black employees at 88.1%. In total, 52.1% of employees were female and 47.9% were male (Figure 3-2). Health/Research E (67.2%) and F (66.21%) employed more females than males and manufacturing A (85.4%) and B (84.1%) employed many more males. The 8 companies were well distributed in terms of time period on the programme with Service G in the first year, manufacturing B, health/research C E and F all in the second year, manufacturing A and service sector D in the third year and service sector H in the fourth year (Table 3 -2).

3.2 VCT Uptake and HIV Status According To Company

Table 3-2 summarizes the tested and untested employees as well as HIV status by company. Overall, only 13.4% (1488) of the employees in these companies that provide free comprehensive services for HIV in the workplace have utilized these services (Table 3-2). Manufacturing A has the highest percentage of people tested with 30% of the employees testing (Figure 3-2). The lowest VCT uptake was for Service G with only 7.2% of the employees testing, this company was the newest company on DAI with only 2 months of programme implementation (Table 3-2 and Figure 3-2). Of the 1488 employees who tested for HIV, 1463 (98.3%) were HIV negative and only 25(1.7%) were HIV infected, with the company percentage of positives ranging between 0% - 3% (Table 3-2). The company which had spent the longest time being a client of the DAI Programme was Service H at 37 months with an uptake of 12.6%. The majority (87%) of the employees did not use the VCT services offered by the employer (Table 3-2). The table of descriptive information for the untested employees is available in the Appendix section (Tables A-3).

Table 3-2: HIV tested and untested by company

		A	B	C	D	E	F	G	H	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
	Employee Population									
	Not tested	355 (69.74)	399 (87.89)	202 (74.0)	2131 (89.31)	1712 (86.33)	538 (81.15)	976 (92.78)	3325 (87.36)	9638 (86.63)
	Tested	154 (30.26)	55 (12.11)	71 (26.00)	255 (10.69)	271 (13.67)	125 (18.86)	76 (7.22)	481 (12.64)	1488 (13.37)
	All	**509**	**454**	**273**	**2386**	**1983**	**663**	**1052**	**3806**	**11126**
	HIV Status									
	Negative	151(98.05)	54 (98.18)	71 (100)	255 (100)	263 (97.0)	117 (93.60)	76 (100)	476 (98.96)	1463 (98.3)
	Positive	3 (1.95)	1 (1.82)	0 (0.00)	0 (0.00)	8 (3.0)	8 (6.40)	0 (0.00)	5 (1.04)	25 (1.7)
	All Tested	**154**	**55**	**71**	**255**	**271**	**125**	**76**	**481**	**1488**
	Company Months on DAI Programme									
	Months	32	17	24	28	22	14	2	37	
	Years	2.7	1.4	2.0	2.3	1.8	1.2	0.2	3.1	

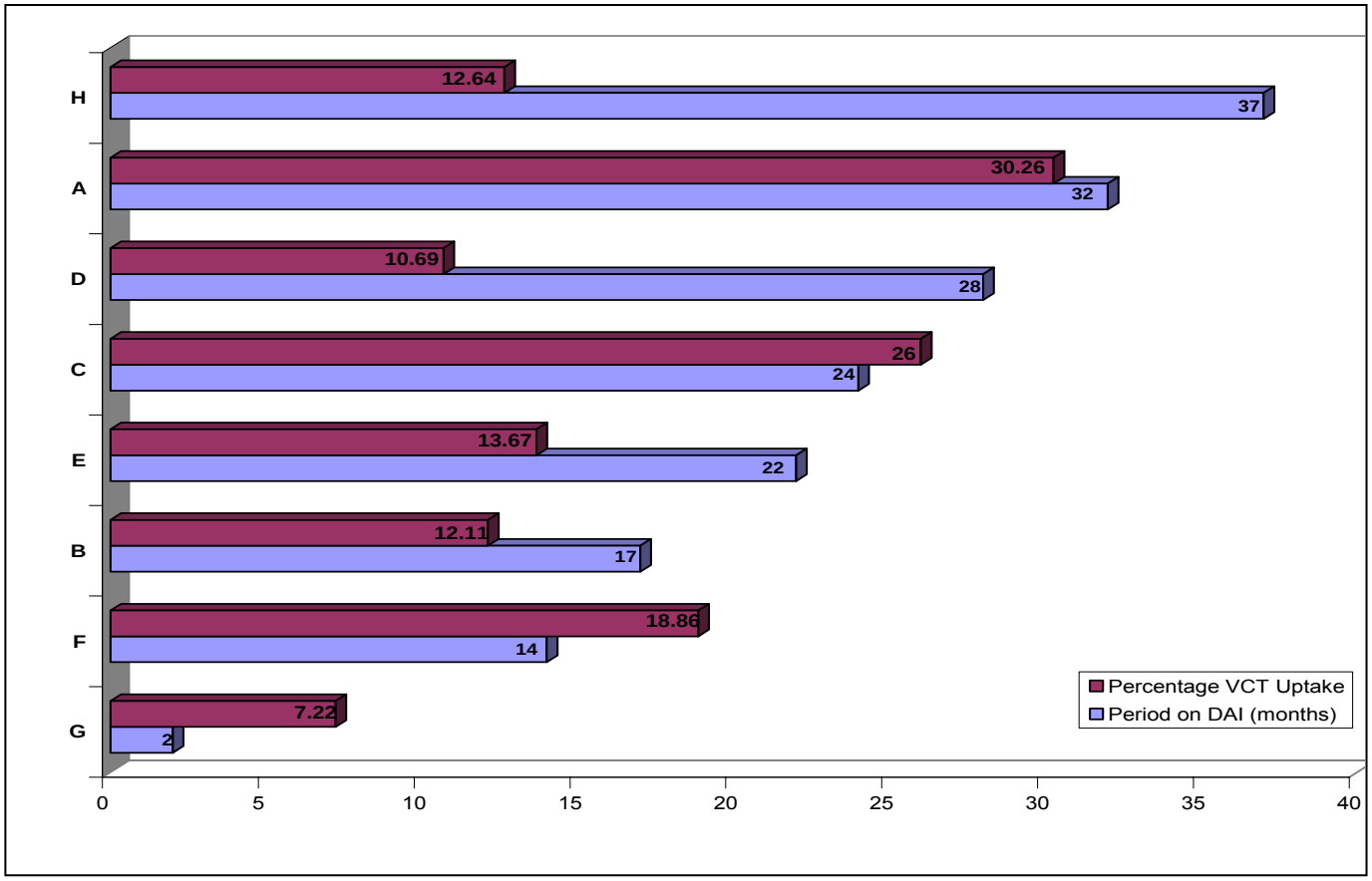


Figure 3-2: Company months as member of the DAI programme and VCT Uptake.

3.3 Descriptive Information for HIV TESTED Employees

Overall the mean (SD) age of all the employees tested for HIV was 36.6(9.5). The youngest employee who tested for HIV was 18 years and the oldest was 66 years old. The mean period in years of employment was 6.6 (6.4), with the longest period being 41 years (Table 3-3). About 5.4% of those who tested where divorced and nearly half (49%) of the tested employees were single. Overall, 16% of all the divorced employees utilized the HIV testing services followed by 13% married, 12% for the single and only 9% of the widowed employees (Table 3-3 and Figure 3-3). Of those who tested, 41% were Black, 30% White, 19% Coloured and 10% Indian (Figure 3-4). More females (58%) were tested than males (42%) (Figure 3-5).

Table 3-3: Descriptive statistics of socio-demographic variables of HIV TESTED employees by company

	A	B	C	D	E	F	G	H	Total
Total (n)*	**154**	**55**	**71**	**255**	**271**	**125**	**76**	**481**	**1488**
Age (years)**									
Mean	44.34	32.88	39.32	34.46	37.32	39.08	34.46	34.46	36.56
Median	45.34	29.22	37.4	32.79	37.05	38.81	32.94	32.91	34.57
SD	9.7	9.76	9.92	8.33	10.2	10.34	8.71	7.8	9.54
Minimum	24.5	21.29	24.79	20.66	18.39	22.84	20.1	20.82	18.39
Maximum	64.48	63.23	58.21	63.36	58.63	63.32	66.66	59.75	66.66
IQR	36.63- 51.50	26.91 - 38.57	31.90 - 48.00	28.19 - 39.10	29.10 - 45.62	30.69 - 45.64	28.31 - 41.17	28.81 - 38.46	29.10 - 43.17
Time Employed by Company (years)**									
Mean	16.5	4.87	6.09	5.64	5.18	6.58	5.8	5.12	6.59
Median	16.62	2.75	3.91	4.3	2.67	3.91	5.56	5.5	5.25
SD	9.25	6.03	6.02	4.86	6.29	6.43	4.28	2.64	6.42
Minimum	2.17	0.58	1.25	0.65	0.16	0.43	0.15	0.57	0.15
Maximum	40.97	28.99	26.42	31.44	37.06	29	17.99	12.26	40.97
IQR	8.39 - 23.68	1.58 - 5.25	2.06 - 8.25	1.95 - 7.62	1.00 - 7.33	1.62 - 10.75	1.89 - 8.97	2.89 - 6.84	1.99 - 8.18
Marital Status (n%)***									
Divorced	2 (1.37)	0 (0.00)	5 (7.04)	13 (5.10)	-	-	6 (7.89)	32 (6.91)	58 (5.44)
Married	113 (77.40)	13 (23.64)	33 (46.48)	85 (33.33)	-	-	31 (40.79)	181 (39.09)	456 (42.78)
Single	31 (21.23)	42 (76.36)	33 (46.48)	157 (61.57)	-	-	39 (51.32)	223 (48.16)	525 (49.25)
Widowed	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	-	-	0 (0.00)	5 (1.08)	5 (0.47)
Unknown	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	-	-	0 (0.00)	22 (4.75)	22 (2.06)
Race (n%)**									
Black	88 (57.14)	52 (94.55)	33 (48.53)	72 (28.24)	107 (39.48)	60 (48.00)	1 (1.32)	195 (40.54)	608 (40.94)
Coloured	18 (11.69)	0 (0.00)	16 (23.53)	33 (12.94)	30 (11.07)	25 (20.00)	36 (47.37)	125 (25.99)	283 (19.06)
Indian	8 (5.19)	0 (0.00)	0 (0.00)	13 (5.10)	36 (13.28)	23 (18.40)	3 (3.95)	59 (12.27)	142 (9.56)
White	40 (25.97)	3 (5.45)	19 (27.94)	137 (53.73)	98 (36.16)	17 (13.60)	36 (47.37)	102 (21.21)	452 (30.44)
Sex (n%)**									
Female	23 (14.94)	7 (12.73)	42 (59.15)	165 (64.71)	207 (76.38)	90 (72.00)	52 (68.42)	278 (57.80)	864 (58.06)
Male	131 (85.06)	48 (87.27)	29 (40.85)	90 (35.29)	64 (23.62)	35 (28.00)	24 (31.58)	203 (42.20)	624 (41.94)
Age **									
< 35 years old	33 (21.43)	39 (70.91)	29 (40.85)	150 (58.82)	122 (45.02)	52 (41.60)	44 (57.89)	299 (62.16)	768 (51.61)
≥35 years old	121 (78.57)	16 (29.09)	42 (59.15)	105 (41.18)	149 (54.98)	73 (58.40)	32 (42.11)	182 (37.84)	720 (48.39)
Time Employed by Company**									
<1 year	0 (0.00)	4 (7.27)	0 (0.00)	22 (8.63)	68 (25.09)	14 (11.20)	14 (18.42)	20 (4.16)	142 (9.54)
≥1 year	154 (100.00)	51 (92.73)	71 (100.00)	233 (91.37)	203 (74.91)	111 (88.80)	62 (81.58)	461 (95.84)	1346 (90.46)

*Total number of employees tested per company ** some information was missing. *** Information on marital status is not collected by companies (E and F).

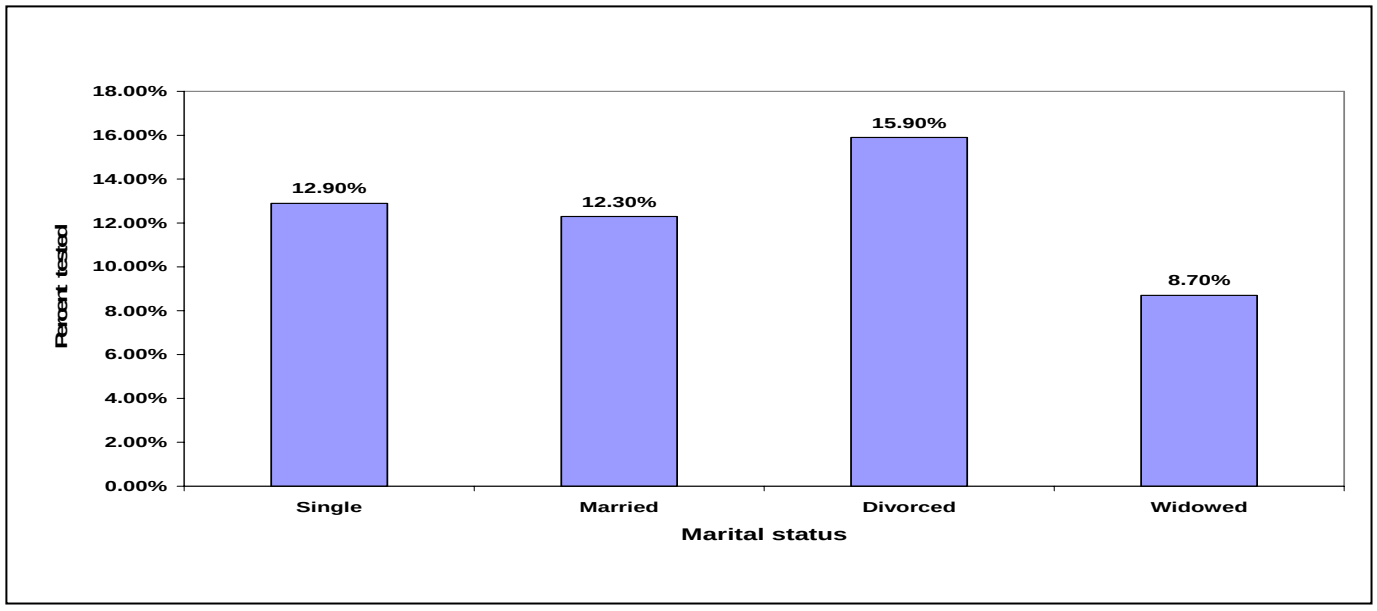


Figure 3-3: Percentage of the employees who tested for HIV according to marital status (i.e. single tested/all single)

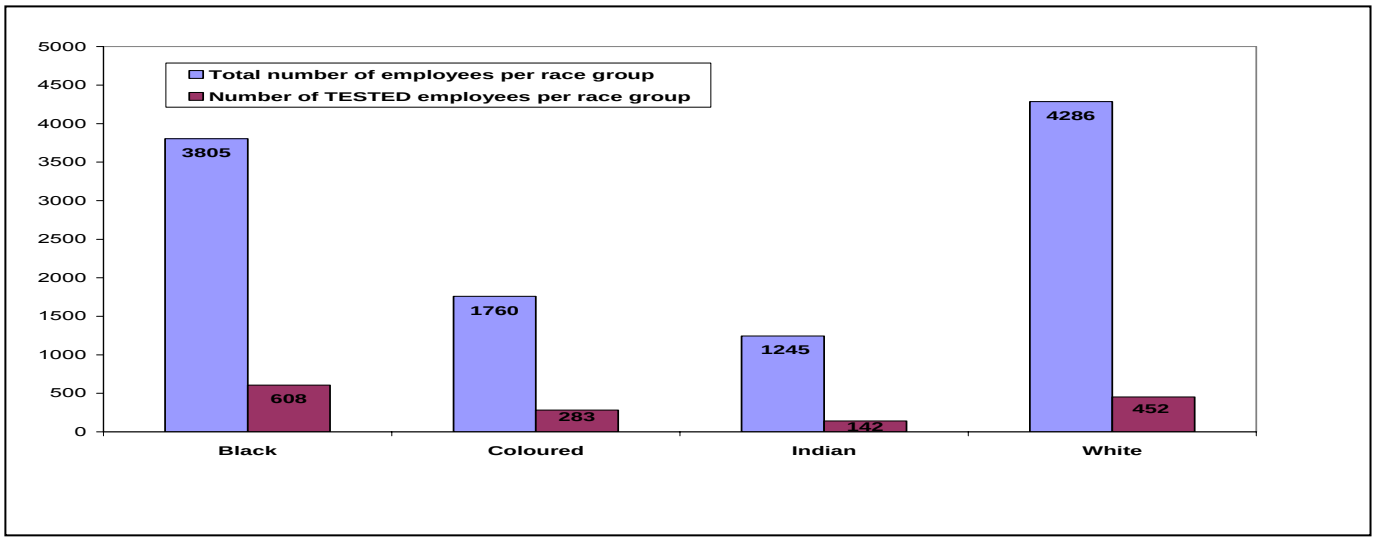


Figure 3-4: Frequency of employees who tested for HIV per race group

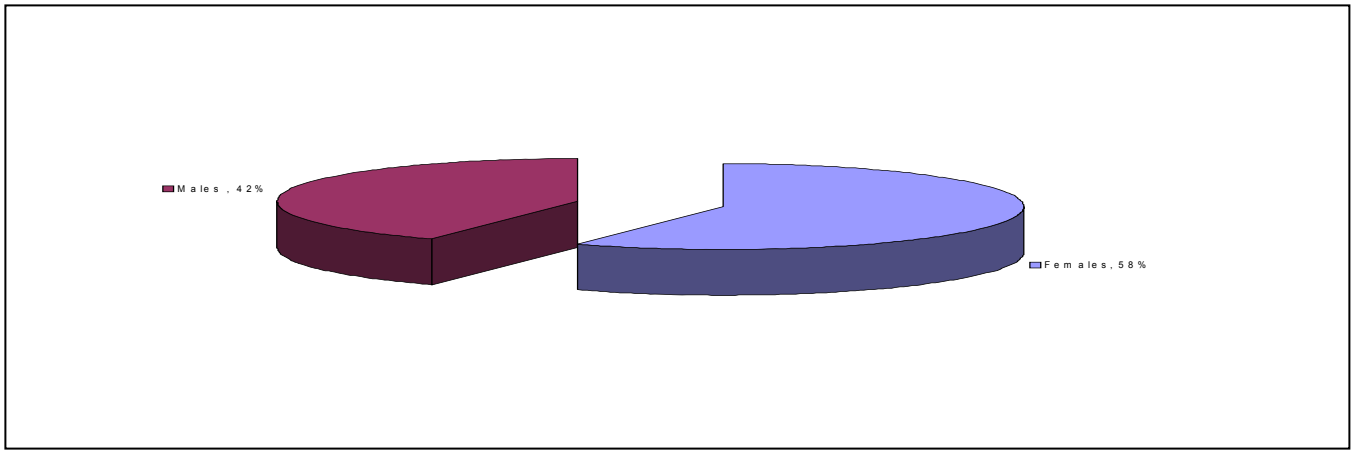


Figure 3-5: Sex Distribution of employees who tested for HIV

3.4 **Associations of Socio-demographic Variables and HIV Testing**

The results of the univariate association of socio-demographic variables with HIV testing are described Table 3-4 below. In both univariate and multivariate models marital status was not associated with testing for HIV. No statistically significant association was found between being divorced and HIV testing (p-value = 0.06) (Table 3-4) however, it is noted that this is very close to suggesting an association and the reported outcome could be due to the fact that the sample of divorced individuals was not big enough. A statistically significant association between being Black and HIV testing (p-value < 0.0001) was noted. Blacks were 1.39 times more likely to be tested for HIV than non-Blacks [OR(95%CI) = 1.39 (1.24 - 1.56)]. Similarly, Coloureds were 1.3 times more likely to be tested than non-Coloureds [OR(95%CI) =1.30 (1.13 - 1.49)]. However, in general whites and Indians were less likely to be tested [OR(95%CI) = 0.82 (0.68 - 0.98) and 0.66 (0.59 - 0.74)], respectively.

There is a statistically significant association between sex and HIV testing status (p-value < 0.0001). Males were less likely to have an HIV test compared to employees who are female OR (95%CI: 0.76 (0.68 - 0.85)]. There is also a slight statistically significant association between being ≥ 35 years old and HIV testing (p-value = 0.03). Older employees (≥35 years) were 1.13 times more likely to be to be tested for HIV than younger (< 35 years) employees [1.13 (1.01 - 1.26)]. Time employed by company (≥1 year or < 1 year) was associated with HIV testing status (p-value < 0.0001) with the employees who were employed by their current company 1≥ year, being 1.67 times more likely to have an HIV test compared to employees who had been employed by their current company < 1 year [OR(95%CI) = 1.67 (1.40 - 2.01)].

Table 3-4: Univariate associations between socio-demographic variables and HIV testing

Variable	Untested for HIV n (%)	Tested for HIV n (%)	OR (95% CI)	p-value
Marital status				
Not Divorced Divorced	6832 (95.71) 306 (4.29)	986 (94.44) 58 (5.56)	1 1.31 (0.98 - 1.75)	0.06
Not Married Married	3901 (54.65) 3237 (45.35)	588 (56.32) 456 (43.68)	1 0.94 (0.82 - 1.07)	0.31
Single Not Single	6095 (63.24) 3543 (36.76)	963 (64.72) 525 (35.28)	1 0.94 (0.84 - 1.05)	0.27
Widowed Not Widowed	7086 (99.27) 52 (0.73)	1039 (99.52) 5 (0.48)	1 0.66 (0.26 - 1.65)	0.37
Race				
Black Non Black	6414 (66.74) 3197 (33.26)	877 (59.06) 608 (40.94)	1 1.39 (1.24 - 1.56)	<0.0001*
Coloured Not Coloured	8134 (84.63) 1477 (15.37)	1202 (80.94) 283 (19.06)	1 1.30 (1.13 - 1.49)	<0.01*
Indian Not Indian	8508 (88.52) 1103 (11.48)	1343 (90.44) 142 (9.56)	1 0.82 (0.68 - 0.98)	0.03*
White Not White	5804 (60.22) 3834 (39.78)	1036 (69.62) 452 (30.38)	0.66 (0.59 - 0.74)	<0.0001*
Sex				
Female Male	4934 (51.21) 4701 (48.79)	864 (58.06) 624 (41.94)	1 0.76 (0.68 - 0.85)	<0.0001*
Age				
< 35 years old	5262 (54.68)	768 (51.61)	1	
$\geq$ 35 years old	4362 (45.32)	720 (48.39)	1.13 (1.01 - 1.26)	0.03*
Time employed by company				
Employed < 1 year	1446 (15.00)	142 (9.54)	1	
Employed $\geq$ 1 year	8191 (85.00)	1346 (90.46)	1.67 (1.40 - 2.01)	<0.0001*
Employment Sector				
Manufacturing Non Manufacturing	8884 (92.18) 754 (7.82)	1279 (85.95) 209 (14.05)	1 1.93 (1.63 - 2.27)	<0.0001*
Health/Research Not Health/Research	7186 (74.56) 2452 (25.44)	1021 (68.62) 467 (31.38)	1 1.34 (1.19 - 1.51)	<0.0001*
Services Sector Non Services Sector	3206 (33.26) 6432 (66.74)	676 (45.43) 812 (54.57)	1 0.60 (0.54 - 0.67)	<0.0001*

OR = Odds ratio; CI = confidence interval * p-value < 0.05

There was a statistically significant association between being employed within the manufacturing sector and HIV testing (p-value < 0.0001). Employees who were employed by a manufacturing company were 1.93 times more likely to have an HIV test compared to employees who were not employed by a manufacturing company [OR(95%CI) = 1.93 (1.63 - 2.27)] . Employment in the health/research sector was significantly associated with HIV testing (p-value < 0.0001). Employees who were employed by health/research companies were 1.34 more likely to have an HIV test compared to employees who were not employed by a health/research company [OR (95%CI) = 1.34 (1.19 - 1.51)]. Employment within the services sector was also significantly associated with HIV testing (p-value < 0.0001). Employees who were employed by a services sector company were less likely to have an HIV test compared to employees who were not employed by a services sector company [OR (95%CI) = 0.60 (0.54 - 0.67)].

In a multivariate logistic regression model controlling for other variables race, sex, period of employment by company and sector of employment all remained significantly associated with HIV testing. Those who had been employed for more than one year were more likely to test than newer employees who had been employed for less than one year [OR (95%CI) 1.83 (1.37 - 2.43)].

Race is also significantly associated with the decision to undergo HIV testing. In the multivariate model Blacks, Coloureds and Indians were more likely to test for HIV than Whites even though in the univariate model it seemed as if Indians were less likely to test. In the multivariate model Coloureds followed by Blacks then Indians were 1.8, 1.5 and 1.4 times respectively, more likely to test for HIV than their white counterparts (Table 3-5).

Table 3-5: Univariate and multivariate associations between socio-demographic variables and HIV testing

	Univariate		Multivariate	
Risk factor	**OR (95% CI)**	**p-value**	**OR (95% CI)**	**p-value**
Marital status				
Single	1		1	
Divorced	1.31 (0.98 - 1.75)	0.06	1.24 (0.90 - 1.70)	0.19
Married	0.94 (0.82 - 1.07)	0.31	0.91 (0.78 - 1.06)	0.22
Widowed	0.66 (0.26 - 1.65)	0.37	0.53 (0.21 - 1.34)	0.18
Race				
White	1		1	
Black	1.39 (1.24 - 1.56)	<0.0001*	1.47 (1.24 - 1.74)	<0.0001*
Coloured	1.30 (1.13 - 1.49)	<0.01*	1.79 (1.48 - 2.18)	<0.0001*
Indian	0.82 (0.68 - 0.98)	0.03*	1.35 (1.04 - 1.76)	0.03*
Sex				
Female	1		1	
Male	0.76 (0.68 - 0.85)	<0.0001*	0.69 (0.60 - 0.80)	<0.0001*
Age				
<35 year	1		1	
≥ 35 years	1.13 (1.01 - 1.26)	0.03*	1.07 (0.92 - 1.24)	0.41
Time employed by company				
<1 year	1		1	
≥ 1 year	1.67 (1.40 - 2.01)	<0.0001*	1.83 (1.37 - 2.43)	<0.0001*
Employment Sector:				
Services Sector[3]	1		1	
Manufacturing[1]	1.93 (1.63 - 2.27)	<0.0001*	2.39 (1.96 - 2.92)	<0.0001*
Health/Research[2]	1.34 (1.19 - 1.51)	<0.0001*	2.83 (2.11 - 3.81)	<0.0001*

OR = Odds ratio - CI = confidence interval. * p-value < 0.05.

Employment sector did impact whether employees decided to test for HIV or not. In a multivariate model, employees who were employed by a manufacturing sector were 2.39 times more likely to test for HIV than those working in the services sector while those employed in a health/research sector were 2.8 times more likely to test compared to those in the services sector.

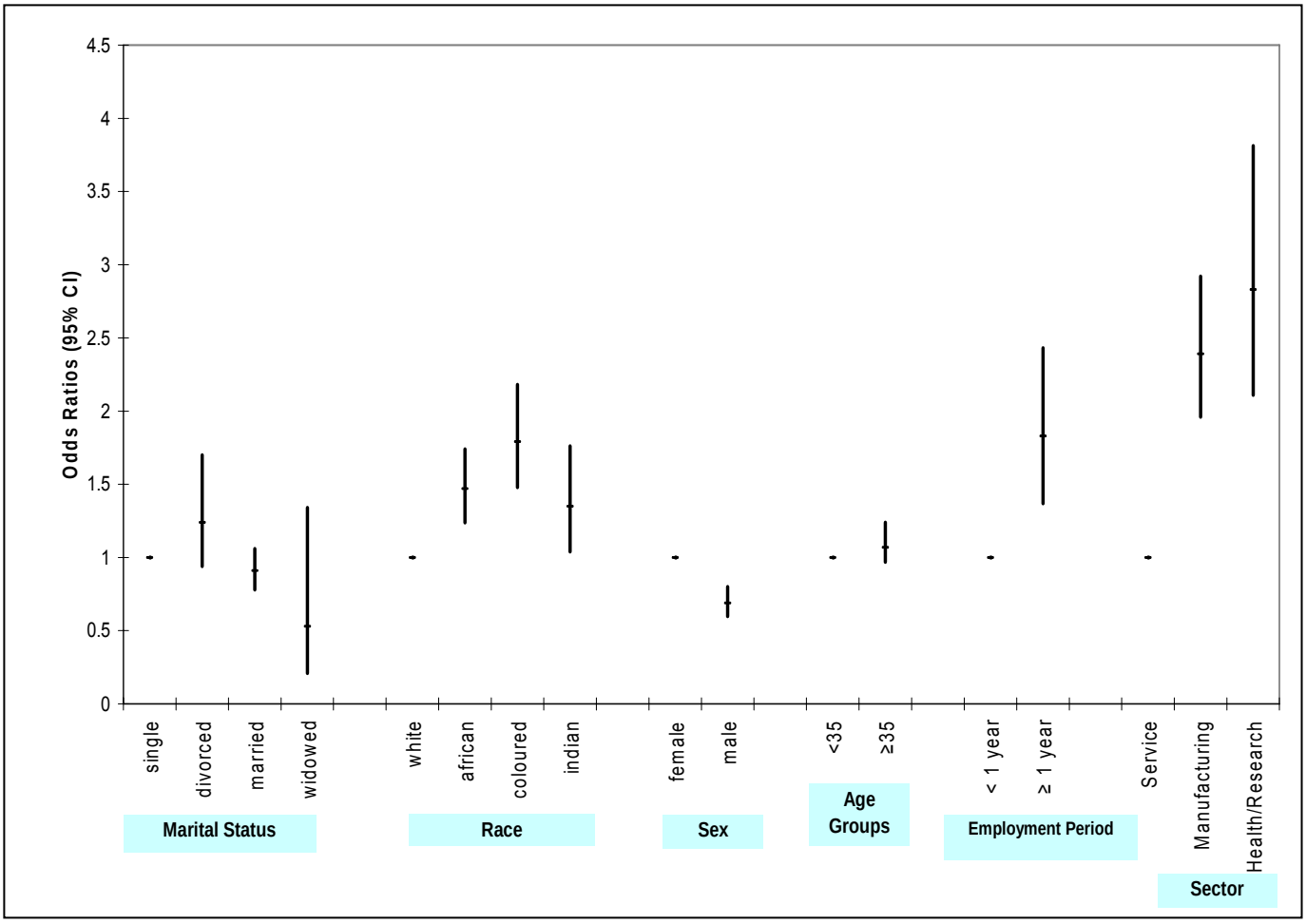


Figure 3-6: Odds ratios of factors associated with HIV testing in multivariate logistic analysis

3.5 General Description of HIV POSITIVE Employees

Less than 2% (25) of the 1488 tested employees were HIV positive (Table 3-2). Because of the small number of employees who are HIV positive statistical analysis was limited to a descriptive analysis. The mean (SD) age of these employees was 34.7 (7.2). Of the 25 HIV positive employees, the majority (23) was Black and 2 were coloured. Seven were married, 2 were widowed and marital status was unknown for the rest of the group. Only 15 of the HIV positive employees had their CD4 counts available. The mean (SD) CD4 count of the HIV positive employees was 396(±145) and their median (IQR) was 452 (225 – 511). Six of these employees had CD4 values < 350 cells/mm3 and 9 had CD4 values of ≥350 cells/mm3.

Chapter 4. Discussion, Conclusion and Recommendations

4.1 Discussion

In this study the overall uptake of VCT was 13.4% and of those employees who tested only 1.7% were HIV positive. This implies that 87% of employees were not tested and this is cause for concern because it creates the impression that the employers' resources were wasted as the services were underutilized.

The total demographic profile of South Africa is composed of 79.7% Blacks, 9.1% Whites, 8.8 % Coloureds and Indians/Asians make up the remaining 2.4% (Statistics South Africa, 2007). The overall demographics for the companies included in this study was concentrated towards the employment of the white personnel with 39% of the employed population being White, followed by Blacks at 34%, then Coloureds and Indians at 16% and 11% respectively.

This seemed true for almost all the companies in this study except for companies A and B whose employee demographics seemed to fit the national population distribution by employing a higher proportion of Blacks, followed by Whites and then Coloureds and in the least were Indians. It must be noted that both these companies were in the manufacturing sector and were therefore more likely to employ semi-skilled and unskilled personnel, thus resulting in the higher employment of Blacks. In this study, employees who were employed by the manufacturing sector, were more likely to have an HIV test [OR (95%CI) = 1.93 (1.63 - 2.27)] compared to employees who were employed in the services sector. Manufacturing A had a higher proportion of Black employees as stated above and also had the highest uptake of VCT. In general, Blacks were 1.47 times and Coloureds were 1.79 times more likely to be tested than Whites. Service D

fell within the financial services sector which is known to employ highly skilled professionals; they had 63% White personnel, 21% Black, 8.6% Coloured and 8.3% Indian personnel. This company had the second lowest uptake at 10.7%. In this study, Whites were in general less likely to test than non- Whites.

In November 2005, the estimated national prevalence of HIV in the South African population was about 10.8% with a higher prevalence in women (13.3%) than men (8.2%). The prevalence was about 13.3% in Blacks, 1.9% in Coloureds and lower prevalence estimates of 1.6% and 0.6% were observed in Indians and Whites respectively (HSRC, 2005). Because HIV prevalence in SA is highest among Blacks, the findings of this study are slightly comforting in the sense that the Blacks, who do have a higher prevalence than any other race group nationally, seem to be utilizing the services more. This inference is made with the knowledge that Blacks were not the dominant race group in the employed population group for this study and higher uptake is not due to demographic dominance The lower utilization by the White and Indian race groups may be an indication that they believed they were not really affected and therefore the services were not useful to them. This is the wrong mentality because HIV infection does not discriminate and PLWHA are found in every race group in South Africa. Although the observed prevalence differs according to race, the HSRC warns that the estimates for Whites and Indians should be interpreted with caution because of the poor response rate among these race groups (HSRC, 2005).There are suggestions that the epidemic is relatively serious among Whites because when compared to similar populations in other Western countries, higher prevalences are recorded in South Africa (Vass., 2005).

Manufacturing A which employed more than two-thirds of married people had the largest proportion of their employees undergoing VCT through the workplace programme. However, manufacturing B and service D employed mainly single people and fell within the bottom three of companies with regard to the proportion of employees who tested for HIV. No statistically significant association was found between being divorced and HIV testing (p-value = 0.06) (Table 3-4) however, it is noted that this is very close to suggesting an association and the reported outcome could be due to the fact that the sample of divorced individuals was not big enough. In this study there were a higher percentage of married people testing and the findings could imply that companies with higher percentages of married employees may see higher uptake of VCT. This inference is very important in light of the fact that in 2005 UNAIDS reported that married women are contributing a major portion to the incidence of HIV and that they are actually being infected by their husbands (UNAIDS, 2005).

The companies with the lowest proportion of tested employees were service G followed by D then manufacturing B and service H with up to 12% VCT uptake. All these companies had a workforce which comprised of more than 50% of young people within each company and all except H had a higher percentage of single people employed. In each the 4 companies, young people comprised more than 50% of the untested (Table A-3). In 2005, the HIV prevalence in the South African population was at its peak in age group of 25 – 29 years (HSRC, 2005). Companies H and G are in the sports/entertainment and telecommunications industry which tends to employ a lot of young people on a contractual basis. Contractors usually do not have access to any of the company benefits including medical aid. Within the employer funded workplace programmes, contactors would sometimes be allowed access to only HIV testing but not to treatment. In this study, multivariate logistic regression analyses did not show any statistically significant association between age and HIV testing. However it is worth noting that these young people may not be testing because they may be contract or temporary workers and

they do not see the benefit of testing if there is no mechanism to support their transition into a care programme. The low uptake in this group may also suggest that single and younger employees who are known to be at higher risk of contracting HIV may also be hesitant to utilize these services because they are just scared to know their HIV status. This finding is however in contrast to the Zimbabwean findings reported by Herndon et al., 2003 that being young was significantly associated with HIV testing.

There is a huge concern around the generally low uptake of VCT for the total employee population of this study even for the ones who do have access to treatment benefits. Cost and convenience were removed as barriers because the employer was paying and testing was brought to the workplace but this did not help much. Fear of knowing ones status has been stated as one of the factors that play a significant role in peoples' refusal to undergo HIV testing. Fear of testing is largely fueled by the stigma and discrimination associated with being HIV infected.

Stigma plays a frustrating role in discouraging the general South African population to undergo HIV testing and is a major stumbling block in the effective fight against HIV & AIDS. Achmat and Cameron, 1995 reiterate that stigma and discrimination play a very negative role in maintaining confidence in HIV support programmes both at community level and in the workplace. Herek and Capitanio (1998) described stigma as a practice of discounting, discrediting, and discrimination directed at people perceived to have AIDS or HIV and the individuals, groups, and communities with which they are associated. This problem was also recognized by the South African government and in 2003; the HIV & AIDS Technical Assistance Guidelines to help address HIV& AIDS in the workplace were formulated and endorsed. This aimed at increasing

the understanding of the disease at employee and management level and to improve total productivity, which would in turn favour the general economy.

The underutilization of testing services in this study can also be explained along the same lines by a recent Southern African review of HIV & AIDS workplace programmes by Mahajan et al., 2007. They highlighted a number of challenges to implementing workplace programmes but placed the emphasis on eradicating persistent stigma in the workplace because this was identified as the major cause of poor uptake of HIV testing, and low enrollment into workplace ART programmes. The findings are repeatedly emphasized in other studies including van Dyk and van Dyk 2007, where logistical problems such as lack of sufficient counsellors, long queues, and lack of privacy or trust in the health care system were cited as contributing to poor uptake. In addition employees were concerned and fearful of breach of confidentiality and/or rejection and possible lack of follow-up support after diagnosis.

In this study, males were less likely to have an HIV test compared to employees who were female; OR (95%CI: 0.76 (0.68 - 0.85)]. HIV prevalence is higher in South African women of reproductive age than in males within the same age category. The women could have been more exposed to information about the vertical transmission of HIV through contact with other health services. They may then have worried more about their status and tested more often than males who only rarely come into contact with the health system as often especially while they feel healthy because they are the breadwinners. Day at al. showed that in Welkom mine workers who are mostly men, a poor rating of one's own health is seen as one of the main reasons for testing for HIV. However a study by UNICEF reported that in most of sub-Saharan Africa, knowledge about HIV transmission routes is still low. Generally, women were less well-informed about HIV than men and they also lacked comprehensive knowledge of HIV transmission. Young men were 20% more likely to have correct knowledge of HIV than young

women. The conclusion was that education levels make a huge difference in transmission (UNICEF, 2004). Despite this, it is encourage that women are testing more than men since they do have a higher prevalence nationally.

In multivariate analyses period of employment by company and sector of employment with race and sex also remained significantly associated with testing for HIV (Table 3-5). The employees, who were employed by their current company ≥1 year, were more likely to have had an HIV test compared to employees who were employed by their current company < 1 year. It appears as if soon after joining a company or maybe when the workplace programme is still new, there some is uncertainty about issues of confidentiality and employees may fear that they may be negatively affected if they test HIV positive. They may actually want to monitor the company's practices over a period of time and to get to know experiences of those who have already utilized the service before establishing trust in the programme. This would mean that the employers would have to stay on the programme and employees would have to be retained to allow time for this trust to be earned. Service Sector G is a good example of where the low rate of testing could be explained by the fact that the company had been on the DAI programme for only 2 months and the employees might not yet have been adequately informed about or comfortable with the programme. This could be viewed as being in direct contrast to Manufacturing A which had the highest uptake and was in their third year of the programme. The top 2 companies in VCT coverage (A and C) had 100% percent of their employees working for the company for more than one year. This may support the above inference that as employees stay longer within companies and companies remain on DAI for longer periods, the level of confidence in the independence of the programme increases and HIV testing uptake increases possibly due to changing perceptions and maybe a reduction in stigma. However, this may not be entirely true because Service Sector H which was in the fourth year of the

programme was in the bottom 50% of the companies in terms of coverage. This could have been because the majority of employees may have already tested and the hype around the programme had died or that there are other unknown factors. Companies who employed older personnel and those who retained employees for longer actually reflected companies who had been in existence for some time while those with younger employees and shorter employment periods had existed for a shorter period. This was actually confirmed by following the history of these companies in South Africa.

Employment in the health/research sectors was significantly associated with HIV testing status (p-value < 0.0001). This could have been because employees in these sectors understand the importance of HIV testing as well as the benefits the programme. The high uptake in this group could also be because of possible occupational exposure where they would therefore be more likely to want to know their status or to have to know their status in order to access post exposure prophylaxis (PEP).

In this study only 2% of all the 1488 employees who were tested through DAI were HIV positive. This is a gross underestimation of the status within DAI and within the country's employed population because according to SACOHA, for anyone doing business in South Africa; 10–40% of the workforce is likely to be infected with HIV (SABCOHA, 2008). However, since this is a self-selected group of companies, these results cannot be extrapolated to the South African work force in general but the findings can be used to highlight issues faced by companies that provide HIV support programmes for their employees.

4.2 Conclusion and Recommendations

It appears as if the majority of employees who were using the VCT services within this study were likely to be a self selected group that was already confident of their HIV negative status. All employees who were at risk were pulling back and not using these services most probably due to stigma. This could have also been due to being temporary workers with a lack of access to care even though VCT was free. In order to reach young black contract or casual workers HIV testing programmes must respond to governments call for VCT services to be offered across a wide variety of settings. This includes the implementation of the provider initiated model of VCT at all health facilities with a special focus on services that service young people e.g. STI, antenatal, family planning and other curative services. Donor funding is available to be sought by employers to cover this disadvantaged group for VCT and treatment in the workplace, even if only VCT is covered, they can always be referred to the public sector for treatment. The majority of casual youth are users of public transport and community based VCT strategies could reach them. This includes testing at taxi and bus ranks, in the malls and at social events like soccer games and music shows. Specifically targeted strategies can be included in the annual health calendar e.g. campaign targeting youth to test during youth month or a testing week/month with a special focus on young men. Employers need to review the programmes that discriminate against contract workers preventing them from accessing VCT and treatment. VCT accompanied by care is recommended and this is supported by the South Africa study by Day et.al. where some gold miners indicated that they would be more likely to test for HIV if treatment was available. This ambitious and controversial recommendation is made in full cognisence of the fact that access to treatment is not the only barrier and there are other intertwined factors including stigma, that impact on VCT uptake.

Another alternative would be for government to legislate compulsory company Low Income Medical Schemes which are affordable and where ART is available as a prescribed minimum benefits. This would most likely result in generally higher uptake irrespective of socio-demographic characteristics or employment status.

The employees of minority race groups who perceived themselves to be at lower risk i.e. Whites and Indians were not testing. These groups need to be specifically targeted through appropriate interventions. In a financial services company like D where the majority of people are white and work on computers, HIV information snippets could be sent electronically because they would reach the target groups, it is hoped that these will generate more discussion and help remove stigma. In companies where the majority of employees are permanent, another strategy is to combine HIV testing with Wellness days where the employee is seen by one nurse who initially does a health risk assessment and measures Body Mass Index. She then pricks and that one drop of blood is used for cholesterol, blood sugar and HIV. The combination of HIV testing and wellness days results in higher uptake of VCT even for males because the focus is no general well being and this is at a minimum extra cost. Males need to have special attention focused on them.

HIV programmes in workplaces continue to have a positive impact on productivity, morale and quality of life even though very few companies have got such support structures in place [The National Workplace Health Promotion (WHP) Survey 2006]. This survey also emphasizes that better knowledge of the transmission of HIV & AIDS, will promote positive attitudes towards PLWHAs.

Confidentiality is also assumed to play a significant role in getting employees to trust the HIV programmes offered by the companies. The independence of the programmes; the benefits of these services for infected employees as well as the reassurance of lack of discrimination should be significantly highlighted on a continuous basis. If employees recognize that company

human resource practices such as recruitment, transfers and promotions are not prejudiced according to HIV status but are based on performance, experience and competence this may help to gain trust in the fairness and justice of the company and improve participation. The accessibility of the comprehensive HIV services should be emphasized and employees need to fully understand the importance of knowing their HIV status as well as the benefits of early intervention. The companies should commit to put long term resources into such programmes because HIV requires lifelong treatment.

One of the benefits which should be highlighted is that unlike the unemployed group which mainly rely on the government health facilities and can only be eligible for treatment once the CD4 count has dropped to below 200 cells/mm3 or at presentation of an AIDS defining WHO stage 4 condition; employees who are beneficiaries of private workplace programmes are initiated onto treatment much earlier (CD4 count of less than 350 cells/mm3) thus resulting in early reversal of immune destruction, and staying well for longer.

In this study it is apparent that even in companies where workplace programmes are well established, continuous education targeting employees and managers is very crucial in order for both the employees and the employers to gain maximum benefit. According to the ACORD's experience in Uganda, employees tend to feel more secure and make the most of the available services if they are aware that the practices of company's HIV workplace policy address the following important components: firstly, it is crucial to put measures in place to ensure that confidentiality is respected and maintained at all times by the employer, support employees and peers. Secondly, because employees with HIV infection are more prone to illness than their HIV negative counterparts, they need to be accommodated by introducing suitable programmes such as flexible hours, light duty and extended sick leave. All employees should be treated equally at all times regardless of their HIV status. This may also help to alleviate stigma and

discrimination at workplaces which employees must be shielded from (Hadjipaterasm et al., 2006).

In South Africa, pre-employment HIV screening, demotion and dismissal of HIV infected employees were common practices noted to be directly or indirectly enforced by some employers (Achmat and Cameron, 1995). It is unfortunate that even though these practices are discouraged, they still continue because employee discrimination and stigma cannot be eliminated if knowledge and education on HIV matters does not improve. In South Africa, Labour Unions continue to play a crucial role in improving employee confidence and encouraging positive workplace attitudes. It is important that employers engage and consult with unions and that they work together from the very early stage of policy formulation in order to encourage acceptance of HIV workplace intervention programmes.

The benefits of affordable, comprehensive and successful HIV workplace programmes have been shown to have a positive impact on national economic growth and social development. (ILO, 2003). Companies are feeling the burden of HIV & AIDS as labour supply and productivity are dwindling and yet the costs of labour are increasing because there are increased losses due to rising absenteeism, sick leave and early retirement of skilled employees. This study emphasizes that for companies who are already offering workplace HIV programmes, it is crucial to focus on improving the levels of employee confidence in the programme and thus encourage utilization. In the South African context, removing stigma maybe a difficult task as it involves an intertwined web of cultural, social, racial and sex practices. However, continuously encouraging tolerance through promoting the knowledge of HIV & AIDS may help to remove fear and stigma and contribute to a healthy workforce within a supportive and enabling working environment.

4.3 Study Limitations

A large number of companies that were initially planned to form part of the study were excluded as they had none of the required information collected. Although the inclusion of companies into this study was based on the availability of information, the companies that have been analyzed were all part of the DAI programme. These companies represent a self-selected group and the chosen sample of companies may not be generalizable to the South African workforce because only certain companies who can afford these types of corporate HIV programmes actually participate. Within the DAI Programme itself, there is selection bias in that the companies that had poor human resource records were excluded. There is the possibility that the companies that had good human resource databases had active human resource managers who supported workplace testing and those companies may have had more HIV testing events than those with poor records. The findings of this study might therefore also not be generalizable to the entire workforce within the DAI client companies.

Off site testing creates the possibility for bias because the individuals who are said to be 'untested' for 2005 could have utilized other health services to get access to HIV testing and may not strictly be untested. They could have also tested at other times outside 2005 but the study was undertaken with the premise that annual HIV testing is recommended especially for all high risk individuals. Therefore an assumption is that all employees were expected to be tested within the annual year period 2005.However there is bias because those who chose to test offsite before 2005 or after 2005 may be different from those who tested on site.

Even though the study involved looking at companies who did pay for testing for both permanent and temporary staff, the temporary employees were thought to be less likely to test because most of the companies did not cover treatment for them. Although the data used was not originally collected for this study, the characteristics included in this study were carefully chosen

to provide sufficient information to predict VCT uptake in South African employees. Therefore the study design is considered to be valid because some of the variables that chosen are known to be associated with uptake of VCT.

4.4 Plan for Utilization and Dissemination of Results

The study population will be given unlinked feedback via joint management and staff briefings for all companies that are registered on the DAI programme. A presentation will be arranged a month after the companies have received written summaries of the research report in order to encourage informed participation and successful debate. The findings will also be presented to Alexander Forbes and Right to Care, the sponsors of the research. The results will be made widely available to the local business sector via business forums like The South African Chamber of Business, South African Business Coalition on HIV & AIDS and The Department of Labour. Opportunities to present the results at national and international conferences and to publish in national and international journals and to reach the International Labour Organization will be pursued. The author would like to present the findings at the Wits School of Public Health's Faculty Research Day.

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Appendix

Appendix 1: Representativeness Of Sampled Companies

This section highlights the process that was followed during the selection of companies for inclusion into this study. An attempt was initially made to obtain the missing fields from the companies as planned in the research protocol. This did not yield any results because by 2007 when the 2005 information was requested from the companies, their databases had in most cases have been updated and some employees who had tested had left the companies and had been deleted from the database of eligible employees that was prepared to be shared with the DAI service providers. It was therefore not possible for the HR departments to issue the study with old and confidential company records. The decision was then made to work with the information that was available. After the selection of companies based on the availability of analyzable information, the included companies were regarded sufficient for the study because of their even distribution across the various sectors as well as adequate representation of the different lengths of time on the DAI programme.

Table A-1 shows all the fields that were available and those that were not available for the 23 companies that could have been analysed and thus resulted in only 8 being selected. In
Table A-2 the time that has been spent by a company on the programme also appeared to be very important in determining the acceptance of an HIV workplace programme. The DAI Programme started in 2002 and the general trend had been that uptake of VCT tends to increase after a period of about a year of the company having joined the programme. Around this time the employees have established some sense of trust in the independence of the

Table A-1: Available & Unavailable data fields for 23 companies eligible for analysis

	Company	ID Number	Age	Sex	Race	No. of years employed	Marital Status	Employment category
1		□	□	x	x	x	x	X
2	A	□	□	□	□	□	x	□
3		□	□	x	x	□	x	X
4		□	□	x	x	□	x	X
5	B	□	□	□	□	□	□	X
6		□	□	x	x	□	x	X
7		□	□	x	x	□	x	X
8		□	□	x	x	x	x	X
9	C	□	□	□	□	□	□	□
10	D	□	□	□	□	□	□	X
11		□	□	x	x	x	x	X
12	E	□	□	□	□	□	□	X
13	F	□	□	□	□	□	□	X
14		□	□	x	x	x	x	X
15		□	□	□	x	x	x	X
16		□	□	□	x	□	x	X
17		x	x	□	□	x	x	□
18		x	x	□	□	□	x	X
19		x	x	□	x	x	x	X
20		□	□	x	x	x	x	X
21	G	□	□	□	□	□	□	X
22	H	□	□	□	□	□	x	X
23		□	□	x	x	x	x	X

□ = available x = unavailable

programme from the company's management and are more willing to come forward for testing because they feel that confidentiality is guaranteed. The 8 companies that were selected for analysis were well distributed in terms of time period on the DAI Programme with one company in the first year, four in the second year, two in the third year and one in the fourth year (Table A-2).

Table A-2: Total period on DAI Programme, Employee Population and percentage uptake of VCT in 2005 for the 23 eligible DAI companies that could have been analyzed

	Months on program at end Dec 05	Years on program	Employee Population	# tested 2005	% VCT uptake 2005
1	2	0.2	1052	76	7.2%
2	4	0.3	580	98	16.9%
3	4	0.3	157	77	49.0%
4	8	0.7	242	108	44.6%
5	12	1.0	1630	785	48.2%
6	14	1.2	17975	4456	24.8%
7	14	1.2	663	125	18.9%
8	16	1.3	29028	6293	21.7%
9	16	1.3	4180	760	18.2%
10	17	1.4	454	55	12.1%
11	22	1.8	1983	271	13.7%
12	22	1.8	301	30	10.0%
13	23	1.9	126	18	14.3%
14	24	2.0	273	71	26.0%
15	25	2.1	209	46	22.0%
16	25	2.1	1701	286	16.8%
17	28	2.3	2386	255	10.7%
18	29	2.4	2852	85	3.0%
19	31	2.6	73	15	20.5%
20	32	2.7	509	154	30.3%
21	37	3.1	3806	481	12.6%
22	39	3.3	2838	200	7.0%
23	42	3.5	287	26	9.1%
			73305	**14771**	**20.2%**

Appendix 2: Descriptive information for HIV UNTESTED employees

Table A-3 describes the socio demographic characteristics of all the untested employees. As indicated previously, the untested employees formed 87% of the study population and therefore showed similar characteristics as those of the total employee population.

Table A-3: Descriptive statistics of socio-demographic of untested employees by company

	A	B	C	D	E	F	G	H	Total
Total (n)*	355	399	202	2131	1712	533	967	3325	9624
Age (years)**									
Mean	44.68	36.55	42.87	36.01	38.07	39.01	31.74	34.2	35.98
SD	10.47	9.1	10.1	8.69	9.71	10.23	9.2	7.44	9.19
Minimum	23.22	21.1	24.14	19.7	18.69	21.62	18.02	20.21	18.02
Maximum	66.63	64	74.34	71.79	89.16	77.71	69.21	67.65	89.16
Time employed by company (years)**									
Mean	15.9	4.5	3.5	5.34	2.38	3.5	2.97	5.5	4.92
SD	9.49	6.41	7.42	5.72	4.9	7.49	3.81	2.78	5.49
Minimum	1.5	0.58	1.25	0.63	0.08	0.19	0.14	0.52	0.08
Maximum	40.5	30.46	31.75	42.91	36.96	33.3	22.05	12.25	42.91
Marital Status (n%)***									
Divorced	12 (3.70)	10 (2.51)	13 (6.44)	96 (4.50)	-	-	21 (2.15)	154 (4.73)	306 (4.20)
Married	228 (70.37)	117 (29.32)	103 (50.99)	1014 (47.58)	-	-	220 (22.54)	1555 (47.79)	3237 (44.43)
Single	82 (25.31)	268 (67.17)	85 (42.08)	1007 (47.25)	-	-	723 (74.08)	1378 (42.35)	3543 (48.63)
Widowed	1 (0.31)	4 (1.00)	1 (0.50)	14 (0.66)	-	-	12 (1.23)	20 (0.61)	52 (0.71)
Unknown	1 (0.31)	0 (0.00)	0 (0.00)	0 (0.00)	-	-	0 (0.00)	147 (4.52)	148 (2.03)
Race (n%)**									
Black	202 (57.39)	348 (87.22)	76 (42.46)	438 (20.55)	581 (33.94)	216 (40.15)	423 (43.34)	913 (27.47)	3197 (33.26)
Coloured	35 (9.94)	3 (0.75)	18 (10.06)	183 (8.59)	80 (4.67)	111 (20.63)	144 (14.75)	903 (27.17)	1477 (15.37)
Indian	12 (3.41)	1 (0.25)	0 (0.00)	177 (8.31)	398 (23.25)	70 (13.01)	66 (6.76)	379 (11.40)	1103 (11.48)
White	103 (29.26)	47 (11.78)	85 (47.49)	1333 (62.55)	653 (38.14)	141 (26.21)	343 (35.14)	1129 (33.97)	3834 (39.89)
Sex (n%)**									
Female	51 (14.49)	65 (16.29)	111 (54.95)	1251 (58.70)	1126 (65.77)	349 (64.87)	521 (53.38)	1460 (43.91)	4934 (51.21)
Male	301 (85.51)	334 (83.71)	91 (45.05)	880 (41.30)	586 (34.23)	189 (35.13)	455 (46.62)	1865 (56.09)	4701 (48.79)
Age (n%) **									
< 35	76 (21.41)	201 (50.38)	55 (27.23)	1145 (53.73)	750 (43.81)	222 (41.65)	695 (71.87)	2118 (63.70)	5262 (54.68)
≥ 35	279 (78.59)	198 (49.62)	147 (72.77)	986 (46.27)	962 (56.19)	311 (58.35)	272 (28.13)	1207 (36.30)	4362 (45.32)
Time employed by company (n%)**									
<1 year	0 (0.00)	47 (11.78)	0 (0.00)	185 (8.68)	601 (35.11)	110 (20.45)	297 (30.43)	206 (6.20)	1446 (15.00)
≥1 year	355 (100.00)	352 (88.22)	201 (100.00)	1946 (91.32)	1111 (64.89)	428 (79.55)	679 (69.57)	3119 (93.80)	8191 (85.00)

*Total number of employees per company ** some information was missing. *** Information on marital status is not collected by companies (E and F).