An Investigation into the Prevalence of HIV/AIDS among Elderly People in Region A, Eastern Cape Province

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Abstract

Many studies have been done on the prevalence of HIV/AIDS in Africa, and the results do not show an improvement in awareness of this pandemic. Little has been written on HIV/AIDS and the elderly. Results from WHO and UNAIDS point at an alarming number of HIV/AIDS cases in the Sub-Saharan part of Africa. The main focus of this study is to add another layer of knowledge to that which exists on this subject, thereby creating an improvement in the understanding and awareness and therefore investigate the prevalence of HIV/AIDS among the elderly. The targeted population are those aged 45 and above in Region A of the Eastern Cape Province of South Africa. Key areas of inquiry are patient care and their well-being. An analysis of the results from the Ante-Natal Clinics and ATICC Data set are key to delivery of important conclusions that meet the study objectives.

Declaration

I, the undersigned, hereby declare that the work contained in this essay is my original work, and that any work done by others or by myself previously has been acknowledged and referenced accordingly.

Antoine Bahizi, 19 May 2011

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1. Introduction

1.1 Background of the Study

Much effort has been made to meet the scourge of HIV/AIDS within Africa. This endeavour is ongoing and encompasses medical treatment as well as support and care programmes.

To this end the priorities are twofold:

1. To raise enough funds to meet the cost of medical treatment.

2. To produce a vaccine that will not only reduce the spread of this pandemic, but more importantly, will eradicate HIV/AIDS completely.

Results released by the joint United Nations programme on HIV/AIDS (UNAIDS) in 2009 revealed that more than 33.3 million people were HIV positive, this figure being largely proportional to Sub-Saharan Africa of which 70% were African. Furthermore, 2.6 million people had been infected with HIV, while an estimated 1.8 million people died because of AIDS. Of the 33 countries where the HIV/AIDS rate has fallen beyond 25%, 22 of those countries are located in Sub-Saharan African as shown in figure 1.1 [UNA10].
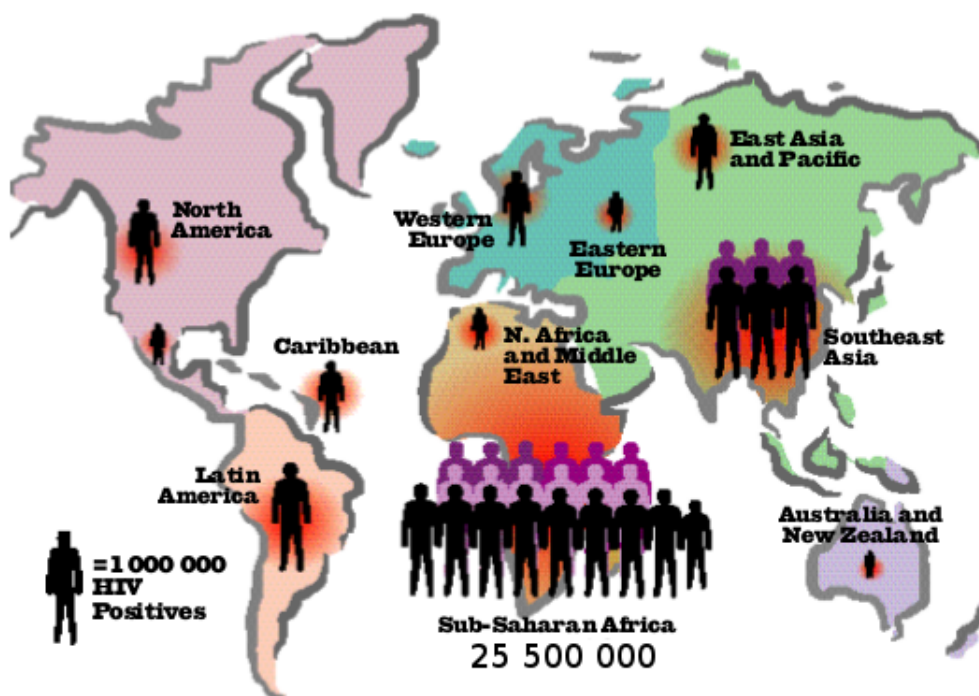
Figure 1.1: The map of HIV/AIDS proportion over the world.

Astonishingly, half of the people living with HIV are in fact women and girls [UNA10]. What is equally striking is the domino effect in the way it unfolds, spreading from individuals into families and from thereon into entire communities. The effect of this on the elderly is extreme, as it is they who have to carry the financial and physical burden of caring for surviving 'AIDS orphans'. Devastatingly, HIV/AIDS

is often transferred to the elderly through secondary infection, which occurs through normal daily activities within the context of poverty-stricken households, where there is a great deal of intimacy [Mba07].

Sadly, this impact on the elderly is unavoidable as, with young parents dying of HIV/AIDS, the grandparents are often the only carers available to these 'AIDS orphans'. Furthermore, this impact is compounded by their minimal resources, placing them under severe economic strain. Conversely, not all grandparents have been 'caring' and documentary evidence has shown that some 'AIDS orphans' have been abused by their grandfathers. This behaviour is seeped in mythology, with HIV positive grandfathers mistakenly believing that sleeping with a virgin will cure them of HIV/AIDS [She99]. With this context, it is clear that the extended African family is under considerable strain.

In summary, notwithstanding the expected population growth expected in Africa, in comparison with the rest of the world, the HIV and AIDS pandemic remains its greatest challenge and the elderly are heavily affected.

1.2 Statement of the Problem

This study will cover the prevalence rate of HIV/AIDS amongst the elderly of region A (on the Fig.1.2) in the Eastern Cape, based on the AIDS Training and Information Counselling Centre data (ATICC). Through this analysis, the effect of HIV/AIDS on the elderly[1] will be exposed in greater detail, specifically to establish whether there is any correlation between the elderly and the youth in the spread of this disease. The rate of older infected people[2] will be determined, which will be applied to the 1996 national census, to estimate the number of infected older people at that time, and the result will be compared to the antenatal survey prevalence rate of HIV.
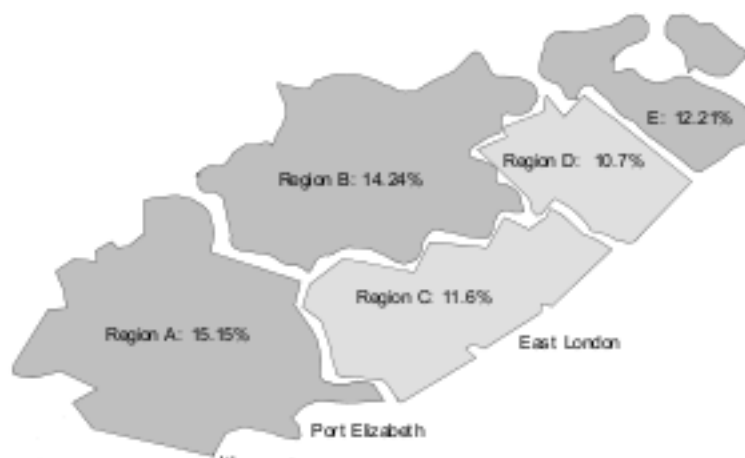
Figure 1.2: The map showing the health regions of the Eastern Cape Province.

1.3 Study Objectives

The objectives of this study are the following:

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[1]This term will be used through out this work, to mean the group aged 60 and above
[2]Older people will be used through out this work to mean the group aged 45 and above

  i Establishing the prevalence of HIV/AIDS among the elderly.

  ii Probing how HIV /AIDS is filtered through to the elderly.

  iii Assessing the effect of 'sugar daddy' phenomenon on the spread of HIV/AIDS.

  iv Assessing the "virgin myth" on the spread of HIV/AIDS.

1.4   Overview of the Chapters

The study will be structured into five chapters, as follows:

Chapter one will deal with the current status of HIV/AIDS, outlining the nature of the disease and its impact within the global arena.

Chapter two will offer a review of relevant literature, specifically pertaining to the Eastern Cape, which will be used as the analytical framework that will drive this study.

Chapter three will provide the description of the data that will form the data analysis of this study.

Chapter four will draw from the data in chapter 3 to reflect upon the nature in which HIV/AIDS is filtered into this community. Significantly, it will examine its effects on the elderly in region A of the Eastern Cape; explore the rate of its occurrence within this group, and assess the possibilities of the young (aged $13-19$) being infected by their elders. An analysis of this data will be offered, which will form the statistical interpretation of this study.

Chapter five will draw together the pertinent findings of this research and offer helpful recommendations in dealing with the HIV/AIDS pandemic, which will be disseminated to the relevant institutions who would benefit from this study.

2. Literature Review

This chapter will offer an overview of the current situation with regard to HIV/AIDS in the Eastern Cape Province.

The choice of the Eastern Cape for this research is two-fold:

1. Its relatively significantly high rate of HIV/AIDS, and

2. Its poor socio-economic conditions, an obviously exacerbating factor in controlling the spread of HIV/AIDS in the Eastern Cape Province.

2.1 The Elderly as Caregivers in the Eastern Cape

Knodel et al [HT05] identified seven ways in which the elderly are experiencing the impact of HIV/AIDS pandemic in their family or household level as following: care-giving, co-residence with ill adults, needing to give financial or material support when the adult child was ill, paying for the funeral of the deceased child, fostering grandchildren, and dealing with negative community reactions. According to Drimie [Dri03] confirmed that given the increase of new infections cases of HIV/AIDS, this pandemic will seriously have impact on range of land issues and livelihood strategies.

As is often the norm in developing countries, young parents from rural areas find it necessary to seek employment in urban areas. Thus children are often left behind in the care of grandparents, who themselves are battling to survive on meagre old-age pensions, which have to be stretched to provide, albeit inadequately, for their over-extended households [SO07].

Moreover, because of their poverty the provision of basic needs takes precedence over the purchasing of protective material necessary for undertaking care-giving activities. This problem is compounded by the high illiteracy rate amongst the group under discussion, which is problematic in terms of dissemination of knowledge amongst themselves about transmission vectors of HIV/AIDS pandemic [She99].

What is encouraging is that community teaching initiatives have gone some way to assist these over-burdened carers to bolster their income by teaching skills such as sewing and gardening, however, there are limitations as to the number of people who can be assisted in this way [RJ10].

According to Shell [She99], often the spread of this pandemic to the household heads often occurred due to factors such as wars or migrant labour. Thus, the status of older people is relevant to this study.

The older person's health and well-being is affected by HIV/AIDS in various direct and/or indirect ways such as physical and mental stress, anxiety and exhaustion caused by care-giving activities. While the impact of HIV/AIDS on care-giving activities on the elderly is not easy to quantify, there might be a definite correlation between the care-giving and negative mental and physical health consequences on the care-givers [She99].

Makwana et al [MK06] continues by showing us that the age factor is pertinent as members of the population in category $(50 - 60)$ who are healthy, are able to handle these care-giving activities more easily than those in category $80+$. According to Schartz et al [SO07], with the increasing population of aged people, more attention should be paid to ensure a good life for the elderly.

In tracing the pattern of the spread of HIV/AIDS, it is critical to note that women are more easily

infected than men. Ironically, they are also more often than not the primary care-givers. According to Munthree et al [MM10], the burden on the elderly in caring for the infected grandchildren is more common in rural areas.

2.2   The Prevalence of HIV/AIDS among the Elderly

The prevalence of HIV/AIDS among the elderly is an under-researched topic, with the focus being more heavily weighted towards the youth. Studies of the former also pose more challenges as it entails differentiating symptoms of HIV/AIDS compared with those of the normal ageing process [KMB+04].

With the passing of time, as the young people infected with HIV/AIDS get older, this problem graduates to becoming a problem affecting the elderly. This translates into an increasing number of infected people living with HIV/AIDS in the 45+ age group. This may be attributed to living longer due to the advanced HIV/AIDS therapy. Conversely, the perception that people aged 50 years and older are sexually inactive, could mean that they are not targeted for screening, or do not expose themselves to the screening process. In such cases, where the elderly are not regularly tested for HIV, definitive data is difficult to obtain [And]. This thesis addresses these issues with concern.

The demographic transition from the high fertility and mortality to low fertility and mortality is set within the structure of graduation from a young to an ageing population. Moreover, given the increased number of the elderly people in South Africa and considering the increase of this category of population, the employer has to plan for an increase in the magnitude of pension payment [Udj06].

The older people are not considered at risk but they are. With the advanced pharmaceutical products and introduction to the market of Viagra, the latter has contributed to an increase in sexual intercourse amongst the elderly, who consider the use of contraception or STDs[1] barriers unnecessary as they have passed their child-bearing years [And].

Unfortunately, confronting issues such as sex and HIV/AIDS with people of the 60+ age group is challenging as culturally, discussion of sexual topics is taboo. Therefore, for health workers attempting to disseminate information about the transmission vectors of HIV and its prevention amongst the elderly, this is fraught with difficult. One would thus concede that this type of dissemination would have more impact on the youth than on the elderly [Udj06].

Furthermore, symptoms of HIV/AIDS amongst the elderly are often confused with those attributable to the normal ageing process [And]. However, evidence suggest that the occurrence of HIV/ AIDS amongst the elderly is increasing and AIDS death of people in labour market is likely to increase the number of population-dependency, especially among the young and the elderly [Udj06].

Through the basis of the data set (Robert Shell,2000 and the national census,1996), this study will determine the prevalence rate of HIV in the elderly, being mindful of the importance of age, sex, area of residence and marital status.

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[1]Sexually Transmitted Diseases.

2.3   The Phenomenon of 'Sugar Daddy'.

Ironically, while a South African researcher, Haldenwang,1993, asserted that although "we do not have the vaccine for HIV/AIDS, education should be the best strategy in the prevention of the spread of HIV/AIDS"; literature by Shell [She99], showed that for many of the youth, the place of contact with HIV/AIDS is, in fact, the schools.

It is here that the practice of unprotected sex is engaged in by schoolchildren, with the mean age of first intercourse for female students being 15 years of age and for male students, 14 years. Reasons given by the youth vary from peer pressure to rape. Alarming cases have been reported where students are forced into obligatory sexual practices with their teachers in exchange for good marks [SZ00].

Young girls are also targeted by older men who are infected with HIV/AIDS. These mistakenly believe that having sexual contact with a virgin will cure them of the disease and ensnare young girls from poverty stricken backgrounds with the promise of the financial security [SZ00].

Moreover, the 'sugar daddy' phenomenon has another side called a transaction sex relationship where girls are, themselves, looking for these men. Normally, this kind of relationship is characterised by transaction of money or gifts. Unfortunately, they are exposing themselves to older people who have had many sexual partners previously and are HIV/AIDS positive and infected with a variety of other STDs [Gba99]. Within time this behaviour results in a vicious circle wherein ambiguity arises about which group transmits the disease to the other, as they both become equally infected [UNA10].

It is this scenario that informs the notion of 'sugar daddy', thus this study hypothesises that the elderly target the younger and most socially vulnerable members of the community.

2.4   Summary of Literature Review

Within the Eastern Cape Province, the literature reveals that the 45+ age group people are affected primarily through care-giving activities. Moreover, much scientific research has to be done so that greater attention be focused on this category of older people.

The literature review shows that women are more likely to be infected than men. This is partly due to female physiology as well as the lack of power in the negotiating sexual relationships with their partners.

The literature review shows that we have a relatively higher prevalence rate of HIV/AIDS among elderly people. This implies that this category of people are sexually active. It is thus mandatory that the relevant institutions educate this category of the population about safe sexual behaviour and preventive measures to counteract HIV infections.

Furthermore, As HIV/AIDS decimates the younger parents of the Eastern Cape Province, the elderly are faced with the dilemma of raising and providing for their all too numerous grandchildren. It is thus imperative that the elderly be supported in ways that will help them cope with the excessive burden placed on them. Assistance should be structured in ways that meet their socio-economic, physical and emotional needs.

The 'sugar daddy' phenomenon is a significant factor in the spread of HIV/AIDS and the lack of quantitative data in terms of these relationships creates further challenges. The provision of private testing centres for men where they would not only be screened for HIV, but also questioned about their sexual relationship/s with a view to encouraging safer sexual behaviour would be beneficial. Within such

spaces the 'sugar daddy' phenomenon could be addressed.

Greater attention needs to be placed on the phenomenon of 'sugar daddy' and it is unfortunate that, as yet, there is no law against such relationships. This is something that needs to be urgently addressed.

Furthermore, a more specialised programme which includes regular follow up needs to be implemented among this group of people. Moreover, further research is required to assess the impact of drugs such as Viagra on this particularly community of people in the Eastern Cape.

Moreover, given that HIV/AIDS deaths are increasing among the parents where the children will have to be taken care by their grandparent, there should be conflict between the grandchildren and grandparents since grandparents should not be able to pay for school fees and other needs for their numerous grandchildren.

This study is based on the AIDS Training and Information Counselling Centre dataset, from which some partial conclusion have made and some hypotheses introduced. Methodological method and description of the data will be introduced in the next chapter.

3. Evaluation of the Data

3.1 Introduction

The literature review of what has been done on this topic have been highlighted in the previous chapters, however, the methodological methods have to be described. In this chapter, the AIDS Training and Information Counselling dataset and Antenatal clinic survey will be described. Note that the limit of this study is descriptive.

In this study, the statistical package SPSS 16 will be used. The study will be limited to descriptive statistics which will help to define some significant statistical relationships between variables. To perform the latter, the notion of mean, median, mode, age dependency ratio, the Chi-square test and the contingency table, which are powerful tools for this study, will be used.

3.1.1 Sex Ratio. The sex ratio is a demographic measure which relates the proportion of males to females. It is usually measured as a given number of males to 100 females. Thus, we have the following formula:

$$\text{Sex ratio} = \frac{\text{male population}}{\text{female population}} \times 100 \tag{3.1.1}$$

This measure will show the majority or minority of men in the population. In other words, when the sex ratio is less than 100 means that we have more women, otherwise, we have more men. At 36 years old, the sex ratio of AIDS patients exceeds the sex ratio of the population at risk as shown in figure A.1.

3.1.2 Age Dependency Ratio. The age-dependency ratio is a measure of the structure of population. This measure relates to the proportion of the population who are likely to be dependent (those who are younger than 15 and those who are older than 60) to the size of the population who are active (those who are aged 16 to 60).

$$\text{Age-dependency ratio} = \frac{\text{Population (0 year old to 15 year old)} + \text{Population (60 year and above)}}{\text{Population (16 year old to 60 year old)}} \tag{3.1.2}$$

In South Africa, in the period 1968 to 2008, the age dependency ratio decreased from 84.33% to 54.15% respectively [TE] and the old age dependency was calculated at 8%.

$$\text{Old age-dependency ratio} = \frac{\text{Population (60 year old to up)}}{\text{Population (16 year old to 60 year old)}} \tag{3.1.3}$$

The old age dependency ratio is sensitive to fertility and HIV/AIDS prevalence which are also very correlated. In the Eastern Cape Province, the prevalence of HIV/AIDS is high among the working group. A new concept of age dependency ratio should be defined since they are receiving care from the heads of household, who are mostly the elderly people.

Moreover, not all the elderly are in the dependency group since there are young children who are financially dependent on the elderly. Thus the high incidence of HIV/AIDS in the the Eastern Cape Province creates a high age dependency ratio.

3.2   Antenatal Survey Clinic Survey

Most studies on the prevalence of HIV/AIDS in South Africa are based on the National Antenatal Survey Clinics, which is done throughout the country every October of each year. Those participating in this survey are mostly pregnant women [She99].

The difficulties faced by the antenatal clinics to get younger women to have themselves screened for syphilis and HIV/AIDS was noted in 1994. These women were reluctant as they preferred 'not to know'. This is largely influenced by the fact that they are still minors in the family home and they fear that should they be tested positive for HIV or other sexually transmitted diseases that this knowledge would be an additional burden for their elders to bear. Ultimately, this affects the statistical data of the HIV/AIDS research, especially amongst the population aged 15-19 years, showing a falsely decreased figure for this age set [She99].

In terms of full representation, this survey is methodologically flawed as it does not cover all categories of the population. Thus the results of this survey can be misleading [She99]. As it covers a group of people who are sexually active, we would expect a high prevalence rate of HIV/AIDS compared to the one conducted by ATICC which covers all categories of the population.

Furthermore, the data is weakened by the omission of the important categories in this survey, such as level of education and income levels as well as full representation of the population. At this point, I wish to emphasize that the national antenatal clinic survey is accurate and covers both the rural and urban areas. The only methodology problem is that it only covers one specific group of the population, this being pregnant women, who are themselves at high risk since they are sexually active.

3.3   Source of the Data

This study has utilised alternative data and encompasses available data on existing cases of HIV/AIDS, which have been positively confirmed and registered by the Port Elizabeth ATICC (Aids Training Information Counselling Centre) clinics between 1990 and 2000.

This new data was gleaned from District Surgeons, Eastern Cape Blood Transfusion, the Province Hospital, municipal antenatal clinics, Insurance companies, the prison services, the South Africa National Defence and Police service, private doctors and Health district officer [She99]. It is important to note that the general principles of social sciences regarding ethics such as the anonymity and confidentiality of respondents will be respected in this study.

More variables (age, sex, year of diagnosis) and more information (kin relationship, mode of transmission, age at death, status, institutions of diagnosis) were registered. The ATICC[1] survey captured all categories of the population including a specific category of the population such as the old people. In other words, the statistical comparison of the HIV/AIDS epidemic rate will cover the entire population of Region A.

Thus, the ATICC provide more information on the transmission vectors of HIV/AIDS than the national antenatal clinic survey. This information, pertaining to the elderly, contradicts what the literature tells us. In other words, elderly men are more likely to be infected by HIV/AIDS than elderly women.

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[1]AIDS Training and Information counselling Centre

3.4   Evaluation of the Variables and Quality of the Data

The evaluation of the variables will tackle some methodology of the data collection, quality of this data set and the representation of the population of Region A in the Eastern Cape Province. We will evaluate each variable with the object of testing its usefulness for statistical analysis .

The main variables in this study are age, population group, estimated transmitted mode, sex, year of diagnosis, year of death, institutions undertaking the test, stage of HIV and area of residence. Some variables have been well registered where the missing values are less than 1% (for example sex and age) as shown in table 3.1.

Order number	Variables	Number of missing values	Percentage
1	Age	0	0%
2	Sex	156	0.6%
3	Institutions centres	50	0.2%
3	Year of death	25 297	92%
6	Ethnicity	30	0.1%

Table 3.1: The quality of variables of study

3.4.1 Age. In this study, the variable age is important since the concept of elderly and dependency population is defined based on the variable of age.

The variable age has 4,388 missing values representing 0.7%. The quality of this variable is statistically good since the missing values are less than 1%.

From this variable, one can say that more than half of the infected population 54.6% is in range $15 - 29$ while four-fifth of the infected population is in range $15 - 44$. The cohort $(0 - 14)$ represents 9.6% of infection cases and the old cohort $(45+)$ represents 5.7% of infected cases. Thus, the importance of this variable in this study is defined.

3.4.2 Marital Status and Sex. We can see from the pyramid (Fig.4.2) that the women are the major contributors to the ATICC data base. One of the results of the descriptive analysis of the ATICC dataset shows 64% of women are HIV/AIDS positive compared to with 36% of men who are HIV/AIDS positive. From information obtained in the literature review, we know that women are more likely to be infected than men, but some may wonder whether the prevalence rate among women is even higher than is shown in the anc dataset descriptive analysis.

To answer this question, we need to familiarize ourselves with the institutions contributing to the dataset. It is pertinent to note that these institutions included the antenatal clinics and Public Hospitals where you find that the respondents are likely to be more women (pregnant women) than men.

To understand the effect of HIV/AIDS on the elderly (both men and women), examining relationships ties are important in this evaluation. Significantly, household heads are most infected. In addition, the literature reveals that women are more likely to be infected than men. The ATICC data set will be used to test whether this hypothesis is valid in Region A of the Eastern Cape

3.4.3 Ethnicity. Although the literature reveals that it is mostly Black African South African who are infected with HIV/AIDS, one has to bear in mind that the anc dataset collection covers mostly this sector of South African population. Furthermore, White and Indian South Africans are more likely to attend private hospitals, which could also influence the surveys from which much of the literature has

been informed. However, this might not be the only reason. The ATICC data tests everyone including the private doctors.

Despite the poverty in the Eastern Cape Province, the prevalence in this province is not as high as in Kwazulu Natal [She99]. The Ethnicity variable from the ATICC will help us to understand whether the hypothesis that elderly Black Africans South African from Region A in the Eastern Cape have a higher infection rate than other ethnic populations is valid.

3.4.4 Estimated Transmission Mode. During the period of collection of data, information requested was the mode of transmission of HIV for each respondent where the following modes have been registered:

Order number	Mode of transmission	Frequency	Percentage
1	Heterosexual	7366	46.1%
2	Perinatal (MTCT)	1772	11.1%
3	Rape	9	0.1
4	Needle stick	7	0.00%
5	Sexual abuse	5	0.00%
6	Multiple partners	4	0.00%
7	Homosexuals	3	0.00%
8	Haemophilic	1	0.00%
9	Not specific/Unknowns	6,816	42.6%

Table 3.2: HIV/AIDS cases by mode of transmission

In this study where we are interested in the effect and the prevalence of the HIV/AIDS pandemic among the elderly, the unknown cases can be assumed to be the cases where the elderly were infected during the care-giving activities. If so, these care-giving activities come in the second place after the heterosexual mode. Thus, more attention has to be focused on care-giving activities.

Our objective is within this variable. Once we agree that the unknown cases are the incidents of new infection occurred during the care-giving activities, This will give us a statistical rate on how it affects the elderly and recommendations will be given to the relevant institutions.

3.5   Summary

In summary, because of high HIV/AIDS prevalence in Eastern Cape Province, one can say that we are expecting a high age dependency ratio.

In the next chapter, on the basis of the statistical tools developed in this chapter, we will provide a statistical description of AIDS Training and Information Counselling Centre data and the 1996 national census. Despite some variables which have been not registered correctly, this ATICC dataset can be used as a sample representative of Region A in Eastern Cape for this study.

4. Statistical Analysis and Interpretation

The scientific review of the problem, methodology and materials have been introduced and described in the previous chapters. In this chapter, based of the statistical analysis, we will attempt to answer the hypothesises in two ways. Firstly, we will show the vulnerability Eastern Cape Province based on the descriptive analysis of the 1996 national census and secondly, we will determine the prevalence among the 45+ age group of Region A, in the Eastern Cape using AIDS Training and Information Counselling Centre data.

4.1 General Information on 1996 National Census

The national census of 1996 revealed the estimated total population of region A, Eastern Cape Province to be $563,816$ which is a 10% sample of the entire population of this province, of which the male population constituted 46.1% (259,881) and the female population 53.9% (303,935).

The 45+ age group were 100,831 equivalent to 17.8% of whole population, of which 40% represent the male and 60% represent the female. Those who are in 60+ age group constituted 8.7% (48,820) of which female population represent 63.3% and the male population represent 36.7%. The average age, the median and the mode among old population was 60, 59 and 56 respectively. The oldest person is 115 years old. The average age of the whole population is 23.23 and the average age of the old population (45+) is 59.39. The pyramid of age and sex is plotted in figure 4.1. The older female population is twice as large as the older male population.
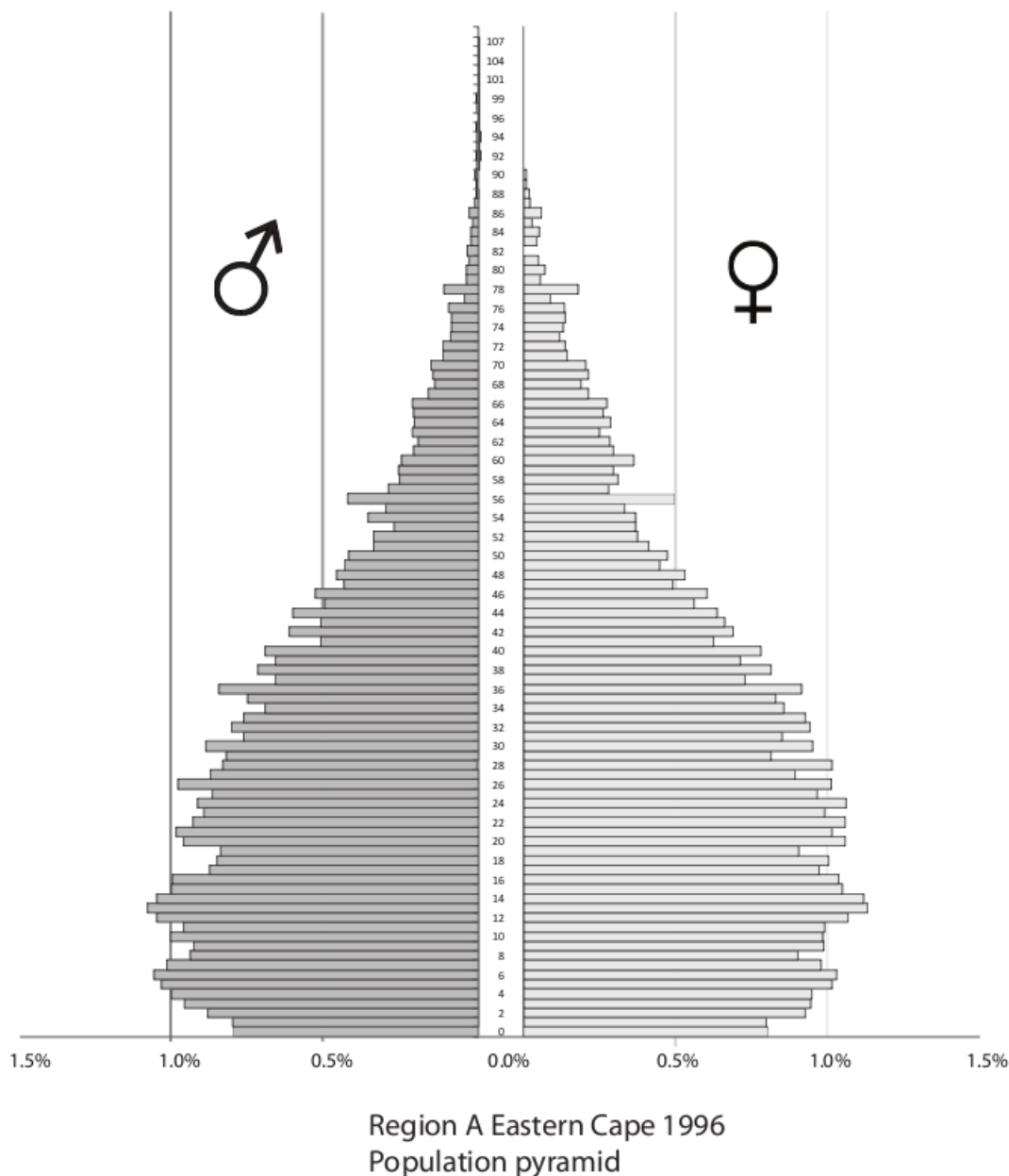
Region A Eastern Cape 1996
Population pyramid

Figure 4.1: Age and sex pyramid. 1996 national census

In the data set, half of the entire population of Eastern Cape did not go to school, 38% and 23% did so among the group $45+$ and the elderly $60+$ respectively. We have many people finishing standard 6 and not continuing for their studies. More studies should be carried out to determine the motivation behind the cessation of schooling at the aforementioned level.

Unfortunately, 85% of whole population are unemployed. Moreover, 79.3% are unemployed in the $45+$ age group and 92% in the $60+$ age group.

In this province, job opportunities are dependent upon a good educational background. This is portrayed within the significant statistical relationship between education and occupation in terms of the test of

association Chi-square $= 498.614, df = 39, \mathsf{p.value} < 2.2e^{-16}$. Expenditure at home depends on the working person since we have a significant relationship between income and occupation (Chi-square $= 2924.302, df = 39, \mathsf{p.value} < 2.2e^{-16}$) . In others words, the ones who are well paid are the ones with high level of education.

More than a quarter of the population does not have any monthly income. Three fourths of the population earn less than R 6000. The situation is worse among older people where more than 32% do not have a monthly income per month and more than 70.5% of the elderly have no monthly income, as detailed in table 4.1.

Order	Amount	All population	group (45+)	group (60+)
1	R 0	19%	32%	70.5%
2	R 1 - R 2400	3.2%	4.2%	2.4%
3	R 2401- R 6000	53.8%	35%	8.9%
4	R 6001 - R 12000	2.4%	9.1%	3.5%

Table 4.1: Income in the Eastern Cape Province

This is a brief descriptive analysis to reflect the vulnerability of the population in the Eastern Cape Province and which illustrates how poverty affects impoverished people generally. A significant consequence is the spread of HIV/AIDS. This is supported by the literature which suggests a correlation between poverty and the spread of HIV/AIDS.

4.2   ATICC Dataset General Information on the Elderly

During the period of data collection from 1996 to May 2000, the total participation was 27,505 with women representing 64% and men 36%. Of the total sample, the elderly (45 and above) are equal to 1636 equivalent to 5.94% where women represent 48.74% and men represent 51.25%. The average, the median and the mode age for the elderly are 51 years old, 49 years old and 45 years old respectively.

The seropositive old people at age of earning pension are 161 (0.58%), of which 90 (55.9%) are men and 71 (44.1%) are female. Among males, the oldest seropositive respondent was 91 year old and among females was 86 year old. The cohort of population is shown in figure 4.2.
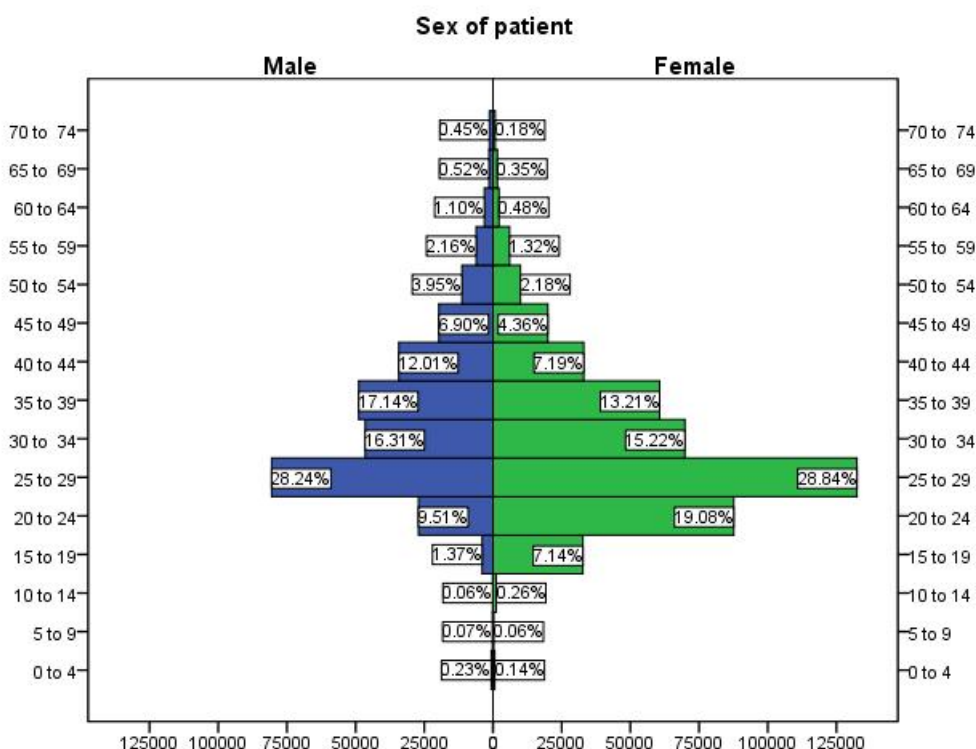
Figure 4.2: Age and sex pyramid. ATICC dataset

In the figure 4.2, the pyramid of age and sex of people with HIV/AIDS is plotted. We clearly observe the predominance of the young girls and the predominance of old men who are HIV/AIDS sero-positive.

Moreover, from the table 4.2, the predominance of HIV/AIDS among older people is observed in the population group where the Black Africans (Xhosa) have 87%, Mixed (Coloured) 9.4%, White 2.8% and finally the Indian is 0.1%.

Order	Population group	Effective	Percentage	Cumulative percentage
1	African	1434	87.7%	87.7%
2	Mixed	153	9.4%	97.2%
3	European	45	2.8%	99.9%
4	India	1	0.1%	100%

Table 4.2: Infection among elderly with respect to the population group

Since 1991, the mortality rate has grown. Death and infection are increasing simultaneously. There may be many reasons explain this, but ultimately this proves that there is, as yet, no curable vaccine for HIV. Moreover, this reveals very strikingly, how HIV/AIDS moves from epidemic to pandemic stages amongst the elderly. One can say that the respondents die in same year that they have been diagnosed as it is shown in the figure 4.3. To verify this one would calculate the average period between diagnosis and actual death, which is calculated at 7 months and 5 days (with sd = 1.00645).
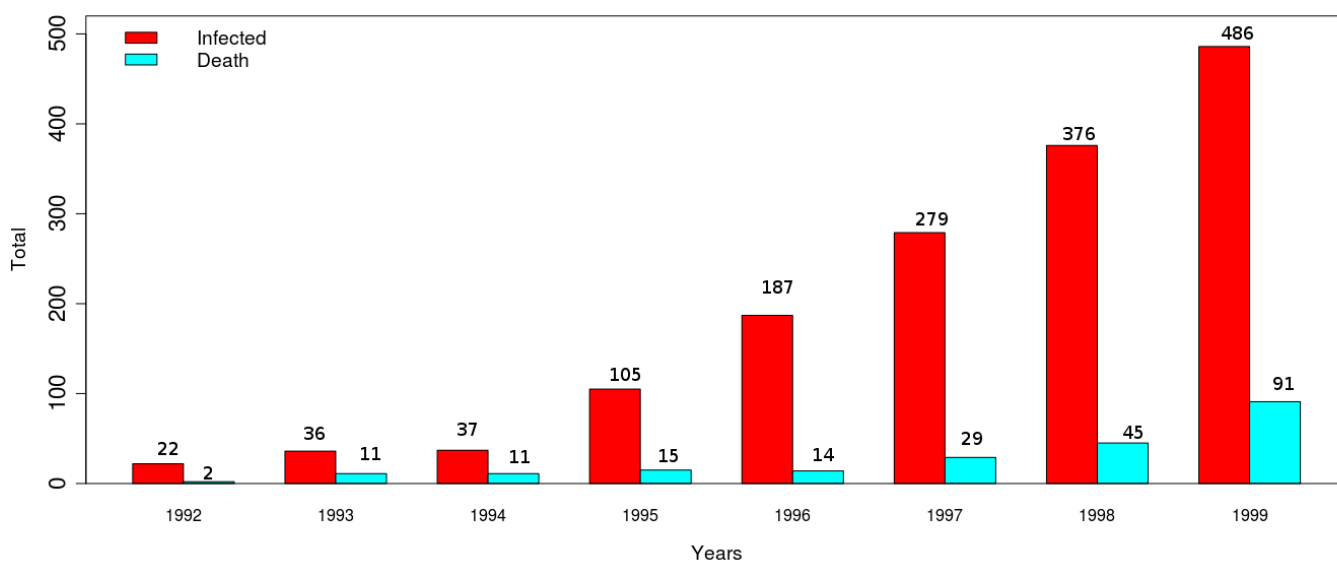
Figure 4.3: Bar chart of cases of infection and deaths since 1991 to 1999

This might imply that the elderly went for the test when they were very sick (dying). This information regarding the average age has to be verified using a larger sample, since the date of death has been registered for 228 people, consisting of older people (45 and up) only.

According to table 4.3, the latter statement is very clear. The illness is obvious since the majority are in the stage 3 of HIV (Symptomatic HIV infection) with 64.9% followed by the stage 4 (called progression from HIV to AIDS) with 24.2%. In other words, the elderly do not participate in the testing program. They attend only when they are experiencing the last stage of HIV/AIDS at which stage their immunity system is compromised.

Order	Stages of HIV/AIDS	Frequency	Percent	Cumulative percent
1	Primary infection	35	9.7%	9.7%
2	Clinically asymptotic stage	4	1.1%	10.9%
3	Symptomatic HIV infection	223	64.9%	75.8%
4	Progression from HIV to AIDS	87	24.2%	100%
Total		359		

Table 4.3: Stages of HIV/AIDS among the elderly

According to figure 4.4, from 1991 to 1994, the effective number of the 45+ men age group HIV positive were twice more the effective number of the 45+ women age group and from 1994 to 1999, the men still being more infected than women but the ratio is almost equal to one. Note that in 1997, more women in 45+ age group were infected than men in the same group. Further research can be done to discover what happened with the HIV/AIDS programme in region A in 1997.
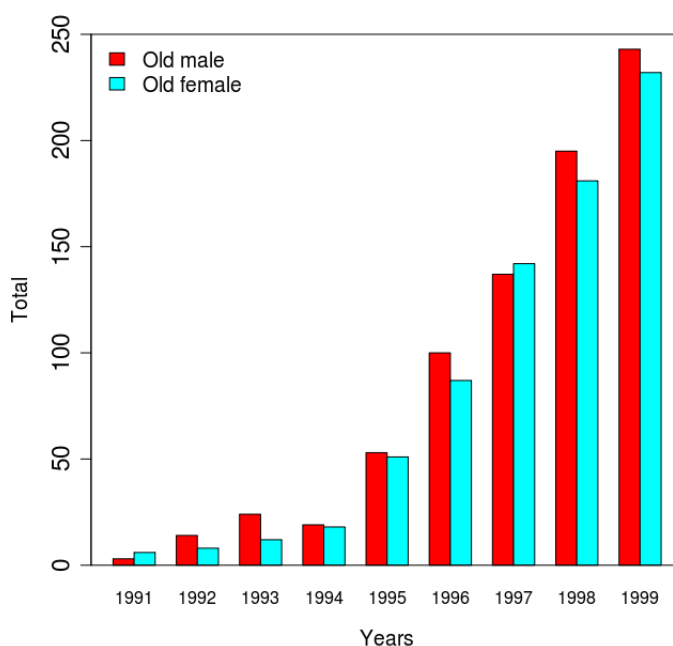
Figure 4.4: Bar chart of cases of infection among the elderly male and female from 1991 to 1999

The high incidence reflected amongst the males, which was particularly marked in the active age (15-45), is revealed through the literature review to be related to the fact that the females have already died [She99].

4.3   Characteristics of the HIV-Positive Elderly

The reasons for older people taking HIV tests are varied. These reasons are, however, given to the institutions where these tests are undertaken, who in turn will pass this information on to researchers. Older people in general, are more likely to go to hospital (60.7%), clinic (21.5%), private doctors (10.3%), insurance (4.1%). There is a significant statistical relationship between the institutions and sex according to test of association $df = 9$, $Sig = 0.0000$. We have many men as blood donors, in prison, Sanitary Tuberculosis, private, insurance, pre-employment and finally, More women are in hospital as it is shown in figure 4.3.

Order	Institutions	sex ratio
1	Blood donor	600
2	Prison	500
3	Sanitarian Tuberculosis	240
4	Private	168
5	Insurance	157
6	Pre-employment	100
7	Health district officer	100
8	Hospital	95

Table 4.4: Sex ratio and Institutions. Motivation of the test for over 45

This is therefore consistent with the literature review as the actual reasons that the women go to hospitals are that they are pregnant and not for HIV testing. Moreover, this shows us that barrier age in Region A is more than 45 year old.

This result can be interpreted in two ways:

1. The high hospital attendance by women might be related to pregnancy.

2. The men might be satisfying loan or insurance requirements as well as meeting work-related requirements. In addition, these tests might be undertaken if they are in prison.

While the data reveals that amongst the elderly population in the Eastern Cape, Black African (Xhosa) people are infected, at a rate of 87.7%, compared with those of mixed ancestry 9.4%, Whites 2.8% and Indians 0.1%, these figures might be influenced by the largely Black African population in Region A in the Eastern Cape and therefore might not a true reflection. These figures would thus need to be verified by doing further research on the other racial categories of the population. It is important to note that there is a significant relationship between the population group and the institutions where these tests have been done ($df = 27, p = 0.000$). Significant, the elderly are more likely to go to hospitals, a phenomenon no doubt largely influenced by the government initiative of providing free medical treatment for the elderly.

From the dataset, one can confirm that we have many cases of HIV/AIDS among old people (45+) in Port Elizabeth (70.6%), Uitenhage (7.5%), Humansdorp (2.4%). Furthermore, of the older people who are sero-positive in the Eastern Cape, they are more likely to reside in urban areas (Town) than in rural areas.

Attendance of sero-positive elderly people at counselling centres was 114 (7%) for the first round, with men showing a higher rate of attendance during 1992, 1993 and 1994 and women during 1991 and 1995 (form table 4.5(a)). However, attendance at the counselling centres dropped to only 42 (2.6%) during the second round, with the majority of attendance being male. From this study, it can be reduced that elderly men are more likely to attend the counselling centre than old women.
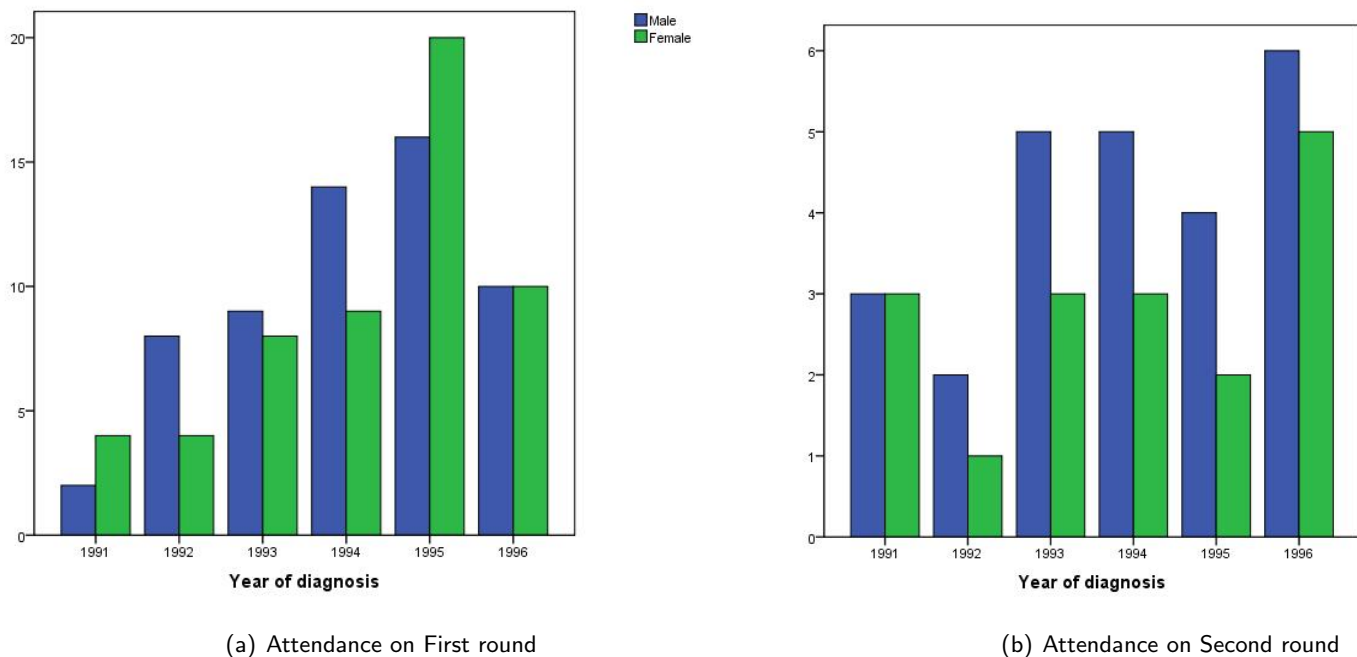
(a) Attendance on First round   (b) Attendance on Second round

Figure 4.5: Attendance to counselling centres in Region A

4.4   The Virginity Myth in Region A

With this region, there is high degree of mythology surrounding sexual intercourse with a virgin as being a cure for HIV/AIDS. The extent of harm caused by this mythology could be determined if more variables are added to our dataset. However, from the figure 4.6 it is evident that this mythology is growing with increasing ferocity within this community.

The adult, married or not, fear their patterns, who may be infected with HIV/AIDS and look for the children who are assumed to be not infected of HIV/AIDS pandemic. The snowball effect of this behaviour is that young girls (5-14) are becoming infected. Within the period 1991 to 2000, it was shown that females in this age group are three times more infected that males of the same age group.
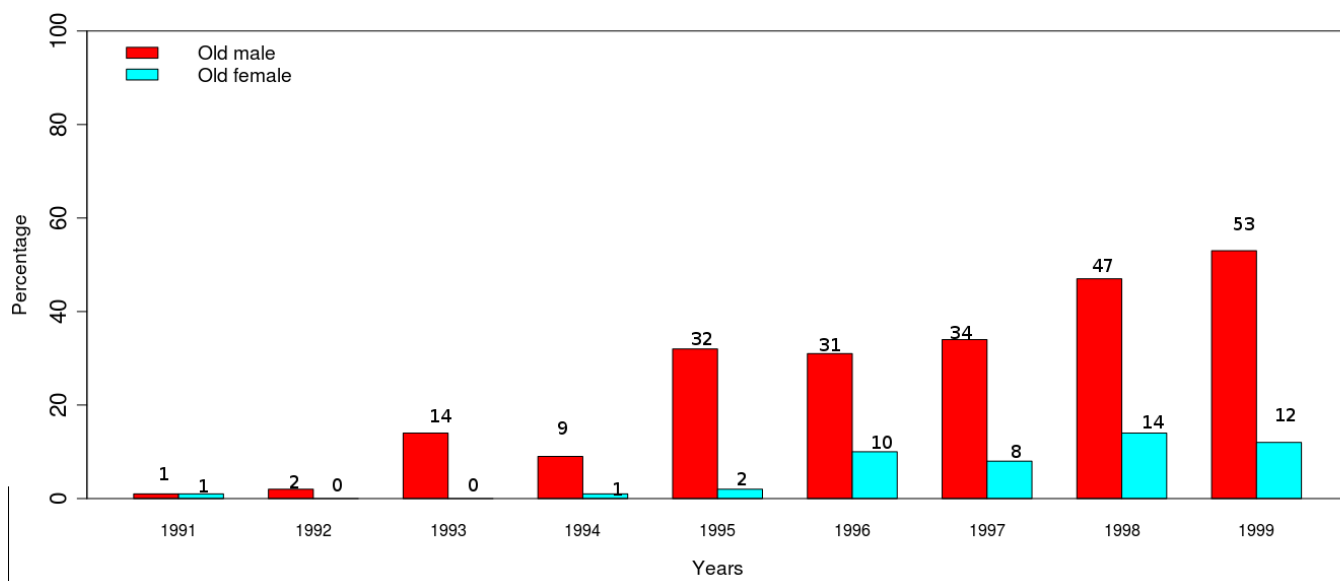
Figure 4.6: Bar chart of the cases of infections among the virgin group (5 to 15 year old)

It is evident that after 1994, the prevalence rate in this group has continued to increase. However, this does not mean that the virginity myth did not exist before 1994, it might well just be that there was less dialogue occurring between Black African South Africans and White authorities [She09].

Unfortunately, our present dataset makes it difficult to determine how widespread the impact of this mythology is. To this end more variables are needed in order to obtain such sexual behaviours with regard to young girls. While one would conclude that this behaviour cannot be attributed to all the elderly men, nor would it affect all the children covered within this study, awareness and research into this conduct is important.

4.5   Rate of HIV in the elderly in 1996

According to table 4.5, 28.03% of the population of Port Elizabeth are infected by HIV, among them 0.9% of the group (45+) are HIV positive. Among older pension holder (60+), 0.2% are infected by HIV/AIDS in Port Elizabeth. According to table 4.5, 28.03% of the population of Port Elizabeth are infected by HIV, among them 0.9% of the group (45+) are HIV positive. Among the 60+ age group, 0.2% are infected by HIV/AIDS in Port Elizabeth.

Towns	Prevalence of HIV/AIDS		
	All categories	group 45+	group60+
Port Elizabeth	28.03%	0.9%	0.2%
Uitenhage	14.9%	0.5%	0.3%
Humansdrop	19.3%	0.14%	0.28%
Middelburg	7.9%	0.5%	0%
Alival North	9.2%	1.5%	0%
Cradack	22.4%	1.1%	0%

Table 4.5: The prevalence rate of HIV with respect to cities of Region A

Moreover, we have the highest rate of the 60+ age group infected by HIV in Humansdrop with 0.25% and the highest rate of the 45+ age group infected by HIV in Cradock with 0.9%. Note that the rate of HIV/AIDS in Alival North and Cradock is almost zero amongst the elderly (60+).

Furthermore, the old people infected by HIV are more likely to be impoverished, for example in group 45+, we have 32.5% living in the street, 9.4% living in site service, 1.8% living in single men's quarters and 0.4% living in squatter camp. Moreover, in the elderly group (60+), 33.5% are living in the street, 11.8% are living in site service, 1.2% are living in the single men's quarters and 0.6% are in squatter camps.

In considering the low income levels and high rates of illiteracy amongst the elderly people of Region A, one might expect the high prevalence rate to be a consequence thereof. However, this is not the case. It would thus be safe to say that the spread of HIV is not directly related to poverty.

In summary, the prevalence rate in Region A, Eastern Cape Province is above 16.95% in all population and 0.8% in the group 45+. Notably, those in the 60+ age group are estimated to be infected at the rate of 0.13% in 1996.

4.6   Weekday and Month of Diagnosis

Figure 4.7(a) shows high diagnosis rates reflected for October and November, which are followed by low diagnosis rates in December. This data might be influenced by the fact that during December clinics are closed over the weekends. Furthermore, with December being a month of festivity, people might be reluctant to be tested, not wanting to have to deal with the trauma of HIV/AIDS during this period of merry-making. Moreover, as is revealed in figure 4.7(b), the under 45 and over 45 age group are more likely to attend clinics for testing on Mondays and Thursdays.
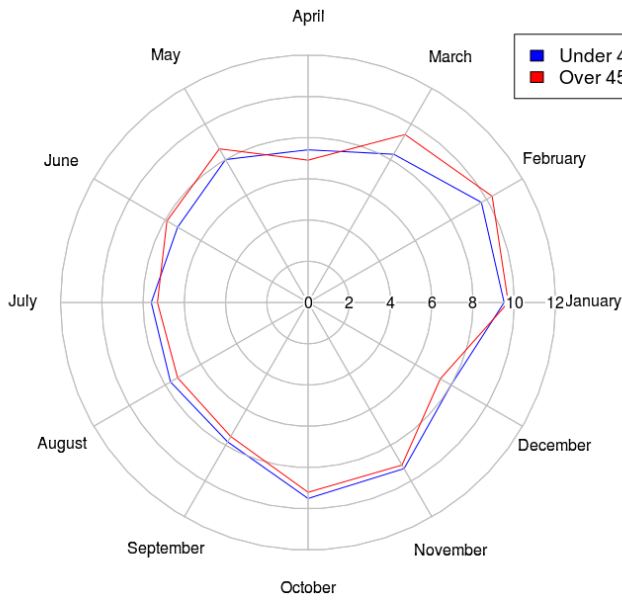
(a) Radar chart of month diagnosis cycles
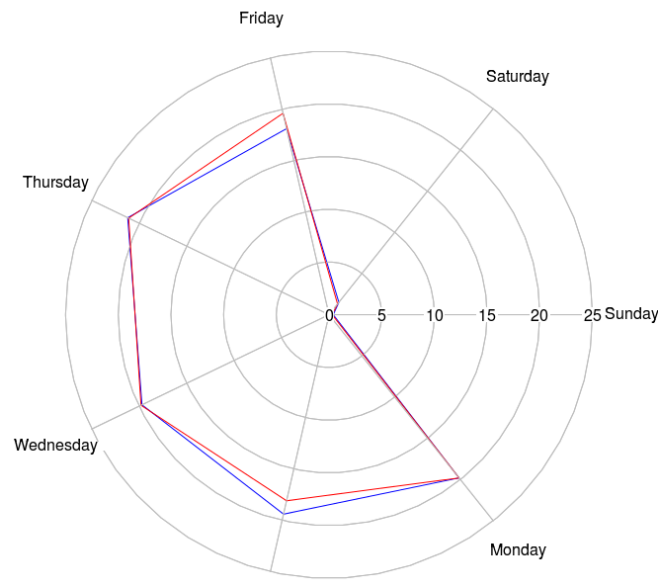
(b) Radar chart of weekday HIV testing

From Monday to Tuesday, the attendance of females from Region A for testing is double that of males as shown in figure 4.7. From this, we can deduce that either the females are failing to notify their partners of their status or alternatively, that they do, but that their partners are not willing to be tested.
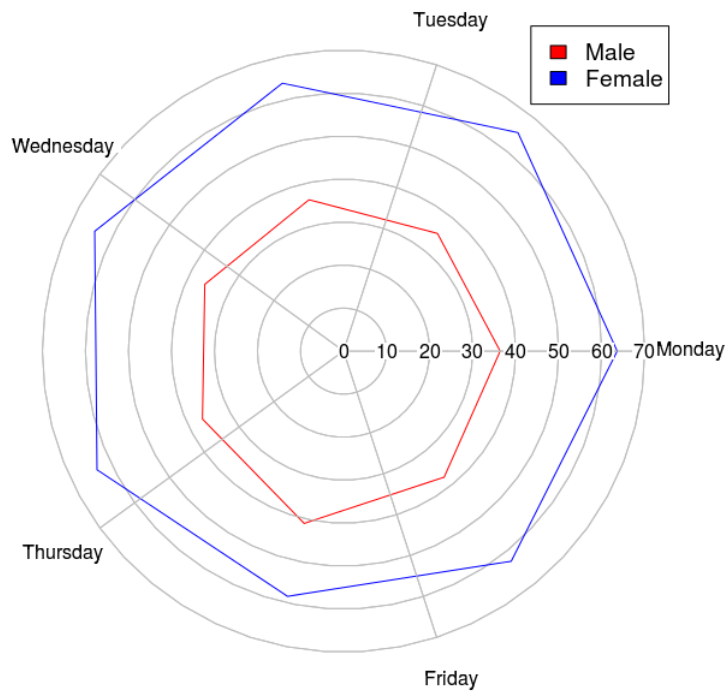

Figure 4.7: Radar chart for cases of infections among male and female in entire the population

4.7   The pattern of HIV/AIDS among the Under 45 and Over 45 Years Old

According to figure 4.8, the proportion of cases of infections decreases in the group (under 45 year old) from 1991 to 1992, and from 1995 to 2000, but from the 1993, the proportion increases until the maximum in 1994. The contrary behaviour appears in the group of over 45 where we register a slight increase from 1991 to 1992 and from 1992 to 1994 where we register the minimum proportion of the 60+ age group who are HIV/AIDS positive.
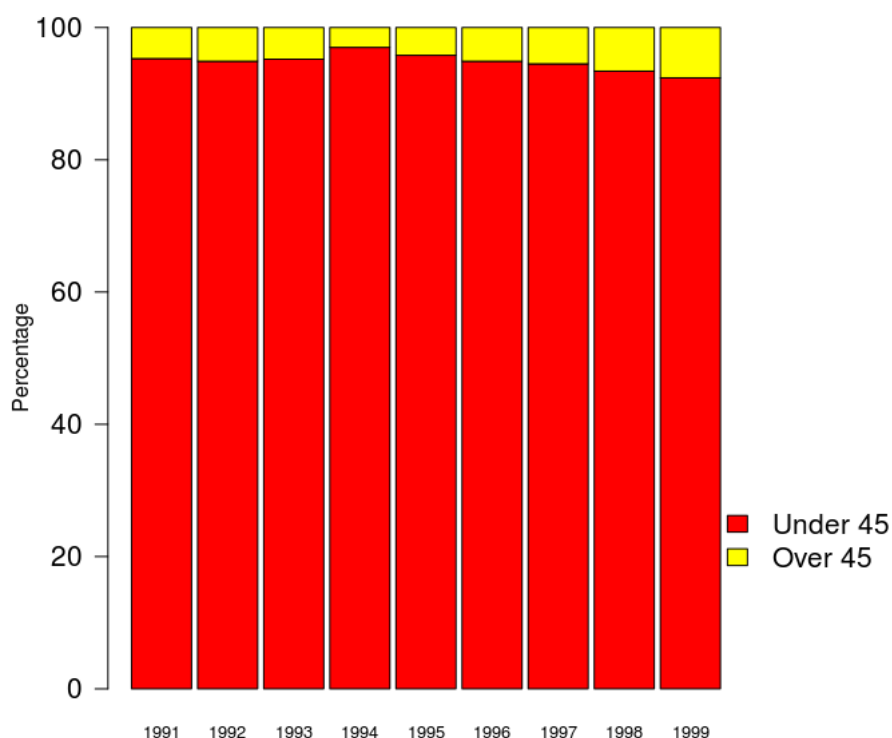

Figure 4.8:   100 percent surface chart of HIV/AIDS proportional cases of infection cases among the over and under 45 years

The pattern that the spread of HIV/AIDS takes is different in the population under 45 and the population over 45. In others words, from the 1991 to 2000 the proportion of the population aged under 45 year old who are HIV/AIDS positive is decreasing, but unfortunately, we registered the increase in the population aged over 45. According to the literature, the high prevalence in 1994 may be related to the repatriated solders of SADF who where in the neighbourhood countries after apartheid regime. One can thus concede that either there is a greater awareness of HIV/AIDS in the group aged under 45 or that they are dying, since the frequency is reducing continuously.

4.8   Cases of Infections among the Under 45 and Over 45

A statistical association between the year of diagnosis and being in the group of under 45 or above 45 is acknowledged, Chi-square $= 89.325$, df $= 9$, Sig $= 0.000$. From this test, since 1991 to 1993, the relative representation of these two groups were almost the same, since 1994 to 1997 and in 2000, the relative representation of under 45 were high and finally, we have a high relative representation of the group over 45 from 1998 to 1999.
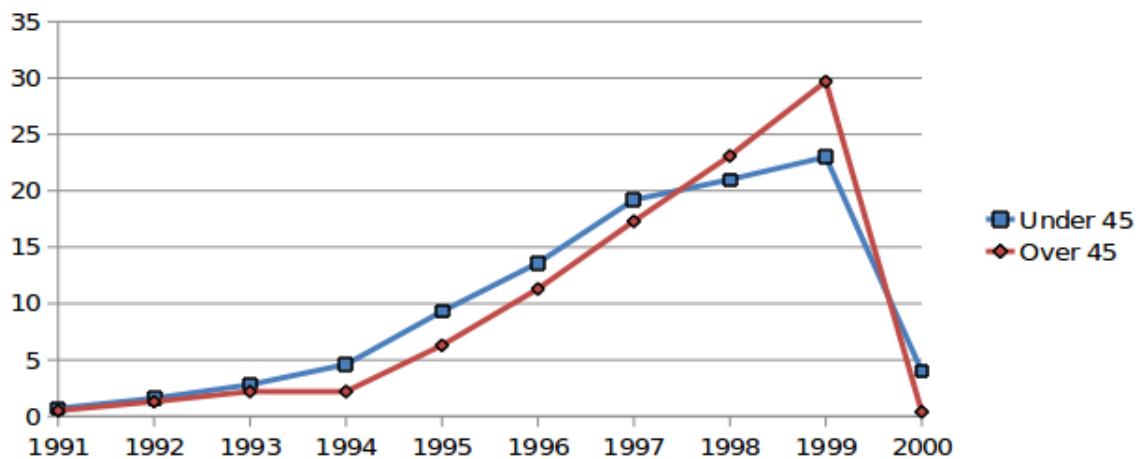

Figure 4.9: Relative representation of under 45 group and over 45 group from 1991 to 2000

4.9   Death among the Under 45 and Over 45 African Population

We have a significant statistical association between the year of death and the under 45 and over 45 Black African with Chi-square $= 104.167$, df $= 10$, Sig $= 0.000$.
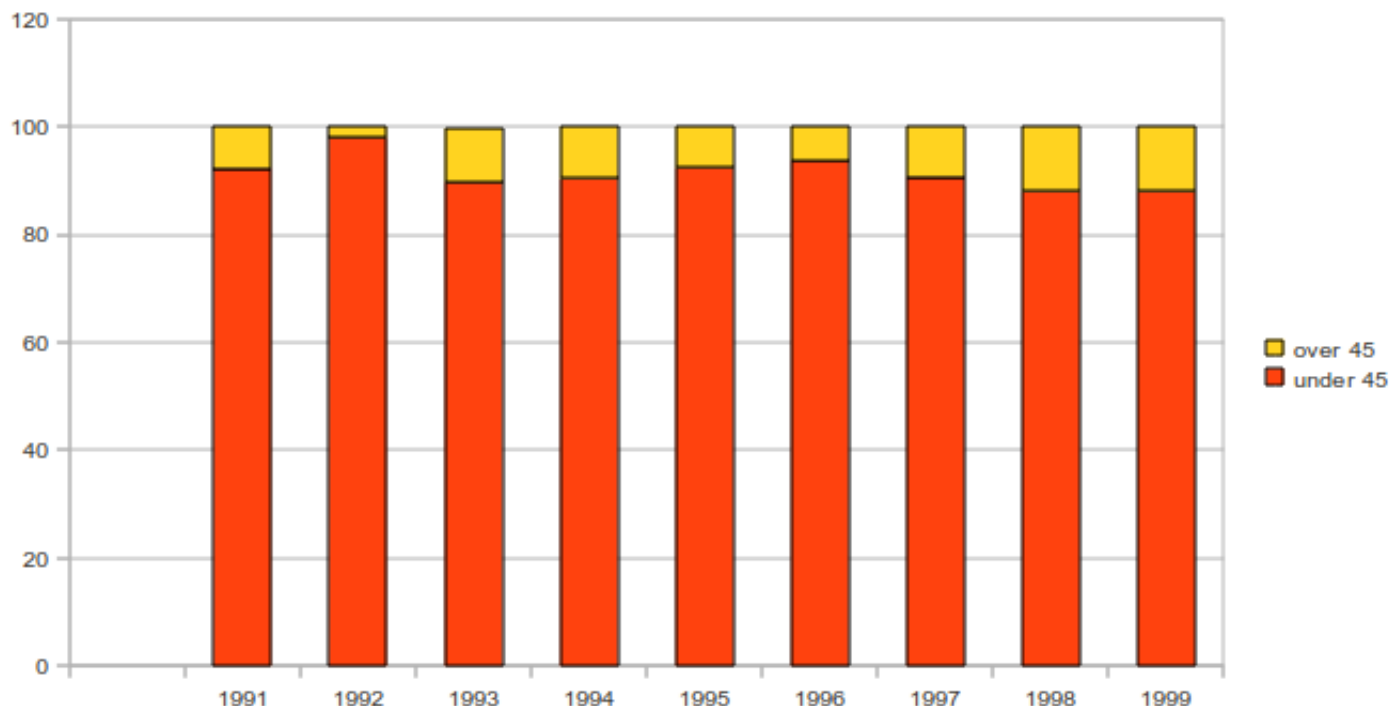
Figure 4.10: 100 percent surface chart of deaths among under 45 and over 45 Black African

From the figure 4.10, we observe that the deaths among the under 45 in Black African is increasing, contrary to the group under 45.

4.10   Infection of HIV with Respect to the Sex of Patient

Here we only have a significant statistical relationship between the African infection cases with the under 45 and over 45 groups. The relative representation of males under 45 is 35.1% against 51.1% for males over 45. For females, the relative representation is 64.9% for under 45 versus 49% for over 45. In others words, the females under 45 are twice as infected as males under 45. Furthermore, we have a high diagnosis rate among men over 45 as opposed to women in this category, as shown by the test of association: Chi-square=111.088, df=10, Sig=0.000.
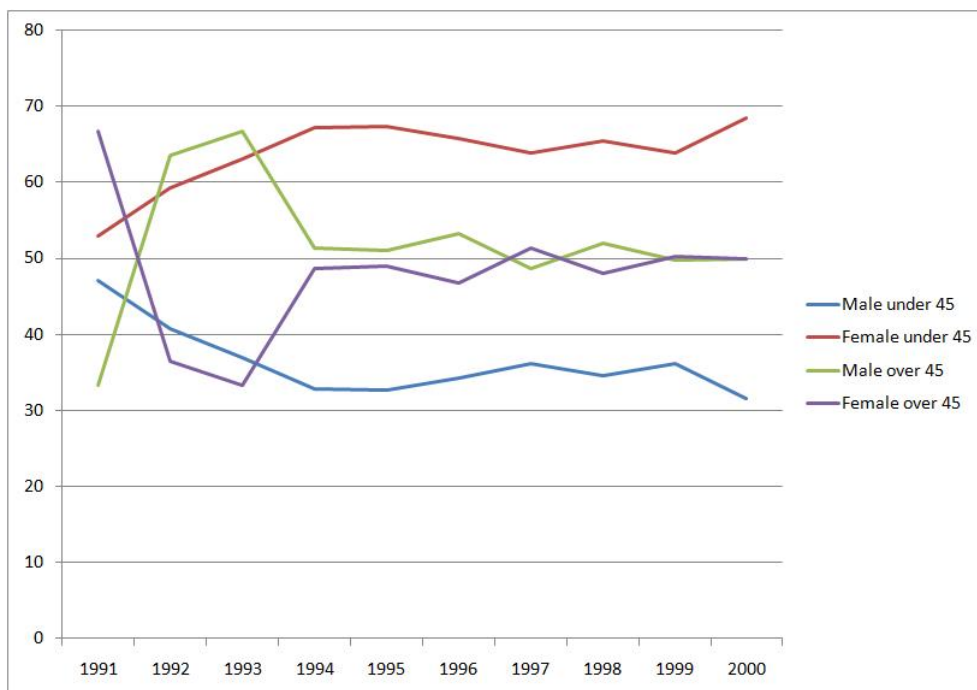
Figure 4.11: Diagnosis of HIV/AIDS with respect to sex of patient

The pattern of HIV/AIDS among the male and female over 45 is almost stable in 1999, but before 1991 to 1998, the behaviour was different. The same phenomenon appears in the group under 45 where the pattern of HIV/AIDS behaves differently from 1999 to 2000. The rate among males under 45 decreases from 1991 to 1994, where we have an almost stable behaviour for the male group aged over 45. The rate increases from 1991 to 1993 and decreases in 1994 and thereafter after we have an almost stable behaviour.

4.11 Population Group

The relative representation of Black Africans under 45 is 93%, 6.4% for Coloured, 0.6% for White and 0% for Indians. Moreover, the relative representation of the group over 45 are 87.8%, 8.7%, 2.7% and 0.1% for Black African, Coloured, Indian and white over 45 respectively. One can observe a high relative presentation of over 45 for European (Chi-square $= 123.754$, df $= 3$, Sig $= 0.0$). Moreover, the relative predominance of Black African under 45 and the over 45 with HIV/AIDS is observed in all population according to figure 4.12.
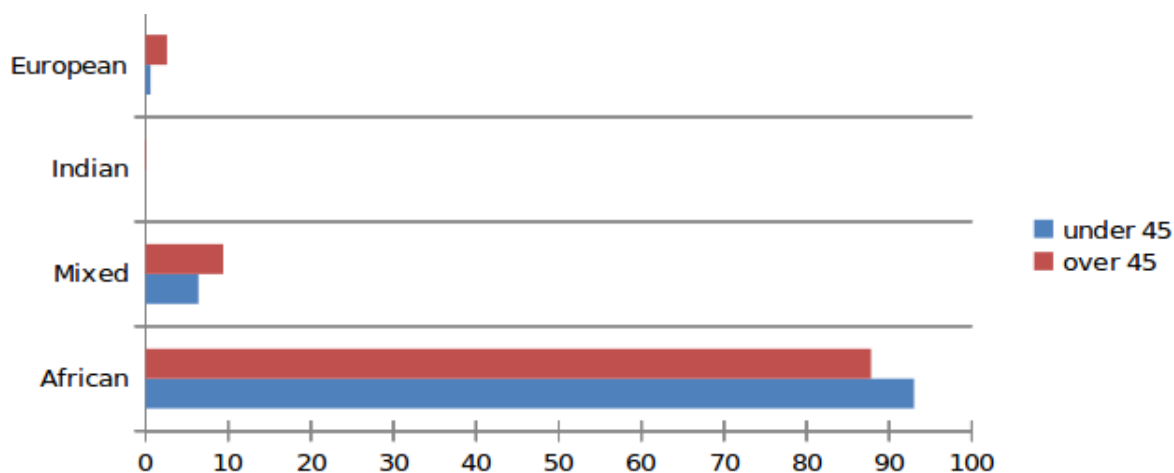
Figure 4.12: Population under and above 45 in ATICC

4.12   Urban and Rural Areas

The group aged under 45 and over 45 years old are more likely to live in urban area and Town huts according to the test of association (Chi-square $= 32.121$, df $= 5$, Sig $= 0.000$) as shown in the following figure 4.13. This is contrary to what the literature reveals, where we find that we have many people in over 45+ age group in the rural areas as well as those aged under 45 in Town and urban areas where they come to seek employment.

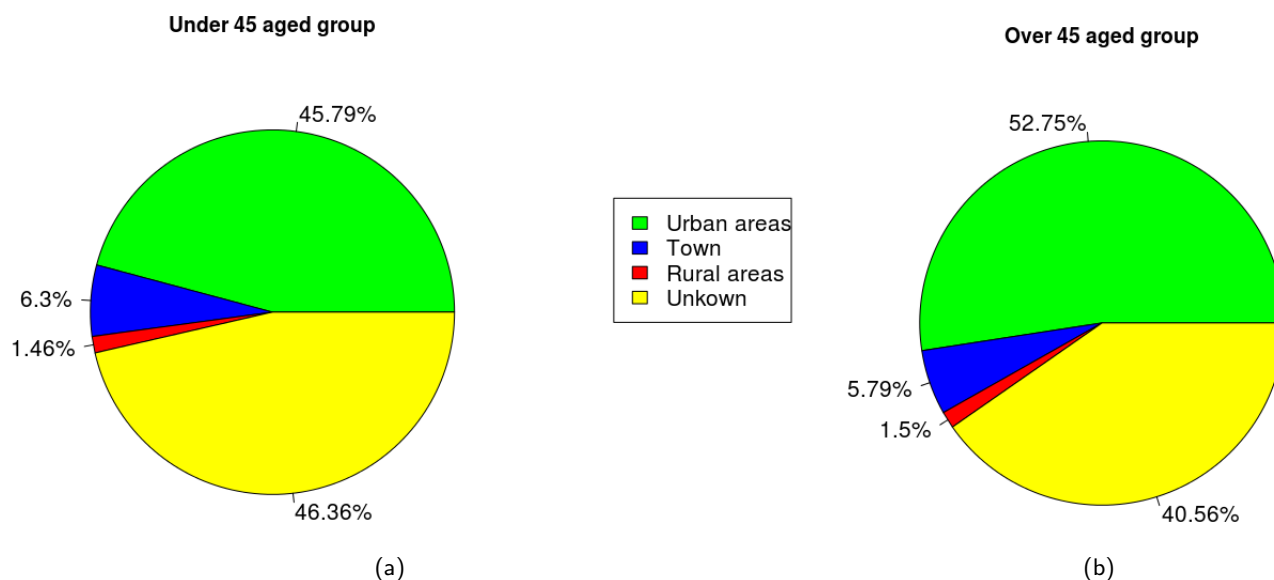(a)   (b)

Figure 4.13: Under 45 and over 45 population dwelling in region A

A statistical association, Chi-square $= 76.153$, df $= 3$, Sig $= 0.000$, is observed between the stage of HIV/AIDS and the two groups (under and above 45). The under 45 year old group is relatively highly

represented in the first three stages of HIV/AIDS and we have a relatively high representation of over 45 year old in the last stage of HIV/AIDS. This makes it plausible that the group aged over 45 had been infected during their under 45 age,as is shown in table 4.6.

Stage of HIV/AIDS	Under 45	Over 45
1	35.9	14.5
2	1.1	1.1
3	7.1	6
4	55.9	78.4

Table 4.6: Stage of HIV/AIDS relative proportion in under 45 and over 45 group

When it comes to where the two groups live (Chi-square $= 60.181$, df $= 29$, Sig $= 0.001$). The over 45 group is relatively likely to live on Street (33%), Site (9.4%), Single men's quarters (1.8%). Furthermore, the under 45 group is relatively like to live in Street (27.8%), jail (1.4%), Site (9.4%) and in Single men's quarters (0.9%).

The institutions where the test has been taken is in relationship with the two groups (under 45 and over 45), Chi-square $= 54.252$, df $= 11$, Sig $= 0.000$. Within a relatively high representation of the under 45 group in Clinics, prison services, and the remaining institutions, we have the predominance of over 45 group as shown in figure 4.14.
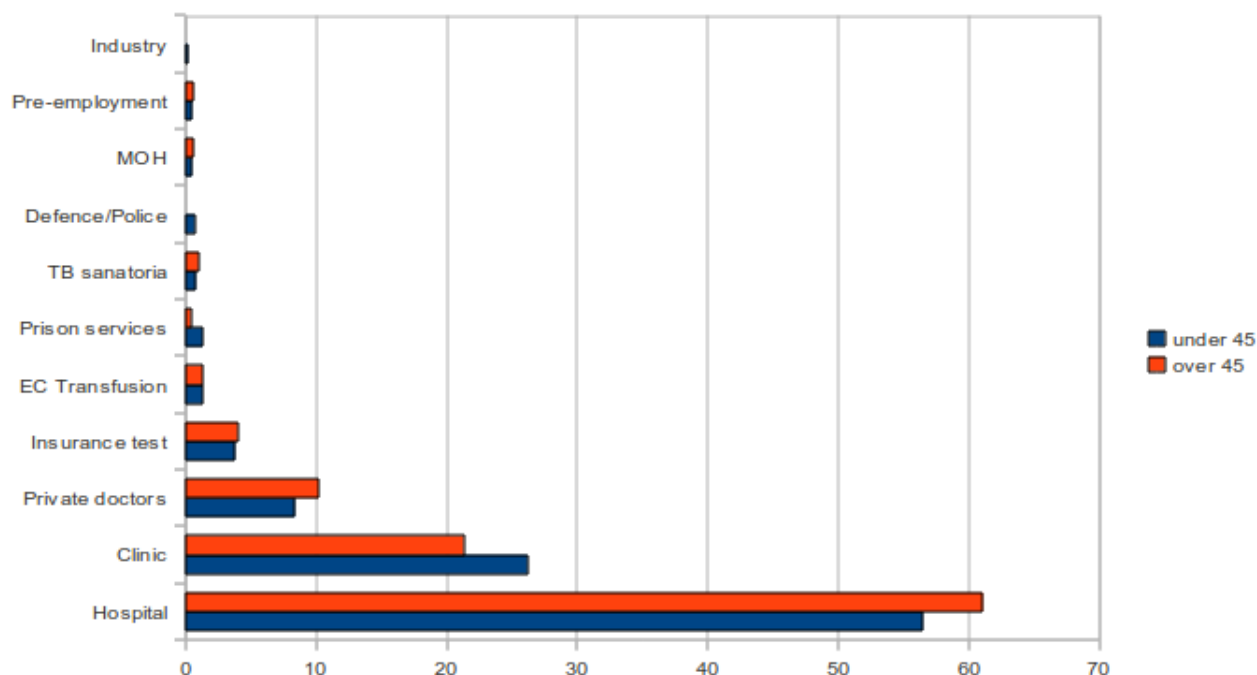

Figure 4.14: ATICC test centres in region A

4.13   Discussion of Results

The population of Eastern Cape Province, based on their average age which is 23 years, can be classified as the intermediate population. The predominance of men is observed even in the elderly category.

The vulnerability and illiteracy have been shown where more than half of the population do not go to School and do not have job. The 45+ age group represent a huge part of the population with 17.8% and the 60+age group represent 8.7%, thus, more attention needs to be focused on this category of old people.

From the data analysis, we have shown that the elderly do not participate regularly in the testing programme, therefore they die in the same year as they went for the test, with an average period of 7 months elapsing between the test to the time of death. It might be that when they return home and inform their house mates, that they are discriminated against, which hastens their demise.

In the period 1991 to 1994, twice as many elderly men were tested than women. The reason for the non-attendance of their partners can only be speculative, however, it might be that their partners were not notified about the testing. However, between 1994 and 1999 greater levels of compliance and notification occurred, with the ratios between males and females tested being almost equal.

Contributing factors to this increased level of compliance could be due to employer demand or to satisfy requirements for loan applications. However, it is clear that the elderly are not undergoing these tests of their own volition. The motivation for women is likely to be pregnancy, since we have many women attending the antenatal clinic. Whereas before 1994 all pregnant women were required to be screened for HIV, such testing is no longer mandatory. The predominance of men seeing private doctors illustrates that even when the they take the test they prefer to keep it a secret. Therefore it seems reasonable to conclude that prior to 1994 men were not notifying their partners of their HIV/AIDS status

Given the reasonable predominance of women in antenatal clinic in the group of old people, we should say that the barrier age is above 45 year old in this region. This may imply that being HIV/AIDS positive does not reduce the fertility of women.

The study has shown that the Black Africans elderly are more infected than other population group in Region A at 87.77%. This situation prevails in the urban areas like Port Elizabeth at 70.6%.

From 1991 to 1995, men were more likely to participate in the counselling centre for the first time after becoming aware that they were HIV positive and majority came back for counselling. This may explain why the elderly males are living longer than females, as they are starting the antiretroviral therapy sooner than women.

The prevalence rate in region A is estimated to be above 16.95% for the entire population, and 0.8% for the 45+ age group, with the 60+ age group estimated to be infected at the rate of 0.13%.

The clinics are open from Monday to Friday with Mondays and Thursdays being the days preferred by the group aged under 45 and over 45. The greater proportional attendance by women compared to men from Monday to Friday, emphasizes the failure of notification and compliance among partners of this population of Region A. While the reduction in HIV testing in December could be attributed to the festival season, this is also a time of heightened sexual activity, creating a catch 22 situation. Thus educational programmes are mandatory during this period. Notwithstanding this, one would emphasize that notification and compliance among the elderly is being achieved in Region A.

From 1991 to 2000, cases of infection affecting those under 45 declined compared to the group aged

45 and older. This is confirmed by the relative representation of these two groups where the infections continue to increase with more speed in older people than younger people. This reveals that programmes aiming to create awareness of HIV have not been successful as infected people are having unprotected sex with uninfected people.

The relative presentation of women is high in the under 45 age group at 64.9% and low in the over 45 year age group at 49%. The women aged under 45 are twice as infected as men aged under 45. Due to the high infection rate in the group aged in stage 4, it can be deduced that many people from this category were infected prior to this.

Moreover, a relatively high proportion of the elderly in Region A are relatively poor. This implies that the aged 60+ do not have savings. Furthermore, the under 45 population are more likely to be in jail, which implies that the criminality is high in the under 45 group. It is pertinent to note that the female under 45 age group are more prominently represented at hospitals because of pregnancy, whereas the over 45 age group are more represented at clinics.

5. Conclusions and Recommendations

5.1 Conclusions

We acknowledge that the study of HIV/AIDS on any given group of the population is a sensitive subject, if misunderstood, can create conflict towards people living with HIV and/or cause increased discrimination of this group. Moreover, the testing for HIV amongst the elderly, which was conducted during 1991 to 2000, would have been significantly more helpful and had the people who were notified of their HIV positive status practised safe sex in order to curtail the spread of HIV. However, as the prevalence rate among the elderly is high and continually increasing, greater attention and specialised programmes are vital for this group of people.

Many authors have written on the subject of the burden of HIV/AIDS on the elderly, but few authors have tried to tackle the issues of the prevalence rate of HIV in this category of elderly population, and how its spread compares to people aged under 45 years. However, HIV/AIDS continues to spread in this category of the population and new infections in this category are observed. This is due to people who are HIV-positive still sleeping with the HIV negatives, and in this group, it is evident they are not concerned about pregnancy, compounding the dangers of engaging in unprotected sexual intercourse.

The aims of this study was to investigate the prevalence of HIV/AIDS among the elderly of region A in Eastern Cape province, the 'sugar daddy' phenomenon and the virgin myth. To achieve the objectives defined by this study, a scientific research methodology was used. The problems were presented within this scientific context using the literature review in the first two chapters of this work. In the third chapter, the evaluation and description of the data set used in this study have been done. In the fourth part of this work, the detailed analysis of the two dataset and discussion of the result have been provided.

We found notification and compliance among the elderly more likely to occur after 1994. However, there was still problem with women attending the counselling centre, as the majority of attendees were elderly males.

An analysis of the year death and the year of diagnosis shows us that the elderly do not participate in the programme of testing HIV since we find that more than 70% were in the last stage of HIV with an average of 7 months from the day of diagnosis and the day of the death. This is contrary to what was expected and one consider the efforts made in creating awareness programmes about HIV, one would expect the elderly to have themselves screened much earlier.Further research is required concerning treatment and awareness of HIV among the elderly. for the therapy of HIV among the elderly.

The analysis has revealed reluctance amongst the elderly people to undertake the test, and even in cases where they do have themselves tested, they tend to hide the results from their partners. What is encouraging is that we have observed a move towards this type of behaviour since 1995, revealing that people are finally communicating more openly about sex.

In the period 1991 to 2000 HIV testing for reasons of employment or loan application became mandatory. However since 1998 these requirements were no longer valid, creating a risk of elderly men no longer feeling compelled to undergo these tests. Often, if they suspect that they are sick, they will not go for the test. A special programme of intervention is required for this group.

The elderly group are particularly vulnerable since they are also affected by other disease. Moreover, the analysis has shown that the spread of HIV in this category of people is still increasing making it difficult to distinguish other illness from the symptoms related to HIV. However, on a positive note, it appears

that notification is occurring within this group.

Based on the assumption made in this study, the care-giving activities are the second pathway of HIV/AIDS among the elderly.

5.2 Recommendations

1. The relevant institutions have to motivate more strongly for the elderly men to continue to attend for testing and to notify their partners once their results become available.

2. The hospitals and clinics have to be prepared for an extra volume of people on Fridays and during the months February and March. Moreover, a more concerted programme has to be defined for the elderly during December since their participation in testing for HIV declines slightly.

3. Support to the elderly group has to be enforced as this category is more vulnerable to HIV/AIDS which is compounded by other illnesses or diseases related to the ageing process.

4. Data relating to HIV needs to be regularly updates and specifically include variables such as the sexual partner, as well as in-depth investigations into the 'sugar daddy' phenomenon.

5. The role of correction data has to be taken more than once per year at the level of the district health officer, so that we can follow the pattern of the spread of HIV .

6. Government needs to plan for the accommodation of children who are left homeless due to the premature death of parents, in cases where the house bonds are still unpaid

7. Due to the high level of poverty in this region, the elderly may have not access to medical aid. Thus, the government has to plan funding to provide a medical aid for this category of the population.

8. The government has to implement a new policy to help the elderly who are placed in care-giving roles to the people living with AIDS or those orphaned.

9. The government needs to disseminate information on the risk of HIV/AIDS, so that the old people can protect themselves during care-giving activities.

10. The elderly need emotional support so that they can deal with the stigma and dissemination of having grand-children or children who are HIV-positive. Moreover, the government has to make funds available to assist the elderly to carry out these duties.
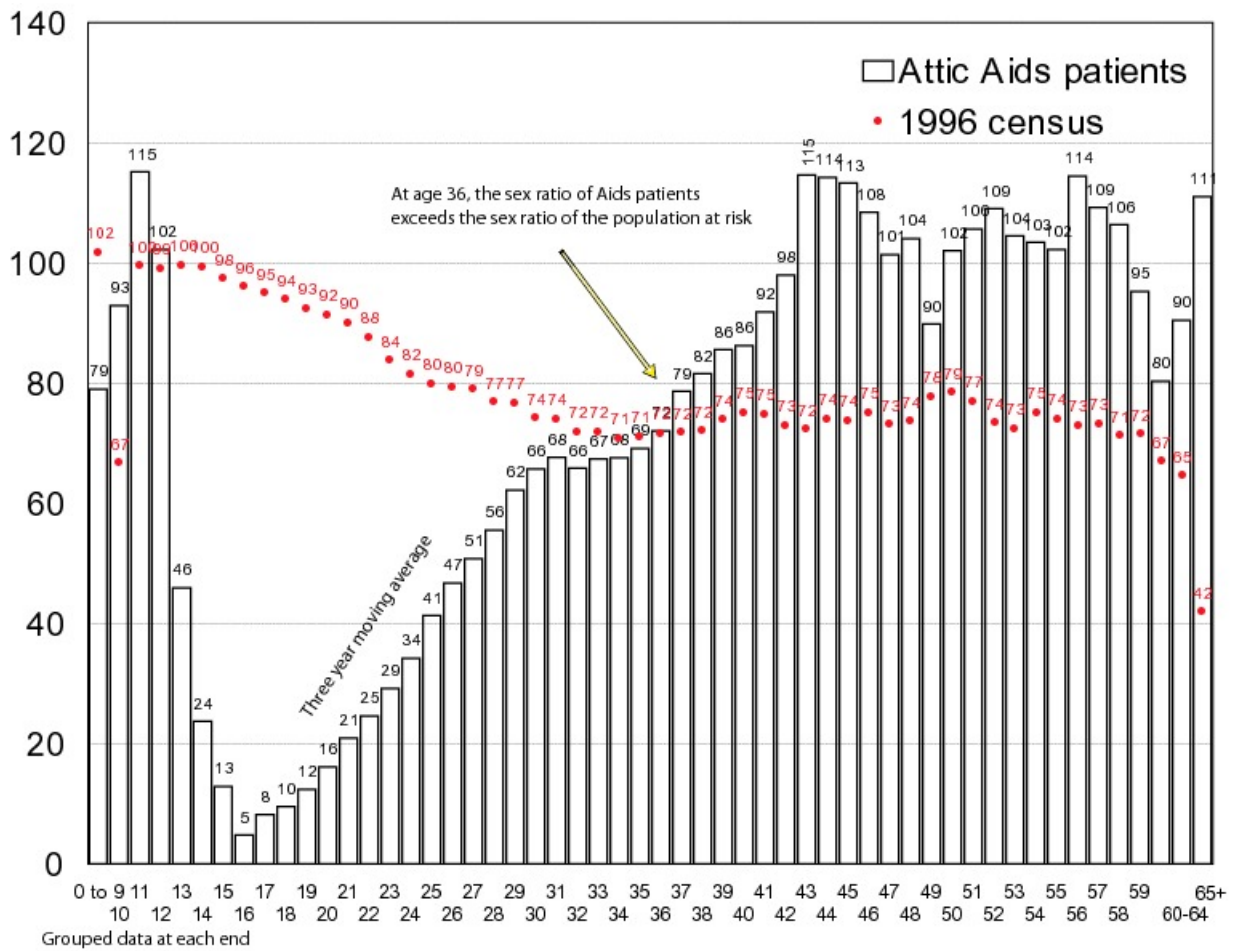
Appendix A. Plots

Figure A.1: Sex ratio of the HIV/AIDS patients and the population at risk

Acknowledgement

First and foremost, without my ability could not this work have been completed. I thank Almighty God for giving me the strength especially during the difficult times.

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References

[And]   Makebra Anderson (ed.), *Hiv/aids and the elderly*, http://www.finalcall.com/artman/publish/article_2010.shtml.

[Dri03]   Scott Drimie, *HIV/AIDS and land: cases studies from kenya, lesotho and South Africa*, Development Southern Africa **20:5** (2003), 2.

[Gba99]   Tola Gbalajobi, *Construction sexual identities within 'sugar daddy' relationships: A case study of sexuality constructs among students at the University of the Witwatersrand*, Masterthesis, University of the Witwatersrand, 1999.

[HT05]   Victoria Hosegood and Ian M. Timaeus, *The impact of adult mortality on the living arrangements of older people in rural South Africa*, Cambridge University Press **25** (2005), 431–444.

[KMB⁺04]   Afework Kassu, Alemayehu Mekonnem, Abebe Bekele, Nuru Abseno, Endalkachew Melese, Feleke Moges, Yared Wondmikun, and Fusao Ota, *HIV and syphilis infection among elderly people on Northwest Ethiopia*, Japan Journal of Infectious Diseases **57** (2004), 264–267.

[Mba07]   Chuks J. Mba, *Impact of HIV/AIDS mortality on South Africa's life expectancy and implications for the elderly population*, African Journal of Health Sciences **14** (2007), 201–211.

[MK06]   Monde Makiwane and Stella Alice Kwizera, *An investigation of quality of life of the elderly in South Africa, with specific reference to mpumalanga province*, Applied research in quality of life **1** (2006), 297–313.

[MM10]   Chantal Munthree and Pranitha Maharaj, *Growing old in the erea of a high prevalence of HIV/AIDS: The impact of AIDS on the older men and women in kwazul-natal, South Africa*, Research on Aging **32** (2010), 155.

[RJ10]   Priscilla Reddy and Shegs James, *Inkala ixine etyeni: Trapped in a difficult situation the burden of care on the elderly in the eastern cape, South Africa*, Tech. Report 364, Populations concil/Horisons, 2010.

[She99]   Robert C.H. Shell, *Sexual culture and death:The HIV/AIDS pandemic and its transmission vectors in the Eastern Cape, 1988-2000*, Paper presented to Office of Population Research, Princeton University **12:3** (1999), 1–23.

[She09]   Robert Shell, *AIDS in the poorest province in South Africa*, Available from Robert C.-H Shell: All AIDS articles, 1999 to 2007, 2009.

[SO07]   Enid Schatz and Catherine Ogunmefun, *Caring and contributing: The role of older women in rural south african multi-generational households in the HIV/AIDS era*, World development **35** (2007), 1390–1403.

[SZ00]   Robert C.H. Shell and Rebecca Zeitlin, *Positive outcomes: the chance of acquiring HIV AIDS during the school-going years in the Eastern Cape, 1990-2000*, The social work practitioner–researcher **12:3** (2000), 139–154.

[TE]   *Age   dependency   ratio   in   south   africa*,   Trading   eco-
            nomics,   http://www.tradingeconomics.com/south-africa/
            age-dependency-ratio-percent-of-working-age-population-wb-data.html.

[Udj06]   Eric O. Udjo, *Demograhic impact of HIV/AIDS on the young and elderly population in
            South Africa*, Journal of Intergenerational Relationships **4:2** (2006), 1–23.

[UNA10]   UNAIDS, *Unaids report on the global aids epidemic 2010*, Tech. Report 364, UNAIDS, 2010.