Evaluation of the clinical management of HIV-infected patients by private sector doctors in the eThekwini Metro, KwaZulu-Natal

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Abstract

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Background: Although private sector doctors are the backbone of treatment service in many countries, caring for patients with HIV entails a whole new set of challenges and difficulties. The few studies done on the quality of care of HIV patients, in the private sector in developing countries, have highlighted some problems with management. In South Africa, two-thirds of doctors work in the private sector. Though many studies on HIV/AIDS have been undertaken, few have been done in the private sector in terms of the management of this disease. Therefore, a study was undertaken to evaluate the clinical management of HIV-infected patients by private sector doctors.

Methods: A descriptive cross-sectional study was undertaken in the eThekwini Metro in KwaZulu-Natal, South Africa, with 190 private sector doctors who, in the first phase of the study, indicated that they manage HIV and AIDS patients and would be willing to participate in the second phase of the study. The HIV guidelines of the Department of Health and Human Services and the South African National Department of Health were used to compare the treatment of HIV patients by these doctors.

Results: Eighty-five doctors (54.5%) always measured the CD4 count and viral load levels at diagnosis. Both CD4 counts and viral load were always used by 76 doctors (61.8%) to initiate therapy. Of the doctors, 134 (78.5%) initiated therapy at CD4 count < 200 cells/mm^3. The majority of doctors prescribed triple therapy regimens using the 2 NRTI + 1 NNRTI combination. Doctors who utilised CD4 counts tended to also use viral load (VL) to assess effectiveness and change therapy ($p < 0.001$). At initiation of treatment, 68.5% of the doctors saw their patients monthly and 64.3% saw them every three to six months, when stable.

Conclusion: The majority of private sector doctors were compliant with current guidelines for HIV management, hence maintaining an acceptable quality of clinical healthcare.

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Introduction

In the developing world, there are inadequate numbers of clinicians to assist in the management of the large number of patients with human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), resulting in high mortality and morbidity rates and having major social consequences.[1] The HIV/AIDS/tuberculosis (TB) epidemic has severely affected South Africa and, although the country has the largest public sector antiretroviral (ARV) programme in the world, it is unable to meet the needs of the high number of people infected.[2] The most recent report on HIV prevalence amongst antenatal clinic attendees indicates that the province of KwaZulu-Natal remains the epicentre of the epidemic, with a prevalence of 38.7%.[3] The unequal distribution of resources between the public and private health sectors results in half of nurses and two-thirds of doctors working in the private sector.[4] In 2008, it was reported that there were more than 4 000 doctor posts vacant in state hospitals.[5] We need to scale up access and use all available doctors, both in the public and private sector, to manage this epidemic. However, in KwaZulu-Natal little is known about the practices of private sector doctors and whether these doctors manage their HIV/AIDS patients appropriately in accordance with international and national guidelines.[6,7]

The United States Department of Health and Human Services panel (DHHS) developed guidelines to help clinicians treat adults and adolescents infected with HIV. The primary areas of attention and revision were when to initiate therapy, which drug combinations were preferred and which drugs or combinations should be avoided.[6] In formulating its guidelines, the South African National

Department of Health (NDOH) adopted continuum of care, with a holistic patient focus in an integrated health system. These guidelines were revised in order to ensure the highest possible standard of care for all South Africans.[7]

Private sector doctors are the backbone of treatment service in many countries; however, caring for patients with HIV entails a whole new set of challenges and difficulties.[8] The few studies done on the quality of care of patients with AIDS in the private sector in developing countries have highlighted some problems with management.[9] In an Indian study, it was concluded that private practitioners were actively involved in diagnosing and managing patients with HIV/AIDS, but that some of their management practices were inappropriate and needed to be remedied.[10] Anecdotal evidence from doctors in Lesotho suggests that the problem of poor management is widespread: only six of 24 patients who were managed by private sector doctors were taking either mono- or dual therapy, while another patient was prescribed just ten doses of nevirapine only instead of nevirapine in combination with other drugs taken for life.[9] Possible reasons cited were affordability, in that the doctor had prescribed what the patient could afford, and lack of knowledge on the part of the doctors.[9] In a study done in Harare a decade ago, to gather data to help formulate treatment guidelines, there appeared to be therapeutic anarchy in the private sector in the way that antiretrovirals were used.[11] The monitoring practices were also of concern in Uganda, where a survey of 21 private medical facilities reported that only four of 17 facilities which prescribed antiretroviral drugs had received CD4 and viral load (VL) results in the previous two months, for only 38 of the 340 patients they were monitoring.[12]

Despite the fact that antiretroviral drugs have been available in the South African private healthcare sector since 1996, and although KwaZulu-Natal is the province with the highest HIV prevalence rate, all doctors in the private sector in KwaZulu-Natal are not managing HIV/AIDS patients. Possible reasons for this may be the lack of training, complexity of the regimens, and poor infrastructure, which cause many doctors to refer such patients to specialists.[13] Though many studies on HIV/AIDS have been undertaken, few have been done in the private sector in terms of the doctors' compliance to guidelines on the management of HIV-infected patients and the quality of care provided to HIV/AIDS patients. This study was, therefore, undertaken to evaluate the clinical management of HIV-infected patients in the private sector in the eThekwini Metro, KwaZulu-Natal.

Methods

A descriptive cross-sectional study was conducted amongst 190 private general practitioners (GPs) and specialists working in the eThekwini Metro, KwaZulu-Natal after obtaining their consent to be part of the study.

A comprehensive list of 1 255 GPs and specialists practising in the eThekwini Metro was obtained from the Medpages Directory; the KwaZulu-Natal Managed Care Coalition (KZNMCC), which is a private doctors' grouping; the private doctors' guilds; the Lancet Clinic Courier database; and the Southern African HIV Clinicians Society. In the first phase of the study, a valid sample of 931 doctors was obtained.[13] Of these, 235 doctors responded that they manage HIV and AIDS patients.[13] Of the 235 doctors, 190 agreed to participate in the second phase of the study. These GPs and specialists were independent of any funding from the Government and were remunerated either by patients paying cash or via a medical aid. A semistructured anonymous questionnaire was completed by each of these doctors. Demographic information, initiation of ARV medication, laboratory markers and values used to initiate treatment, and prescribed regimens were all topics included in the questionnaire. The DHHS and NDOH guidelines for the management of HIV/AIDS patients were used to determine the extent of private sector doctors' compliance to five processes, namely:

1. Evaluations done at diagnosis and before initiating therapy for HIV-infected patients.
2. Criteria used to initiate antiretroviral therapy (ART).
3. ART regimen.
4. Laboratory parameters used to monitor effectiveness and to change therapy.
5. Frequency of clinical and laboratory monitoring by these doctors.

All information was treated confidentially. The completed questionnaires were collected, entered and analysed using SPSS Version 15. Frequency tables and percentages were used to describe the responses in the case of categorical variables. Cross-tabulations and Pearson's chi-square test were used to assess associations between categorical variables, with a p-value < 0.05 indicating statistical significance.

Ethics approval for the study protocol was obtained from the Nelson R Mandela School of Medicine, University of KwaZulu-Natal.

Results

A response rate of 90% (171) was obtained from the 190 doctors, consisting of 138 (80.7%) GPs and 33 (19.3%) specialists. Compliance with the five processes is described below.

Evaluations at diagnosis of HIV-infected patients

Laboratory markers used at diagnosis:

CD4 count and VL were always measured by 119 doctors (76.3%) and 85 doctors (54.5%), respectively, at diagnosis of HIV/AIDS patients. All 85 doctors (54.5%) who always

Table I: Antiretroviral drugs used by private sector doctors in different regimens at initiation of treatment (n = 171)

Drug name	Drug class	N =	Single therapy		Dual therapy		Triple therapy		Four-drug therapy	
			Count	%	Count	%	Count	%	Count	%
Lamivudine (3TC)	NRTI*	131	0	0%	11	8.4%	120	91.6%	0	0%
Stavudine (d4T)	NRTI	97	1	1.0%	4	4.1%	89	91.8%	3	3.1%
Zidovudine	NRTI	81	1	1.2%	9	11.1%	71	87.7%	0	0%
Didanosine (ddi)	NRTI	48	0	0%	3	6.2%	45	93.8%	0	0%
Zalcitabine	NRTI	11	0	0%	0	0%	9	81.8%	2	18.2%
Abacavir	NRTI	5	0	0%	0	0%	4	80.0%	1	20.0%
Efavirenz	NNRTI†	90	0	0%	5	5.6%	85	94.4%	0	0%
Nevirapine	NNRTI	81	4	4.9%	4	4.9%	73	90.2%	0	0%
Tenofovir	NtRTI‡	1	0	0%	0	0%	1	100.0%	0	0%
Ritonavir	PI§	19	0	0%	0	0%	17	89.5%	2	10.5%
Indinavir	PI	14	0	0%	0	0%	13	92.9%	1	7.1%
Lopinavir	PI	13	0	0%	0	0%	12	92.3%	1	7.7%
Saquinavir	PI	6	0	0%	1	16.7%	5	83.3%	0	0%
Nelfinavir	PI	5	0	0%	0	0%	5	100.0%	0	0%
Atazanavir	PI	4	0	0%	1	25.0%	1	25.0%	2	50.0%

** NRTI: nucleoside reverse transcriptase inhibitor †NNRTI: non-nucleoside reverse transcriptase inhibitor ‡ NtRTI: nucleotide reverse transcriptase inhibitor § PI: protease inhibitor*

measured VL at diagnosis also measured CD4. However, five doctors (3.2%) never measured CD4 or VL at diagnosis

Evaluations before initiating therapy

Complete medical history and physical examination (clinical assessment):

The majority of doctors (149, 96.1%) always clinically assessed their patients before initiating therapy, using indicators such as weight loss, opportunistic infections and fever.

Laboratory tests:

1. Complete blood count: (n = 152)

A total of 138 doctors (90.8%) always or often did complete blood counts before initiating therapy.

2. TB screening: (n = 148)

Some 123 doctors (83.1%) always or often screened for TB before initiating therapy.

3. CD4 and VL measures: (n = 143)

A total of 123 doctors (86.0%) always measured CD4 and 79 (55.2%) always measured VL before initiating therapy, of whom 76 doctors (61.8%) always used both CD4 counts and VL to initiate therapy.

The reasons cited by the doctors who did not always or often do blood counts, TB screening, VL and CD4 was that it was too costly for the patient. Some doctors also cited inadequate laboratory access as a reason for not doing TB screening. However, inadequate training or inadequate laboratory facilities did not deter doctors wanting to do laboratory evaluation before initiating therapy.

Criteria for initiation of treatment

Of the 149 doctors, 117 (78.5%) doctors reported using CD4 count < 200 cells/mm^3, and 24 (16.1%) reported using CD4 count < 350 cells/mm^3 to initiate therapy.

Of the 90 respondents, 30 doctors (33.3%) initiated therapy at VL levels between 50 000 and 100 000, while 22 (24.4%) doctors did so at VL levels > 100 000. Two doctors stated that they would initiate therapy at any level if the patient requests therapy, while one doctor would initiate therapy at any level if the patient is pregnant.

Drug regimen

Antiretroviral treatment regimens:

A range of antiretroviral drugs was used in deciding on the ART regimen (see Table I).

It is clear from Table I that the majority of the doctors used the listed drugs in triple therapy regimens rather than as single, dual or four-drug therapy regimens. The drugs lamivudine, stavudine, zidovudine, didanosine, efavirenz and nevirapine were the most common ARV drugs used in this triple regimen, although the protease inhibitors ritonavir, indinavir and lopinavir were also used. The drugs nevirapine, zidovudine and stavudine appeared to be the only drugs used as single therapy. Only one doctor used tenofovir and this was used in a triple therapy regimen.

The combinations of classes of drugs that were used in highly active antiretroviral therapy (HAART) are presented in Table II.

Multiple regimens were used by doctors in order to treat different patients. In total there were 24 drug regimens from four different combination classes of antiretroviral drugs,

Table II: Drugs used in combination therapy (HAART) by private sector doctors (n = 171)

	Drug regimen	No (%) of doctors that reported the use of different drug regimen (n = 171)
2 NRTI*+1 NNRTI†	3TC[1]+d4T[2]+efavirenz	61 (35.6%)
	3TC+d4T+nevirapine	54 (31.6%)
	3TC+AZT[3]+efavirenz	47 (27.5%)
	3TC+AZT+nevirapine	42 (24.6%)
	d4T+AZT+efavirenz	35 (20.5%)
	d4T+AZT+nevirapine	35 (20.5%)
	d4T+ddi[4]+ nevirapine	31 (18.1%)
	3TC+ddi+nevirapine	30 (17.5%)
	d4T+ddi+efavirenz	29 (17.0%)
	3TC+ddi+efavirenz	29 (17.0%)
	AZT+ddi+efavirenz	27 (15.8%)
	AZT+ddi+ nevirapine	25 (14.6%)
Total reports of drug regimen by doctors no (%), 95% CI		**445 [71.9%(68.1–75.4)]**
3 NRTI	3TC+d4T+AZT	47 (27.5%)
	3TC+d4T+DDI	37 (21.6%)
	D4T+ddi+AZT	33 (19.3%)
	3TC+d4T+DDC	8 (4.7%)
	3TC+d4T+abacavir	3 (1.8%)
Total reports of drug regimen by doctors no (%), 95% CI		**128 [20.7%(17.6–24.1)]**
2 NRTI+1 NtRTI‡	3TC+d4T+tenofovir	1 (0.6%)
Total reports of drug regimen by doctors no (%), 95% CI		**1 [0.2%(0.01–1.04)]**
2 NRTI+1 boosted PI§	3TC+d4T+ Kaletra®[5]	10 (5.8%)
	D4T+AZT+Kaletra®	8 (4.7%)
	3TC+AZT+Kaletra®	7 (4.1%)
	AZT+ddi+Kaletra®	7 (4.1%)
	D4T+ddi+Kaletra®	7 (4.1%)
	3TC+ddi+Kaletra®	6 (3.5%)
Total reports of drug regimen by doctors no (%), 95% CI		45 [7.3%(5.41–9.68)]
Grand total	**24**	**619**

* NRTI: nucleoside reverse transcriptase inhibitor
† NNRTI: non-nucleoside reverse transcriptase inhibitor
‡ NtRTI: nucleotide reverse transcriptase inhibitor
§ PI: protease inhibitor
[1] 3TC: lamivudine
[2] d4T: stavudine
[3] AZT: zidovudine
[4] ddi: didanosine
[5] Kaletra®: lopinavir+ritonavir

resulting in 619 reports by 171 doctors. The most common regimens used by the doctors were the 2 NRTI + 1 NNRTI regimen, followed by the 3 NRTI regimens. The 2 NRTI + Boosted PI was also used by a small minority of the doctors, while one doctor used tenofovir, an NtRTI with 2 NRTI.

Prophylaxis:

Of the doctors, 27 indicated the use of prophylaxis either in single therapy regimen (25.9%), dual therapy regimen (3.7%), triple-therapy regimen (55.6%) or only as prophylaxis (14.8%). Co-trimoxazole was the drug used as prophylaxis.

There were no statistically significant differences between GPs and specialists regarding either the regimen or type of drug used.

Monitoring practices to assess effectiveness and to change therapy (n = 171)

Parameters used to monitor effectiveness of therapy:

1. Laboratory markers:

Table III depicts the frequency of combined use of laboratory markers by private sector doctors to monitor effectiveness of therapy of HIV/AIDS patients.

Table III: The frequency of the combined use of CD4 and VL laboratory markers by private sector doctors to assess effectiveness of therapy of HIV/AIDS patients

		No (%) of doctors that used VL levels to assess effectiveness of therapy		Total no of doctors
		No	Yes	
No (%) of doctors that used CD4 counts to assess effectiveness of therapy	No	24 (82.8%)	5 (17.2%)	29
	Yes	51 (35.9%)	91 (64.1%)	142
Total no of doctors		75 (43.9%)	96 (56.1%)	171

$p < 0.001$

The CD4 count was used to monitor the effectiveness of therapy by the majority of doctors while 91 doctors (64.1%) used both CD4 counts and VL (see Table III).

2. Clinical indicators:

A total of 138 doctors (80.7%) also assessed their patients clinically using weight loss and opportunistic infection as indicators.

Parameters used to change therapy:

1. Laboratory markers:

In Table IV the combined use of laboratory markers to change therapy is shown.

Table IV: The frequency of the combined use of CD4 and VL laboratory markers by private sector doctors to change therapy of HIV/AIDS patients (n = 171)

		No (%) of doctors that used VL levels to change therapy		Total no of doctors
		No	Yes	
No (%) of doctors that used CD4 counts to change therapy	No	36 (62.1%)	22 (37.9%)	58
	Yes	17 (15.0%)	96 (85.0%)	113
Total no of doctors		53 (31.0%)	118 (69%)	171

$p < 0.001$

Ninety-six doctors (56.1%) used both CD4 and VL to change therapy while 22 (12.9%) doctors did not use CD4 counts but used VL.

The majority of the doctors changed therapy depending on the degree of change from the previous CD4 count (105, 78.4%) and from the previous VL level (101, 81.5%).

2. Clinical indicators and resistance testing:

A total of 101 (59.1%) doctors used clinical indicators such as weight loss and the presence of opportunistic infections to change therapy.

Thirty-three doctors (19.3%) tested for resistance before they changed therapy. Two-thirds of these doctors also used CD4 count and VL to change therapy.

Frequency of clinical and laboratory monitoring of HIV-infected patients

Frequency of doctor consults with HIV-infected patients:

1. When treatment was initiated doctors saw their patients:
- every month: 100 (67.1%)
- every second month: 8 (5.4%)
- every three months: 18 (12.1%)
- every four to six months: 3 (2%)
- every seven to 12 months: 2 (1.3%)
- at the patient's request: 6 (4%)
- depending on clinical status: 12 (8.1%)

2. When patients were stable doctors saw them:
- every month: 18 (12.5%)
- every second month: 10 (6.9%)
- every three months: 56 (38.9%)
- every four to six months: 37 (25.7%)
- every seven to 12 months: 19 (13.2%)
- at the patient's request: 4 (2.8%)

Twelve doctors saw their patients as frequently as required depending on their clinical status, but when patients were stable 50.0% saw them every three months.

Frequency of laboratory monitoring:

CD4 (n = 151):

Most doctors (122, 80.8%) monitored for CD4 every three to six months, while 17 (11.3%) monitored every eight to 12 weeks. Four doctors (2.6%) reported no CD4 monitoring.

VL (n = 132):

A total of 65 doctors (49.2%) monitored the VL levels at six months, while 41 doctors (31.1%) monitored VL every three to four months. Six doctors (4.5%) indicated no VL monitoring.

Referral practices of private sector doctors (n = 171)

Over 76% of doctors referred HIV/AIDS patients to the next level of care, and the majority (70%) stated that they do this when patients are very ill. However, over 45.6% of doctors referred patients on request and 41.8% of doctors referred patients due to drug failure. The doctors referred patients to specialists (61.2%) as well as to public sector (58.8%) or parastatal health facilities (32.5%).

Compliance with guidelines (n = 145)

The majority (133, 91.7%) of doctors stated that they follow guidelines in the management of HIV-infected patients. However, when asked to name the guidelines they followed 36 (26.9%) doctors were not sure of the name, 51 (38.2%) stated that they followed the guidelines of the SA HIV Clinicians Society, 21 (15.73%) stated the NDOH guidelines and 25 (19%) named other sources.

Therapeutic decision making (n = 159)

The majority of the doctors (88.1%) always engaged their HIV and AIDS patients in any therapeutic decision making concerning their clinical management.

A summary of the practices and guideline recommendations is depicted in Table V.

Discussion

This study evaluated five dimensions of the HIV/AIDS care of patients by private sector doctors, namely:
- the evaluations done at diagnosis and before initiating therapy for HIV-infected patients
- the criteria used to initiate ART
- the ART regimen
- the laboratory parameters that are used to monitor effectiveness and to change therapy
- the frequency of clinical and laboratory monitoring by these doctors.

The DHHS and NDOH guidelines for the management of HIV/AIDS patients were used as comparators to determine the extent of compliance by private sector doctors, hence evaluating the quality of care these doctors provide to HIV-infected patients.

The majority of the doctors complied with the recommendations published in the guidelines with respect to the evaluations done at diagnosis and at the pre-treatment stage. The doctors in this study tended to make use of the CD4 counts more than they did of the VL at diagnosis and before initiating ART. However, when it came to changing therapy more doctors used the VL than the CD4, and more VL determinations were used to monitor effectiveness than

Table V: Summary of process indicators and doctor practices to evaluate compliance with guideline

Process indicators and outcomes used to evaluate clinical care of doctors	Guidelines recommendation: Recommended (R) Special circumstances (S)		No (%) of doctors who complied with guideline recommendation	N =
Evaluation at diagnosis and before initiation of therapy	DHHS	NDOH		
Clinical assessment	R	R	149 (96.1%)	155
CD4	R	R	131 (86.2%)	152
VL	R	R	79 (55.2%)	143
TB screening	R	R	92 (62.2%)	124
Complete blood count	R	R	123 (80.9%)	152
Criteria for ARV initiation				
Asymptomatic: CD4 < 200 cells/mm^3	R	R	117 (78.5%)	149
Asymptomatic: CD4 < 350 cells/mm^3	R	R	24 (16.1%)	149
VL > 100 000	R	R	22 (24.4%)	90
ART regimen				
Preferred classes of drug				
a. NNRTI-based regimens [1NNRTI+2NRTI]	R	R	Used 71.9%	
b. PI-based regimens [1 PI (boosted)]+2NRTI	R	R	Used 7.3%	
c. Triple-NRTI regimens [only if NNRTI and PI cannot be used]	S		Used 20.7%	
Preferred drug regimen				
a. Efavirenz+3TC+d4T		R	61 (35.6%)	
a. Nevirapine+3TC+d4T		R	54 (31.6%)	
a. Efavirenz+AZT+3TC			47 (27.5%)	
b. Lopinavir/ritonavir+AZT+ddi		R	7 (4.1%)	
b. Lopinavir/ritonavir+AZT+3TC	R		7 (4.1%)	
c. Abacavir+AZT+3TC	R		0 (0%)	
Clinical and laboratory evaluation to assess effectiveness of therapy				
Clinical assessment	R	R	138 (80.7%)	171
CD4	R	R	142 (83.0%)	171
VL	R	R	96 (56.1%)	171
Clinical and laboratory evaluation to change therapy				
Clinical assessment	R	R	101 (59.1%)	171
CD4	R	R	113 (66.1%)	171
VL	R	R	118 (69%)	171
Frequency of clinical and laboratory evaluation				
Clinical assessment:				149
Every month from initiation of treatment for 3 months			100 (67.1%)	
Every 3 months when stable		R	56 (38.9%)	151
CD4 : Every 3 to 6 months	R	R	122 (80.8%)	132
VL: Every 6 months		R	65 (49.2%)	

were used at diagnosis or initiation of treatment. Laboratory markers such as CD4 cells/mm^3 and VL are cited in the guidelines as important parameters to initiate, assess and change therapy. The CD4 count normally decreases by 30 to 100 cells/mm^3 a year in an HIV-infected patient who is not on HIV medication[14] and serves as a major clinical indicator of immuno-competence in patients with HIV infection.[6] It is usually the most important consideration in decisions to initiate ARV therapy. VL is normally used as a consideration in the decision to initiate therapy[6] but is critical for evaluating response to therapy since plasma VL has been shown to be a better predictor of progression to AIDS and death than the number of CD4$^+$ T cells..[15] Interestingly only 19.3% of the doctors used resistance testing to change therapy. Resistance testing continues to be an important component of optimising drug selection after treatment failure. Resistance testing is recommended in all patients with virological failure prior to beginning a

new ARV combination.[16] However, the cost of this method to change therapy limits its use. CD4 and VL sometimes are not good predictors to change therapy as the issue of non-adherence may be the reason for these values giving a non-optimal result.

The criteria used by the doctors to initiate therapy with respect to CD4 count were also found to be compliant with national and international guidelines. The majority of the private sector doctors in this study initiated therapy when the CD4 count was less than 200 cells/mm^3 while 16.1% initiated therapy at less than 350 cells/mm^3. The medical criterion that was recommended to initiate ARV therapy was a CD4 cell count of equal to or less than 200 cells/mm^3 irrespective of World Health Organization (WHO) stage.[7] The DHHS guidelines[7] also recommended therapy initiation at CD4 counts of less than 350 cells/mm^3; it is crucial, however, at critical levels of less than 200 cells/mm^3. The SA HIV Clinicians Society guidelines[17] at the time also recommended ART treatment in asymptomatic patients with CD4 counts of less than 200 cells/mm^3, and that ARV therapy should be considered on an individual basis in patients with CD4 counts between 200 and 350 cells/mm^3. The national guidelines at the time did not make any recommendation regarding initiating therapy at levels < 350 cells/mm^3, therefore the minority of doctors in this study that initiated therapy at < 350 cells/mm^3 could be clinicians that belonged to the SA HIV Clinicians Society or followed international guideline recommendations. At CD4 levels > 350 cells/mm^3, the recommendation was that treatment should be deferred[6,17] as there was little evidence on the benefit of initiating therapy in asymptomatic patients with CD4 cell count > 350 cells/mm^3 as robust immune reconstitution still occurred in the majority of patients who initiated treatment with CD4 cell counts in the 200 to 350 cells/mm^3 range. Also, toxicity risks and adherence challenges generally outweigh the benefits of initiating therapy at CD4 cell counts > 350 cells/mm^3.[6] The DHHS guidelines recommend initiating therapy when the VL is above 100 000 in established HIV asymptomatic infection. In this study 22 doctors (24.4%) initiated therapy when the VL was > 100 000.

The majority of the doctors in the private sector complied with the national and international guideline recommendations in treating with triple drug combination therapy, consisting of either 2 NRTI/NtRTI with 1 NNRTI or 1 boosted or unboosted PI.[6,7,17] The most common regimen prescribed by doctors in this study was the triple therapy consisting of 2 NRTI + 1 NNRTI, followed by 3 NRTI, and 2 NRTI + boosted PI. The drugs lamivudine (3TC) + stavudine (d4T) with either efavirenz or nevirapine were most commonly prescribed in the 2 NRTI + 1 NNRTI regimen.

The NDOH guidelines for the first-line regimen for all public sector patients at the time was 3TC + d4T with either efavirenz or nevirapine unless contraindicated, and for the second-line regimen zidovudine (AZT) plus didanosine (ddi) and lopinavir/ritonavir (Kaletra®). This study found the first-line regimen to be the most commonly prescribed regimen by the private sector doctors, with only 7.1% prescribing the second-line regimen. Because of the scarcity of guidelines for HIV management in the private healthcare sector, these doctors may have opted to follow the guidelines recommended by the NDOH for first-line regimens. In addition, the SA HIV Clinicians Society also endorsed the use of NRTI and NNRTI as first-line regimen in their published guidelines.

The 3 NRTI combination was used more frequently than the recommended second-line regimen by the doctors in this study. The national guidelines do not make any reference to its use. The DHHS guidelines, however, recommend its use only when the first-line and second-line regimens have failed, but go on to suggest the drugs that need to be used in this combination.[6] The SA HIV Clinicians Society recommends that patients be referred for specialist care if the first-line and second-line regimens fail and that clinicians should avoid using this combination in patients who have failed the PI-based combination. Even though this drug class was used over 20% of the time by doctors in the study, no single doctor used the recommended drugs in this combination.

The frequency at which clinical and laboratory monitoring was done by doctors also complied with recommendations found in the guidelines: more than two-thirds of the doctors saw their patients every month when they initiated therapy, and about 65% saw them every three to six months when stable. Twelve doctors saw their patients as frequently as required, depending on their clinical status. Over three-quarters of the doctors monitored their patients for adherence using, among other indicators, CD4 counts and VL. The CD4 monitoring every three to six months and the VL monitoring every six months were consistent with international and national guideline recommendations. In addition, the national guideline recommendation, that patients be seen every month for three months and then every three months for clinical assessments, was adopted by the doctors in the study for the management of their HIV-infected patients. The NDOH also recommended referring patients to specialists when there was drug failure, which was heeded by 41.8% of the doctors in this study.

There appeared to be major compliance with the HIV management guidelines published by the NDOH and the DHHS, with some good clinical practices, such

as monitoring for adherence and involving patients in therapeutic decision making. The majority of the doctors in this study demonstrate compliance to the guidelines, thereby affording their patients quality management of their condition. However, the response of 171 private sector doctors to the study limits the generalisability of the data to all doctors in the private sector in South Africa, since the sample size was relatively small and confined to the eThekwini Metro in KwaZulu-Natal. Further, the reliability and validity of participants' self-reporting is unknown.

Conclusion and recommendations

The majority of the doctors are managing their patients in accordance with the recommended national and international guidelines. However, some doctors are treating their patients with drug combinations that are not recommended as second-line regimen. These doctors run the risk of not providing quality healthcare to their patients and, therefore, need to attend continuous AIDS training workshops regularly, in order to demonstrate compliance to guidelines and provide much needed quality care to HIV-infected patients. It is also recommended that a further study be conducted to compare the management of private sector doctors with the revised guidelines and do a further evaluation of the quality of their clinical care.

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