



Initiation of antiretroviral therapy at rural primary health care clinics in KwaZulu Natal

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South Africa bears the greatest burden of HIV infection globally with the most infected people living in KwaZulu-Natal (KZN). Decentralised medical care for HIV positive patients and antiretroviral therapy (ART) delivery to primary health care facilities were proposed nationally to achieve adequate ART coverage for patients in need of treatment. This study described the HIV positive patients who accessed medical care and were initiated on ART at two existing government Primary Health Care (PHC) clinics with no added donor support, in Ilembe, KZN. This was an observational descriptive study of ART initiation from 01 April 2008 to 30 April 2009. Data were collected from clinical records kept on site. HIV Testing and the pre-ART programmes which consisted of medical care prior to ART initiation are briefly described. Socio-economic, demographic and clinical characteristics of patients who were initiated on ART were sampled and described. A minority (2.95%) of the study population tested for HIV of which 36.0% tested positive. Majority (60.0%) of patients who joined the pre-ART programme care did not return. The ART sample consisted of 375 patients of whom 65.0% were women, 85.9% were unmarried, 61.6% were unemployed and 50.4% had a secondary level of education. Tuberculosis (TB) prevalence and incidence at ART initiation were 22.1% and 14.7% respectively. The prevalence of Syphilis and Hepatitis B co-infections were 13.1% and 8.6 % respectively. Two thirds of female patients (66.4%) received a Pap smear result of which the majority (62.3%) were abnormal. Uptake for HIV testing followed by relevant CD4 testing was poor. High TB, Hepatitis B and Syphilis co-infection was noted amongst patients initiated on ART. Cervical cancer screening must be intensified. Although ART initiation with no added external resources was successful, record keeping was suboptimal.

Suid-Afrika dra die grootste las van MIV-infeksie ter wêreld met die meeste besmette mense in KwaZulu-Natal (KZN). Gedesentraliseerde mediese sorg vir MIV-positiewe pasiënte en dienslewering van antiretrovirale terapie (ART) aan primêre gesondheidsorg- fasiliteite is nasionaal voorgestel om optimale ART-behandeling aan behoeftige te verskaf. Hierdie studie beskryf MIV-positiewe pasiënte wat ART-behandeling ontvang by twee bestaande Primêre Gesondheidsorgklinieke (PGS) in Ilembe, KZN sonder enige bykomende skenkerondersteuning. Waarnemingsstegnieke is in die studie gebruik om ART-bekendstelling van 01 April 2008 tot 30 April 2009 te bestudeer. Data van kliniese rekords wat op die perseel gehou is, is ingesamel. MIV-toetsing en mediese behandelingsprogramme voor die bekendstelling van ART word kortliks beskryf. Sosio-ekonomiese, demografiese en kliniese eienskappe van pasiënte wat aan ART bekendgestel is, is versamel en beskryf. Minimum (2.95%) respondente aan die studie is vir MIV getoets, waarvan 36.0% positief getoets het. Die Meerderheid (60.0%) van pasiënte wat by die voorafgaande ART-sorgprogram aangesluit het, het nie terugkeer nie. Die ART-steekproef het bestaan uit 375 pasiënte waarvan 65.0% vroue was, 85.9% was ongetroud, 61.6% was werkloos en 50.4% het 'n sekondêre vlak van onderwys gehad. Die bestaan (reeds onder behandeling) en voorkoms (diagnose tydens bekendstelling van die ART-program) van Tuberkulose (TB) tydens ART-bekendstelling was 22.1% en 14.7% onderskeidelik. Die voorkoms van sifilis- en hepatitis B-infeksies was 13.1% en 8.6% onderskeidelik. Twee derdes van die vroulike pasiënte (66.4%) het 'n Papsmeer ondergaan, waarvan die meerderheid (62.3%) se uitslae abnormaal was. Die begrip vir MIV-toetsing gevolg deur toepaslike CD4-toetsing was swak. Hoë TB-, Hepatitis B- en sifilisinfections was by pasiënte aangeteken wat met ART-behandeling begin het. Ondersoek vir servikale kanker moet verhoog word. Hoewel die ART-bekendstelling met geen toegevoegde eksterne hulpbronne suksesvol was, was rekordhouding nie optimaal nie.

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Introduction

Problem statement

Primary Health Care (PHC) as defined at the Alma Ata Declaration includes taking health care to where people work and live (World Health Organisation, United Nations Children's Fund 1978).



Primary health care and the development of PHC clinics were formally introduced to South Africa (SA) in April 1994 (ANC, WHO, UNICEF 1994). Challenges that these PHC clinics encounter include; the increased health care demands caused by the human immunodeficiency virus and acquired immunodeficiency syndrome (HIV and AIDS) pandemic, healthcare worker shortages and inequalities in resource distribution (Health Systems Trust 2008). Initiation of antiretroviral therapy (ART) for HIV infected patients at PHC government clinics will provide universal access to health but serves to add to the challenges encountered at PHC. It is vital to understand the socio-economic, demographics and clinical characteristics of patients accessing ART at public PHC clinics as outlined in this study in order to provide holistic health care.

Aim of the study

This study describes how patients attending PHC clinics enrolled onto an ART programme provided at these clinics. An overview of the clinics HIV testing and pre-ART programmes is provided followed by a comprehensive description of the patients who were initiated onto ART.

Background

HIV has drastically changed the health status of various parts of the world since its emergence, with sub-Saharan Africa being the most affected (UNAIDS 2008). SA bears the greatest burden of HIV infection in the world, with an adult HIV prevalence of 18.0% (UNAIDS 2008) of whom 60.0% are estimated to be women. Within SA, the province of KwaZulu Natal (KZN) has been the worst affected by HIV (Health Systems Trust 2008). The Ilembe Health District in northern KZN is approximately 75km north of Durban, comprises of a small urban area surrounded by deeply rural areas. It has four hospitals with various PHC clinics attached to each hospital. The incidence of new sexually transmitted infections (STIs) seen at PHC in 2008 was high at 4.6; 6.8 and 4.6 per 100 000 populations, in SA, KwaZulu Natal (KZN) and Ilembe respectively (Health Systems Trust 2008). The 2008 antenatal HIV sero-prevalence in SA, KZN and Ilembe was 29.3%, 38.7% and 35.8% respectively (Health Systems Trust 2008). In Ilembe, the minority of the population (7.8%) had access to private medical care between 2007 and 2008, leaving the majority dependent on the government facilities to meet their healthcare needs (Health Systems Trust 2008). The need to decentralise ART services was greatest in this district as it is heavily burdened by HIV.

Trends

The decentralisation of ART services to PHC level has been successful in Lusisiki (Bedelu *et al.* 2007), Khayelitsha (Boullé *et al.* 2010), Mseleni (Fredlund & Nash 2007) and Hlabisa (Mutevedzi *et al.* 2010). All these PHC sites were supported by donor non-governmental organisations (NGOs) in partnership with the SA National Department of Health (DOH). These NGOs fund a quarter of the South African ART Programmes by working through existing governmental

public health facilities. This is done by supporting the building and renovation of facilities, the provision of medicines, human resources support, healthcare provider training, quality assurance and monitoring and evaluation of the programmes (UNAIDS 2010; Klausner *et al.* 2011). The government clinics in this review had no such added support and utilised existing resources. The majority of public PHC clinics in SA have no external funding (Health Systems Trust 2008) and have been earmarked to gradually introduce ART services (South African Department of Health 2007).

Research objectives

The study objectives were to determine the prevalence of HIV infection amongst those patients who test for HIV at two designated clinics in the Ilembe district and to describe the demographic and clinical profiles of patients who were initiated on ART during the study period. The study spanned the interval from 01 April 2008 to 30 April 2009.

Definition of key concepts

In 1994, the African National Congress introduced a new national health plan for SA of which the PHC was the foundation. The first point of entry for patients into the health system is through PHC clinics. These clinics offer basic health promotion, preventative, curative and rehabilitative services. These clinics are open eight hours a day on weekdays (ANC, WHO, UNICEF 1994).

Voluntary pre-test counselling, HIV testing and post-test counselling (VCT) were instrumental in the recommended HIV testing model in 2008 (South African Department Of Health 2007). A person could decline VCT out of their own free will. VCT provided patients with the opportunity to understand their HIV risks and to know their HIV status through HIV tests (South African National Department of Health 2010).

Eligibility criteria for ART according to the South African National ART guidelines at the time of the study, was the WHO defined stage IV disease or a CD4+ lymphocyte (CD4 cell) count of less than 200 cells/ μ l (South African Department of Health 2007).

Contribution to the field

The DOH has implemented task shifting by allowing nurse practitioners providing PHC to initiate ART. This has expanded the scope of PHC nurse practitioners. Initiating ART at PHC poses numerous challenges. Health systems issues as well as having to meet the expectations of a demanding patient population are seen as the primary challenges. This study describes the patient profile and the challenges facing practitioners who have to deal with a demanding patient population.

Literature Review

Although SA has the largest public sector ART programme in the world, ART coverage was estimated at 45.0% of those



eligible in 2008 (WHO, UNAIDS, UNICEF 2008). To increase the uptake of patients onto ART, emphasis has been placed on regular care and retention of HIV positive patients within health care facilities. Patients are managed at the health care facility from the time of diagnosis of HIV infection to after initiation of ART. The period prior to the initiation of ART is referred to as the pre-ART period (Larson *et al.* 2010; Lessells *et al.* 2011; Rosen & Fox 2011). Early initiation of ART in the disease progression requires early diagnosis and monitoring of the infection until treatment eligibility is reached (Rosen & Fox 2011).

Studies have shown that there is generally very poor retention of patients within pre-ART programmes in rural clinics in KZN (Lessells *et al.* 2011), in urban clinics in Johannesburg (Larson *et al.* 2010) and in health care facilities in Sub-Saharan Africa (Rosen & Fox 2011). The ART programme, which initially began at public hospitals in KZN, has been well reviewed (Peltzer *et al.* 2010; Vella *et al.* 2008). The limitation of ART delivery to hospitals has led to long patient waiting lists as the demand for services exceeded both human and laboratory resources (Ojikutu 2007). The DOH aimed to treat 80.0% of eligible HIV positive people by 2011 by scaling-up ART services through the proposed decentralised integrated delivery of care to PHC (South African Department of Health 2007).¹ The decentralisation of ART in this study, from the regional hospital to the local feeder PHC clinics, was an initiative of Stanger Provincial Hospital. The outcome was to increase ART coverage in KwaDukuza. Existing PHC clinics were selected and supported by Stanger Provincial Hospital.

Research method and design

Context of the study

The study is set in KZN in an impoverished rural environment. There are four sub-districts in Ilembe, one of which is KwaDukuza which comprises of a regional hospital, Stanger Provincial Hospital, and nine primary health care clinics. Two of these PHC clinics were reviewed in this study; Ballito and Shakaskraal Municipal Clinics. The study ended on 01 May 2009 when a donor organisation partnered with these government clinics to assist with the growing patient load. The study population comprised of all patients seen at the clinic from 01 April 2008 to 30 April 2009. These clinic attendees were offered VCT for HIV as per national guidelines (South African Department of Health 2007). VCT was client initiated. All patients who tested HIV positive were offered a CD4 cell count test to be done immediately at the clinic. Blood specimens collected for CD4 cell counts were transported to the local hospital where the tests were conducted. Patients were asked to return in a week for the CD4 cell count result. On receiving the results patients were assessed either to join the pre-ART programme or enrol for ART. These programmes also enrolled patients who tested for HIV at other health facilities, but chose to attend these clinics which were in closer proximity to their homes or place

¹ According to the Global AIDS response progress report 2012 for the Republic of South Africa the estimated percentage of eligible adults and children currently receiving Antiretroviral therapy in 2011 was 75.2%. Therefore the goal was not achieved.

of employment. All aspects of the pre-ART and ART care were implemented as part of the decentralised care for HIV positive patients and are currently on-going.

Patients who join the pre-ART programme are offered contraceptive services, six monthly CD4 cell counts and treatment for minor symptoms. As part of the pre-ART programme patients are urged to return to the clinics for on-going medical care after diagnosis. All HIV positive patients, irrespective of CD4 count, were supplied with multivitamins every month. Clinical records of follow-up visits are kept on site.

The ART programme consists of; three days of literacy training, baseline investigations such as HIV viral load, full blood count, liver functions test, a hepatitis B test, a syphilis test, sputum examinations and a chest x-ray to exclude Tuberculosis (TB) infection, which is followed by a medical examination. In addition women were offered contraception and cervical screening by means of a Papanicolaou (Pap) smear. The 2001 Bethesda Classification was used for reporting Pap Smears (Solomon *et al.* 2002). All investigations were couriered to Stanger Provincial Hospital laboratory from where relevant specimens were sent to referral laboratories. Pregnant women and children under the age of twelve were initiated on ART at the regional hospital as per protocol at that time; therefore they were excluded from this study. Patients were initiated onto ART by a medical officer at the clinics.

The sample population were patients who were initiated onto ART. Inclusion criteria: HIV positive patients older than 12 years who were eligible for ART. Exclusion criteria: pregnant women and patients younger than 12 years eligible for ART.

Design

This was an observational descriptive study design of patients initiated on ART from 01 April 2008 to 30 April 2009.

Data collection method

Data outlining HIV testing were collected from standardised PHC and VCT registers kept at the clinics. To maintain consistency in the data the same exclusion criteria were applied to the HIV testing and pre-ART programme during data collection. Patients requiring ART have clinical files stored at the clinics instead of the standard outpatient clinic card used at PHC. Data were collected from the standardised ART forms prescribed by KZN DOH that were used at hospital ART clinics. Data were collected retrospectively by the principal investigator over a six month period from February 2010 to July 2010. Clinical files were coded numerically for data collection to maintain patient confidentiality. Files with incomplete data were reviewed and not excluded. Missing files could not be accounted for. Permission to access records was obtained from the Chief Executive Officer of Stanger Provincial Hospital and the Supervisor of the PHC Services.



Data analysis

Data collected were entered directly into an electronic data collection form on an Excel spreadsheet and analysed as categorical or numerical variables using SPSS version 18 with the help of the biostatistician from the University of KwaZulu Natal (UKZN).

Results

The study population comprised of the 146 081 PHC patients seen between 01 April 2008 and 30 April 2009 at the two clinics. HIV testing was done on 2.95% of the study population of whom 36.0% tested positive as shown in figure 1. The prevalence of HIV infection amongst those patients who tested for HIV was therefore 36.0%. Of those HIV positive patients 57.8% did CD4 cell count tests of whom, 51.6% had CD4 cell counts greater than 200, 19.1% had CD4 counts less than 200 and 29.4% did not receive a test result.

Of the 1553 patients who tested positive for HIV 171 (11.0%) were eligible for ART based on CD4 count results only. The remaining 1382 (89.0%) HIV positive patients were eligible for the pre-ART programme. A total of 646 (46.7%) of the 1382 patients joined the pre-ART programme. Seventy percent of these patients were women. More than half (60.0%) of these patients who enrolled into the pre-ART programme did not return for monthly follow-ups after one month.

A total of 431 new ART patient files were recorded for the study period. Of these 31 files were missing, 18 pregnant patients were referred to initiate ART at the hospital and seven patients were not eligible as they were patients already on ART. The ART sample size of 375 patients represented 87.0% of eligible patient files. The ART sample as represented in table 1 consisted of 375 patients of whom 171 were patients who tested positive for HIV at the clinic and were eligible based on CD4 count results. The remaining 204 patients in the ART sample included patients who were down referred by the hospital and local NGOs to initiate ART at the clinic and those who were enrolled based on clinical criteria. The median age was 34 (IQR 14–68). In this sample 65.0% were women, 86.0% were unmarried and 50.4% had a secondary level of education. The majority of patients were unemployed (61.6 %) and almost half the households were social grant recipients (45.9 %). Electricity (89.6%) services were available to most households whereas piped water (26.4%) and sanitation (11.7%) services were not readily available.

The median body mass index (BMI) and CD4 cell counts were 21.6 and 144.5 cells/mm³ respectively as shown in table 2. The majority of the patients (75.7%) were asymptomatic at ART initiation. Most patients (69.1%) were classified clinically as WHO clinical stage three (World Health Organisation 2006). A large number of patients (76.0%) did not report a previous hospital admission in the preceding year.

The prevalence of TB, Syphilis and Hepatitis B co-infections were calculated based on the available results. Prevalent TB

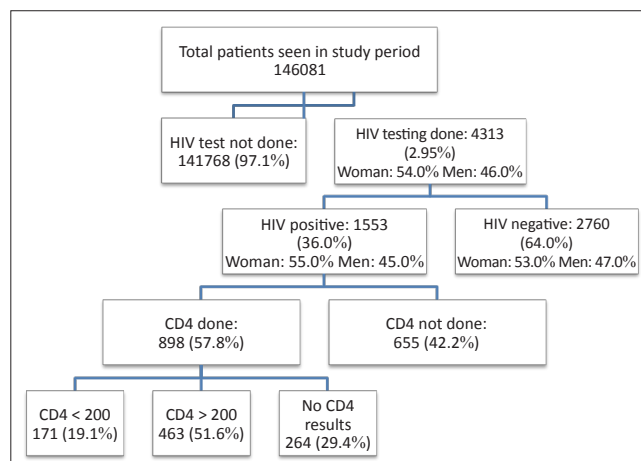


FIGURE 1: Algorithm presenting HIV testing from 1 April 2008 to 30 April 2009

TABLE 1: Demographic characteristics of patients put on ART (*n* = 375)

Demographic characteristics	<i>n</i>	%
Sex		
Women	244	65.0
Men	131	35.0
Race		
South African	369	98.0
Foreign	6	2.0
Home language		
Zulu	273	72.8
Xhosa	84	22.4
English	3	0.8
Other	15	4.0
Marital status		
Single	322	85.9
Married	36	9.6
Co-Habiting	9	2.4
Marital status not recorded	8	2.1
Disclosed HIV status		
Yes	347	92.5
No	26	6.9
Disclosure not recorded	2	0.5
Highest level of education		
None	42	11.2
Primary	140	37.3
Secondary	189	50.4
Tertiary	2	0.5
Level of education not recorded	2	0.5
Employment status		
Employed	143	38.1
Unemployed	231	61.6
Employment status not recorded	1	0.3
In Receipt of a social grant		
Yes	172	45.9
No	200	53.3
Social grant receipt not recorded	3	0.8
Type of grant received		
Child support grant	146	84.9
Disability grant	13	7.5
Old age grant	8	4.6
Social relief of distress grant	2	1.2
Care dependency grant	1	0.6
Type of grant not specified	2	1.2
Domestic facilities		
Tapped water in the home	99	26.4
Flushing toilet in the home	44	11.7
Electricity in the home	336	89.6

n, given as number of patients.



refers to patients already on TB treatment at ART initiation with the TB diagnosis made prior to the patient becoming eligible for ART. Incident TB refers to patients diagnosed with TB during the ART initiation process. Incident TB was stratified into extra-pulmonary TB (EPTB) and pulmonary TB (PTB). Pulmonary TB (PTB) was further stratified based on the presence of Acid Fast Bacilli (AFB) on sputum smears. A sputum positive PTB case is defined as a patient who has at least one positive AFB smear observed on microscopy of the sputum.

Syphilis and Hepatitis B co-infection were high at 13.1% and 8.6% respectively. A third of women did not have a Pap smear result in their clinical records. Abnormal Pap smears were detected in 62.3% of the available Pap smear results.

Ethical Considerations

No specific patient could be identified through the data collection process, therefore confidentiality was maintained throughout the study. Ethical approval to undertake the study was granted by the Biomedical Research Ethics Committee of UKZN (Reference 149/09).

Trustworthiness

A controlled research environment may have yielded better outcomes than those of the public health clinics observed in this study. This study reflects current clinical practices at that time within the public sector. The results from this study can be generalised to high HIV prevalence populations accessing health care from public clinics in South Africa.

All clinical files were reviewed, thereby eliminating selection bias. A total of 31 patient files were missing files and could not be accounted for. Information bias did occur because of the missing data encountered in incomplete clinical records.

Discussion

The poor uptake of the PHC population for HIV testing, highlighted by the minority of clinic attendees testing for HIV, supports the WHO's recent change in guideline on HIV testing to provider initiated testing (PICT), because of the limitations associated with the voluntary nature of VCT (WHO, UNAIDS, UNICEF 2008). SA has integrated VCT and PICT and called this HIV Counselling and Testing (HCT) (South African National Department of Health 2010). The HIV prevalence amongst patients who tested (36.0%) was similar to the antenatal HIV prevalence in KZN (38.7%) and Ilembe (35.8%) (WHO, UNAIDS, UNICEF 2008). However, 42.2% of the newly diagnosed HIV positive patients did not undergo the CD4 blood test. This could be because of patients needing more time to deal with the bad news or time constraints as phlebotomy was a separate procedure with an additional waiting period. Almost a third of patients (29.4%) who did a CD4 cell count test did not receive the results. Similarly the loss or inaccessibility of results was reported at the Mseleni ART programme because of the paper based record keeping

TABLE 2: Clinical characteristics of ART patients (*n* =375)

ART patients	<i>n</i>	%
Clinical characteristics		
Median BMI	374 [†]	-
Median CD4 count	372 [‡]	-
Median Viral load	133 [§]	-
WHO performance stage CD4 count		
Asymptomatic	284	75.5
Symptomatic	82	21.9
Bed ridden less than 50% of the day in the last month	5	1.3
Bed ridden greater than 50% of the day in the last month	4	1.1
WHO Clinical Stage		
Stage 1	2	0.5
Stage 2	6	1.6
Stage 3	259	69.1
Stage 4	108	28.8
Hospital admission in previous year		
Previous hospital admissions not recorded	2	0.5
Yes	88	23.5
No	287	76.0
TB Characteristics		
History of TB in the past year	107	28.5
Prevalent TB at initiation of ART	83	22.1
Incident TB at initiation of ART	55	14.7
• EPTB	22	40.0
• PTB	33	60.0
▪ Sputum positive PTB	20	60.6
▪ Sputum negative PTB	13	39.4
Syphilis co-infection		
Syphilis results missing	108	28.8
Syphilis result available	267	71.2
• Syphilis results missing	35	13.1
• Syphilis result available	232	86.9
Hepatitis B co-infection		
Hepatitis B results missing	259	69.1
Hepatitis B results available	116	30.9
• Hepatitis B positive	10	8.6
• Hepatitis B negative	106	91.4
Pap smear results		
Total women	244	100.0
Pap smear results missing	82	33.6
Available pap smear results	162	66.4
• Normal pap smear	61	37.7
• Abnormal pap smear	101	62.3
▪ ASCUS : atypical squamous cells of unknown significance	10	6.2
▪ LSIL: Low-grade squamous intraepithelial lesion	66	40.7
▪ HSIL: High-grade squamous intraepithelial lesion	25	15.4
ART history		
No previous ART	352	94.0
Previous ART as treatment	16	4.0
Took ART as PMTCT	7	2.0
Regimen		
1a (Lamivudine, Stavudine and Efavirenz)	356	95.0
1b (Lamivudine, Stavudine and Nevirapine)	19	5.0

Cumulative per cent is calculated on available data.

ART, antiretroviral therapy; WHO, World Health Organisation; TB, Tuberculosis; EPTB, extra-pulmonary TB; PTB; pulmonary TB; PMTCT.

n, given as number of patients.

[†], median = 21.6.

[‡], cells/mm³ = 144.5.

[§], copies/mL = 21000.0.



system used at PHC (Fredlund & Nash 2007). Results from investigations are printed at the local regional hospital and couriered to the clinics. Results are often lost in this process.

More than half the patients joining the pre-ART programme dropped off after one month. Similar programmes in rural KwaZulu-Natal (Lessells *et al.* 2011) and urban Johannesburg (Larson *et al.* 2010) showed that 55.1% and 69% of patients respectively, failed to return for follow up HIV care. Reasons cited in these studies for poor patient retention were; asymptomatic HIV infection (Lessells *et al.* 2011), stigma, lack of financial resources and psychological issues (Larson *et al.* 2010). A systematic review of pre-ART care reported that little therapeutic care is provided in the pre-ART period and patients may find the costs of going to the clinic outweighs the benefit of the minimal therapeutic intervention offered during this asymptomatic phase of the infection (Rosen & Fox 2011). Routine medical care and monitoring for HIV positive patients in the pre-ART period is an area that needs more attention in order to improve active surveillance, so that patients in need of ART are identified early. Medical care early in the disease can reduce HIV related morbidity and mortality and help reduce on-going transmission of the disease (Lessells *et al.* 2011).

The predominance of female patients with an unmarried marital status and a secondary level education is reflected in other studies of ART patients in SA (Houlihan *et al.* 2011; Mutevedzi *et al.* 2010; Peltzer *et al.* 2010; Vella *et al.* 2008)). The higher unemployment rate at PHC (85.0%) (Mutevedzi *et al.* 2010) compared to hospital (60.0%) (Fredlund & Nash 2007) patients are probably due to the lack of formal employment in these communities, thereby leaving most patients financially reliant on social grants. The most common type of social grant accessed by the patients in this review was the Child Support Grant. Access to basic amenities such as household water (26.4%) and toilets (88.3%) were far less than the national estimates of 40.0% and 92.0% respectively (Statistics South Africa 2008). However, access to electricity (89.6%) was higher than the national estimate (82.0% (Statistics South Africa 2008). The South African government has highlighted that aspects of poverty in townships such as inadequate sanitation and food, unemployment and poor education, violence and crime have been associated with increased HIV transmission (South African Department of Health 2007). Poverty has also been associated with poor adherence to ART for a multitude of reasons. In order to provide holistic care HIV programmes must address the nutritional, economic and psychosocial needs of patients (Flanigan *et al.* 2007).

There were no CD4 cell counts available for 40% and 29% of patients who were initiated on ART at hospitals in KZN (Vella *et al.* 2008) and at a NGO supported clinic in Hlabisa (Houlihan *et al.* 2011) respectively. A CD4 cell count which was a prerequisite for ART initiation was available for 99% of patients in this study. The incomplete clinical records encountered in this study are consistent with the previous evaluation of hospital ART sites in KZN. High workloads

and staff shortages were attributed as being the cause (Health Systems Trust 2008; Vella *et al.* 2008). Reasons for missing blood results include incomplete request forms submitted to the laboratory, incorrect specimen tubes submitted and misplaced specimens during transit to the laboratory.

Despite staff education on correct administrative and phlebotomy procedures these human errors were encountered on a regular basis. However, these errors were not observed with CD4 cell count results because the VCT counsellors took sole responsibility for accessing and keeping records of CD4 results. The general nursing staff took on the responsibility of collecting and filing all other results in addition to their large workloads. This also indicates the effectiveness of task shifting. Access to HIV care may be better at PHC level than at hospital level as patients tend to access care at PHC prior to the onset of severe opportunistic infections (Fatti, Grimwood & Bock 2010). TB, which is the leading cause of death in HIV positive people, is associated with advanced WHO stage of HIV, low baseline CD4 cell counts and high plasma viral load (World Health Organisation 2010). The number of patients receiving TB treatment (22.1%) was similar to other integrated ART clinics (20.0%) (Basset *et al.* 2010) and different to the clinical characteristics of patients initiating ART at hospitals (7.0%) (Peltzer *et al.* 2010). Both TB treatment and ART were offered within the same clinic which increased the uptake of patients for both programmes. This indicates that the ART roll-out programme serves as an excellent vehicle in which ambulant patients get screened for TB. Sputum culture, a more sensitive diagnostic TB test that is not routinely available at PHC, will intensify TB case finding at ART initiation (Basset *et al.* 2010). The high number of sputum negative PTB cases is consistent with the findings in other South African ART programmes (Basset *et al.* 2010; Lawn *et al.* 2006); Induced sputum and use of new genetic technologies will improve the sensitivity of sputum specimen examination for TB.

Major drivers of HIV infection in South Africa are the high level of STIs and the high HIV viral loads associated with recent HIV infection or advanced disease (Health Systems Trust 2008). The sero-prevalence of syphilis (13.1%) was higher than the KZN and national antenatal syphilis prevalence of 1.9% and 2.8% respectively (Health Systems Trust 2008; South African National Department of Health 2009). The route of transmission of Hepatitis B virus infection (HBV) is the same as HIV thus co-infection is common. In SA, the prevalence of HIV-HBV co-infection varies from 5.0% (Firnhaber *et al.* 2008) to 7.1% (Boyles & Cohen 2011) in urban and rural areas respectively. The HIV-HBV co-infection of 8.6% in this study reflects the higher prevalence trend in rural areas. The poor availability of Hepatitis B results in ART programmes in KZN was previously reported (Vella *et al.* 2008). Screening for cervical cancer in women allows for early detection of the pre-invasive stages of cervical cancer that can be treated (South African National Department of Health 2002). HIV positive women have a high prevalence of abnormal Pap smears and are at higher risk of developing



cervical squamous intraepithelial lesions and cervical cancer (Moodley *et al.* 2009). Cervical dysplasia increases as CD4 cell counts decrease in HIV positive women (Firnhaber *et al.* 2010). It has been well documented that cervical screening needs to be intensified in HIV positive women (Firnhaber *et al.* 2010; Moodley *et al.* 2009). Adequate cervical screening coverage in the general PHC population has remained a challenge in SA (Denny 2008). A third (33.6%) of women in this review who are known to be at high risk for cervical cancer did not have a Pap smear. Pap smears were done on an appointment basis in these clinics and were limited to 10 per day for each clinic because of staff shortages and the lack of availability of adequately sterilised speculums. This number included cervical screening of the general PHC clinic attendees and HIV positive patients who were initiated on ART. Patients enrolling for ART were given an appointment to return on a later date for a Pap smear. Abnormal Pap smears were found in 62.3% of patients. These results were consistent with findings from similar ART cohorts, with CD4 cell counts less than 200, in Cape Town (66.3%) (Moodley *et al.* 2009) and Johannesburg (60.5%) (Firnhaber *et al.* 2010). The most frequent abnormality observed was a low grade squamous intra-epithelial lesion (LSIL) (40.7%) that followed the trends observed in the Cape Town (40.0%) (Moodley *et al.* 2009) and Johannesburg (31.8%) (Firnhaber *et al.* 2010) cohorts.

High grade squamous intra-epithelial lesion (HSIL), the immediate precursor to cervical cancer, requires a colposcopy at detection (South African National Department of Health 2002). Colposcopies were required for 15.4% of the women who were initiated on ART in this review. This emphasises the need for intensifying yearly Pap smear tests on all HIV positive women. Prior ART history revealed that fewer patients were re-initiating ART (4.0%) than in a previous study (9.0%) (Boyles *et al.* 2011). Studies show that regimen 1a was prescribed more often than regimen 1b (Houlihan *et al.* 2011; Vella *et al.* 2008). This may be attributed to the high TB prevalence in which Nevirapine is contra indicated and has a worse safety profile than Efavirenz when co-administered with anti TB drugs.

Limitations of the study

This study, being an observational descriptive study of the routine data recorded in ART patient records, is a reflection of the programme at an operational level at PHC, therefore missing data cannot be accounted for.

Recommendations

Continuous quality control and assurance need to be intensified for the follow-up of clinical and laboratory investigations done at PHC clinics. It should be done at regular intervals and monitored by the clinical manager. Loss of follow-up in pre-ART is a cause of great concern and strategies need to be in place to encourage retention in these programmes. Making a community diagnosis and developing community oriented, multi sectorial solutions

to the problems facing the community is essential if one has to deal effectively with these problems. The incorporation of NGOs, faith based organisations and community health care workers into the PHC clinics pre-ART programmes will increase retention of patients.

The high prevalence of STIs in this community can be addressed by increasing the district health safe sex educational programmes in this community. Shortcomings in cervical screening such as the lack of speculums, limiting the number of Pap smears done per day and the lack of trained staff capable of performing a Pap smear are issues to be addressed to intensify cervical screening for HIV positive women. Findings from this study will be forwarded to the District Health Authority.

Conclusion

This study assessed an ART roll-out programme in rural PHC settings in KwaZulu Natal. The clinical practice is far from ideal and many inadequacies were identified. Strengthening PHC is essential if such programmes are to be effective. When task shifting was used it was noted to be very effective. Programme managers need to utilise innovative ways of dealing with service delivery constraints. Information technology programmes can be effectively introduced into such programmes. Data capturers could easily capture key information needed for patient management. Missing fields can then be flagged for follow up. This will ensure better monitoring and may lead to better clinical outcomes. Shortcomings identified were inadequate CD4 testing at VCT, incomplete clinical records and missing investigations. Doing CD4 cell counts, when HCT is performed, has become routine practice in some settings. This may serve to improve on the percentage of patients who have baseline CD4 cell counts. However, dealing with the bad news of being diagnosed with HIV and trying to assimilate one's future options at the same time is far from ideal if one has to practice patient centred care.

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Competing interests

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Author contributions

H.G.M. was responsible for writing the article. M.N. was responsible for editing and supervision.

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