

RESEARCH ASSIGNMENT

**The Reasons for Changing HAART in HIV Positive
Patients at the Thusong Comprehensive Care Management and
Treatment Site, West Rand District, Johannesburg, Gauteng**

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DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Date: ----- 26 / 10 / 2011 -----

ABSTRACT

Objective

To determine the reasons for the change or modification in the first line HAART regimen (1a and 1b) in HIV positive patients at the Thusong CCMT site.

Methods

This study is a quantitative descriptive study using a standardized data collection tool to extract retrospective data from medical records.

Subjects

Subjects for this study included patients 18 years or older attending the Thusong CCMT site, which were started on HAART regimens 1a or 1b and were on treatment for at least 6 months. The final sample size evaluated was 257 patients.

Results

There was a high rate (43%) of change or modification of the first line HAART regimen. Majority of the patient's (72%) had their regimen modified due to side effects of the drugs and only a small number (9.7%) of patients had a complete change in the regimen due to virological failure. Stavudine (d4T) associated lipodystrophy was the most common side effect (45.5%) followed by peripheral neuropathy (16.7%), leading to treatment modification.

Conclusion

The rate of modification or change of first line HAART regimen, at Thusong CCMT, was fairly high (42.6%), and the most common reason for the modification or change was drug side effect of stavudine (d4T).

Introduction

According to the World Health Organisation (WHO) 0.6% of the world's population were infected with HIV in 2005.¹ The number of people living with HIV worldwide has continued to grow and in 2008 reaching an estimated 33.4 million.¹ An estimated 5.6 million people were living with HIV and AIDS in South Africa in 2009, more than in any other country.²

It is estimated that 2 million (1.7 million-2.4 million) deaths due to AIDS-related illnesses occurred worldwide in 2008.¹ In 2009, an estimated 310,000 South Africans died of the Acquired Immune Deficiency Syndrome (AIDS). The prevalence of Human Immunodeficiency Virus (HIV) amongst people aged between 15-49 years was 17.8%.² Young people accounted for around 40% of all new adult HIV infections world wide.² Sub-Saharan Africa is the most affected region with 67% of the population living with HIV.²

Treatment with highly active anti-retroviral therapy (HAART) increases the life expectancy of people infected with HIV.¹ Even after HIV has progressed to diagnosable AIDS the average survival time with anti-retroviral (HAART) therapy (as of 2005) is estimated to be more than 5 years.¹ According to a WHO report in 2009, without HAART, death normally occurs within a year.¹ HAART treatment reduces both mortality and morbidity due to HIV. The impact of the AIDS epidemic is reflected in the dramatic change in South Africa's mortality rate.³ The overall number of annual deaths increased sharply from 1997, when 316,559 people died, to 2006 when 607,184 people died. In 2006, 41% of these deaths were from the 25-49 years age group, whereas in 1997, this age group accounted for only 29% of the deaths.³

According to the South African National Antiretroviral Treatment Guidelines (first edition 2004) there were two recommended HAART regimens. The first line therapy was called Regimen 1 and second line therapy was called Regimen 2. The first line regimen was further divided into 2 regimens, Regimen 1a and Regimen 1b. Regimen 1a was intended for use on all patients who qualified to be on HAART, except pregnant women, and 1b was primarily intended for pregnant women.⁴ The 3 drugs used as Regimen 1a were d4T (stavudine), 3TC (lamivudine) and Efv (efavirenz), and

the 3 drugs used in Regimen 1b are d4T, 3TC and NVP (nevirapine). Regimen 2 consists of 3 drugs - AZT (zidovudine) and ddI (didanosine) and lopinavir/ ritonavir.

The HAART regimen can be modified by changing at least one antiretroviral used in the initial regimen, or it can be changed by simultaneously stopping all three antiretroviral drugs used in the initial HAART regimen and replacing them with a new regimen that was not used before. Reasons that can be used to modify or change HAART therapy despite good adherence are drug side effects and virological failure.⁴

In a study conducted in The Royal Free Hospital in London UK, 44.4% of patients had their HAART regimen changed.⁵ In 29.1% of these patients, the reason was immunological or virological failure and in 44.4% the changes were due to toxicities, patient's choice or poor compliance.⁵ In this particular study it was also found that a total of 26.6% of patients discontinued their HAART.

In a Swiss HIV Cohort Study, it was found that 47% of patients presented with clinical adverse events,⁶ and this subsequently lead to a change in the HAART regimen. In a study conducted in India, where 77% of patients were started on first line regimens, similar to the ones we were using in South Africa, it was found that the most common reason for modifying the treatment was a drug-related adverse event (64%).⁷ In this study it was also found that in 19% of cases, the cost of the drugs was the reason leading to treatment discontinuation.

There is not much data available on the reasons for the discontinuation or modification of HAART amongst the Sub-Saharan African populations. At the Mulago Hospital in Kampala, Uganda it was found that most common reasons for the discontinuation of treatment was cost, drug toxicities, and the fact that the drugs were out of stock,⁹ whereas in South Africa drug cost and non-availability of the drugs is not usually an issue in the public sector. At the Mbagathi District Hospital in Nairobi, Kenya it was found that the most common reasons to modify the drug regimen was to avoid potential or real side effects of the drugs.⁸ Lipodystrophy, lactic acidosis and then peripheral neuropathy were among the most common side effects experienced

by patients, which were related to d4T (stavudine). All the patients had stavudine changed to AZT (zidovudine) or tdf (tenofovir).⁸

In a study done at two Primary Care Treatment programmes in Khayelitsha and Nyanga in Cape Town South Africa, 44% of patients included in the study were started on regimen 1a and 31% on regimen 1b.¹⁰ The largest number of drug substitutions due to toxicity was in patients on d4T (20.8%) that included lipodystrophic body changes (9.0%), peripheral neuropathy (6.2%) and symptomatic hyperlactataemia (5%). A large proportion of individuals (7.6%) were taken off NVP because of hypersensitivity reactions and the least likely drug to be substituted was Efv (1.9%). The main drug contributing to toxicities and side effects such as lipodystrophy, peripheral neuropathy and hyperlactataemia was d4T.

While I was working at the Thusong CCMT site in the West Rand District of Johannesburg in the Gauteng province, I noticed that after a few months of starting on the HAART Regimens patients often had their regimen modified or changed to another regimen. This motivated me to study the circumstances for the modification or change in the initial HAART Regimen and I conducted this study on the patients whose treatment were modified or changed.

Aim

To determine why HIV positive patients on HAART Regimen 1 needed a modification or change in the regimen.

Objectives

1. To determine the age and gender of patients whose HAART regimen was changed or modified.
2. To determine the percentage of patients with Regimen 1 modification or change.
3. To determine the reasons for the change or modification in Regimen 1.

Methods

Study Design

This study was a descriptive quantitative study using a standardized data collection tool to extract retrospective data from medical records.

Study Site

The study was conducted at the Thusong CCMT (comprehensive care, management and treatment) site in Kagiso, Johannesburg. The CCMT was established in 2006 in a black township with an adult population of 19,950 individuals and serves the needs of patients from Kagiso and the surrounding areas. The CCMT is open from Monday to Friday 08h00-16h00. At the centre, a doctor is available three days a week (i.e. Tuesday, Wednesday and Thursday) and on the other two days, there is a professional nurse available.

In South Africa, the National Department of Health guidelines for HAART treatment were changed in April 2010 and introduced tdf as first line treatment in place of d4T. The change in regimen at this point significantly changed the side effect profile of patients on HAART Regimen 1.

Study Population and sampling

The study population included all patients attending the clinic from 01 July 2006 until 30 June 2011. A total of 603 HIV infected patients were included in the sample without the need for any sampling.

Inclusion criteria were:

- Patients over the age of 18 years.
- Patients started on HAART Regimen 1.
- Patients who were on HAART for more than 6 months.
- Patients who had their initial regimen changed or modified.

Exclusion criteria were:

- Patients below the age of 18 years.
- Patients referred from another CCMT site.
- Patients who were started on a mixed regimen other than regimen 1a and 1b.
- Patients who were started on a tdf based Regimen 1 according to The National Department of Health (NDOH) recommendations from April 2010.

Data Collection

The files of all 603 patients eligible to partake in the study were included in the study. In patients with a regimen change the reason/s for changing the patient's HAART regimen, as recorded in the patients file, was collected and analyzed. The following data was collected from the patient's record:

- Age
- Gender
- Initial HAART regimen
- The change or modification in the regimen
- Reason/s why the regimen was changed

Lipodystrophy was recorded as sudden increase in the weight (body mass index), increase in the size of stomach or breast, fat deposition at the back between the shoulders below neck (buffalo hump) and thinning of face (facial wasting), limbs and buttocks. Peripheral neuropathy was recorded as numbness, weakness, burning pain (mostly at night), and pins and needles especially in the feet and hands. Virological failure was recorded as a sustained increase of >1000 copies/ml in two consecutive reading 3 months apart in spite of good adherence.

Data Analysis

The data was analysed by using the Epi-info version 3.2 programme developed by the centre for disease control in Atlanta, Georgia. Percentages (%) and frequencies (n) of the entire sample were calculated for the age categories, for male and female gender, for the initial HAART regimen started and for the reasons for treatment modification or change. The mean,

median and modal ages were calculated for both male and female gender. Significance testing at done at a 0.05 level and relevant p-values were calculated.

Ethical Consideration

Strict procedure of confidentiality and anonymity were observed throughout the study. Only people directly involved in data collection had access to the patient's medical records. No names or identification numbers were recorded at any point as part of data analysis or reporting. There were no personal risks, harms or dangers to the lives of the patients whose records were included in the study. There was no direct involvement of the patients therefore a waiver of informed consent was obtained. Permission and approval for the study were applied for and obtained from both the office of the Director Health for the West Rand District Council in Gauteng and the Health Research Ethics Committee (HREC) of the Stellenbosch University on 10 May 2011. (Ethics Reference No. N11/04/137)

Results

At the time of the study a total of 1550 patients were attending the CCMT for their antiretroviral treatment but only 603 patients met the inclusion and exclusion criteria. Of these 603 patients, only 257 (42.6%) patients had modified or changed their regimens.

Demographic profile

For this study the age of the patients was further categorized into four groups i.e. old age (> 60yrs), older middle age (40-59 yrs), young middle age (25-39 yrs) and young adults (18-24yrs). Table 1 below shows the distribution of patients by age categories. For female patients the mean age was 38 yrs, the median age was 38 yrs, and the modal age was 31yrs. For male patients the mean age was 41 yrs, the median age was 41yrs, and the modal age was 45 yrs.

Table 1: Distribution of patients by age categories. (N= 257)

Age Categories	Frequency (n)	Percentage (%)
Young adult age (18-24 yrs)	12	4.7%
Young middle age (25-39 yrs)	128	49.8%
Older middle age (40-59 yrs)	114	44.4%
Old age (>60 yrs)	3	1.1%
Total	257	100%

From Table 1 above it can be seen that almost half of the patients 128 (49.8%) were in the young middle age category. In the older middle age there were 114 (44.4%). Therefore, it can be stated that the majority of patients (94.2%) are aged between 25-59 yrs, and only 4.7% are in the young adult category and very few patients 1.1% are in the old age category.

Table 2 below shows the distribution of patients by male and female gender. From Table 2 it can be seen that more than two thirds of the patients 173 (67.3%) were females and the rest 84 (32.7%) were males.

Table 2: Frequencies (n) and percentages (%) of patients by gender. (N= 257)

Gender	Frequency (n)	Percentage (%)
Male	84	32.7%
Female	173	67.3%
Total	257	100.0%

Figure 1 below shows the frequency (n) distribution of patients by age categories and gender variables. (N=257)

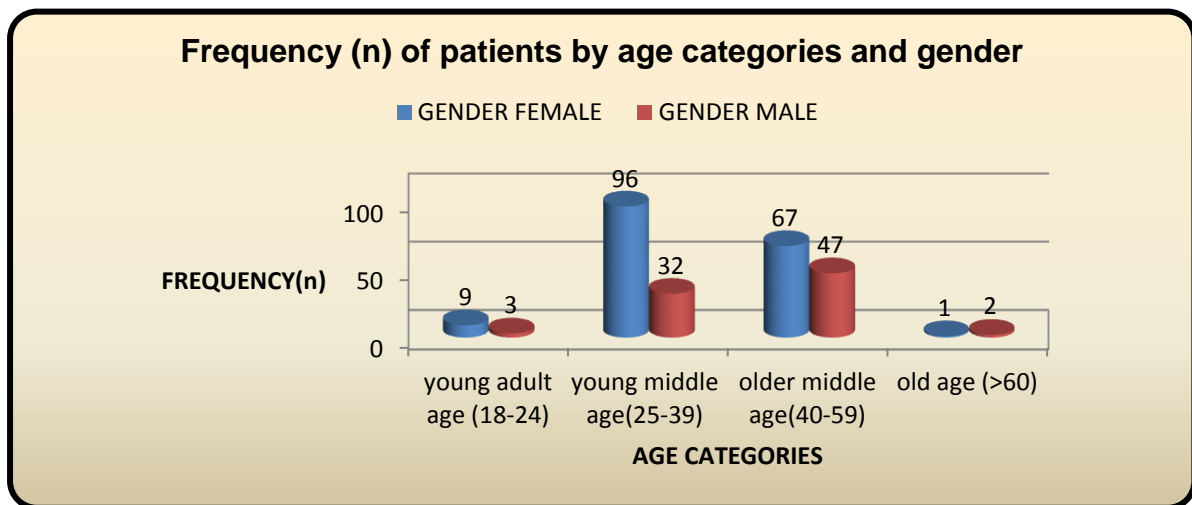


Figure 1 Frequency (n) distributions of patients by age categories and gender variables. (N=257)

Figure 1 above shows the distribution of patients by age categories in male and female gender. The group with the biggest difference between male and females is the young middle aged group (25-39 yrs).

Initial regimens

Table 3 below shows the distribution of patients on the initial regimens (N=257). From Table 3 we see that the majority of the patients (94.9%) were initially started on regimen 1a (d4T + 3TC + EFV).

Table 3: Frequencies (n) and percentages (%) of the patients on the initial regimens. (N=257)

Regimen Started	Frequency (n)	Percentage (%)
1a	244	94.9%
1b	13	5.1%
Total	257	100.0%

Table 4 shows the distribution of the patients on the initial regimens started by age categories (N=257). Of the patients on regimen 1a, 122 were from the young middle age group and 109 were from the older middle aged group. There were no patients on regimen 1b in the older age group.

Table 4: Frequency (n) of patients by age categories and initial regimen started (N=257)

AGE CATEGORIES	INITIAL REGIMEN STARTED		
	1a	1b	Total
Young adult (18-24 yrs)	10	2	12 (4.7%)
Young middle age (25-39yrs)	122	6	128 (49.8%)
Older middle age (40-59 yrs)	109	5	114 (44.4%)
Old age (>60 yrs)	3	0	3 (1.1%)
TOTAL	244 (95%)	13 (5%)	257 (100%)

Table 5 shows the distribution of patients by their initial regimens and gender. From the patients who were started on regimen 1a, 161(65.98%) were females and 83 (34.02%) were males.

Table 5: Frequency (n) of patients by gender and initial regimen started (N=257)

GENDER	INITIAL TREATMENT STARTED		
	1a	1b	TOTAL
FEMALE	161	12	173 (67.3%)
MALE	83	1	84 (32.7%)
TOTAL	244	13	257 (100%)

Reasons for change or modification of regimens

The reasons for the change in the initial treatment are listed in Table 6. We see that the major cause of the treatment modification was lipodystrophy (45.5%), followed by peripheral neuropathy (16.7%), pregnancy (11.7%) and virological failure (9.7%). Out of 257 patients who had their regimen changed or modified 224 (87.2%) had modification of their initial regimen and 33 (12.8%) had a complete regimen change.

Table 6: Reasons for the change or modification of initial treatment. (N=257)

Reasons for Change	Frequency (n)	Percentage (%)
Lipodystrophy	117	45.5%
Peripheral neuropathy	43	16.7%
Pregnancy	30	11.7%
Virological Failure	25	9.7%
Lipodystrophy and Peripheral Neuropathy	12	4.7%
Gynaecomastia	6	2.3%
Nightshift/Shift worker	6	2.3%
Defaulted Treatment	6	2.3%
No reason	4	1.6%
Hypertension	3	1.2%
Bipolar mood disorder	1	0.4%
Confusion	1	0.4%
Hallucinations	1	0.4%
Lactic acidosis	1	0.4%
Nightmares	1	0.4%
Total	257	100.0%

In Table 7 we see that of the 257 patients in the study, 185 (71.9%) patients had d4T substituted. The d4T was changed to tdf in 95 (36.9%) patients which is in line with the new guidelines that stated “patients started on d4T should remain on d4T if well tolerated, early switching with any toxicity, substitute with tdf if any side effects to d4T or at high risk of toxicity i.e. high BMI, low Hb or older female.” d4T was changed by AZT in 64 (24.9%) patients prior to the availability of tdf with the new guidelines or because tdf was contraindicated. The major reasons for the change of d4T to AZT were lipodystrophy, peripheral neuropathy and gynaecomastia. The change of Efv to NVP was either because the patient became pregnant or she was planning to get pregnant. Only a few male patients had their Efv changed to Aluvia because of the side effects of

Efv (nightmares), or because they started working nightshift or became shift workers.

Virological failure was the only reason related to a full regimen change.

Table 7: Frequency (n) of patients with treatment modification or change by gender. (N= 257)

REGIMEN MODIFIED	FEMALE	MALE	TOTAL
d4T TO ABC	1 (0.8%)	0 (0%)	1 (0.4%)
d4T TO AZT	38 (31.6%)	26 (40%)	64 (24.9%)
d4T TO AZT TO tdf	18 (15%)	7 (10.7%)	25 (9.7%)
d4T TO tdf	63 (52.5%)	32(26, 7%)	95 (36.9%)
TOTAL	120 (46.6%)	65 (25.3%)	185 (71.9%)
Efv TO ALUVIA	5 (15.6%)	3 (42.9%)	8 (20.5%)
Efv TO NVP	27(84.3%)	4 (57.1%)	31 (79.5%)
TOTAL	32 (82%)	7 (18%)	39 (15.1)
REGIMEN CHANGED			
FULL REGIMEN CHANGED	21 (8.2%)	12 (4.6%)	33 (12.8%)

The reasons for the change or modification of the initial treatment were categorised into four main groups:

- (1) Side effect of drugs included confusion, gynaecomastia, hallucination, lipodystrophy, lactic acidosis, peripheral neuropathy, and nightmares.
- (2) Patient's personal reasons included shift work and night shift worker.
- (3) Virological failure.
- (4) Other reasons included bipolar mood disorder, hypertension and those patients where no reason was written in the file

Table 8 below shows the frequency (n), percentages (%) of the various categories for reason for modification or change of the initial regimen.

REASONS FOR INITIAL TREATMENT MODIFICATION/ CHANGE CATEGORIES	FREQUENCY (n)	PERCENTAGE (%)
Side effect of drugs	185	72.40%
Patient reasons	42	16.30%
Virological failure	25	9.70%
Other reasons	4	1.60%
TOTAL	257	100%

Table 8 shows that the major causes for the treatment change or modification was side effects of the anti-retroviral drugs (72.4%) followed by patient's reasons (16.3%) and virological failure(9.7%).

Figure 2 shows the frequencies (n) of the categories of reason for regimen change/modification by age categories.

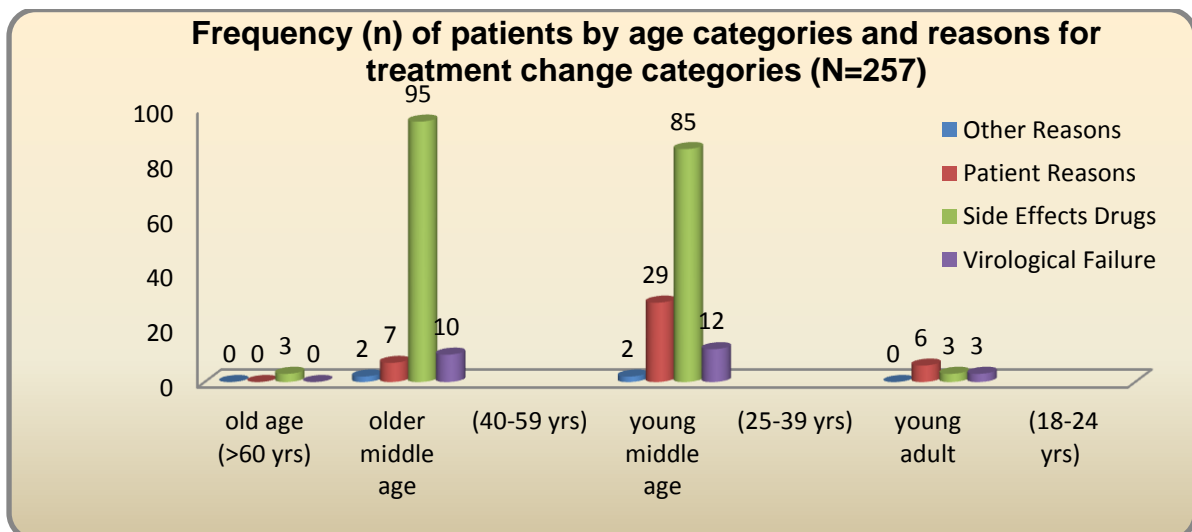


Figure 2: Frequency (n) of patients by age categories and reasons for treatment change categories. (N=257)

Figure 2 clearly shows that the side-effects due to drugs, is the main reason for treatment change or modification in all categories, except in the young adult group, where it is patient's reason.

Figure 3 shows that in both males and females, side effect of drugs was the commonest reason for modifying or changing the regimen.

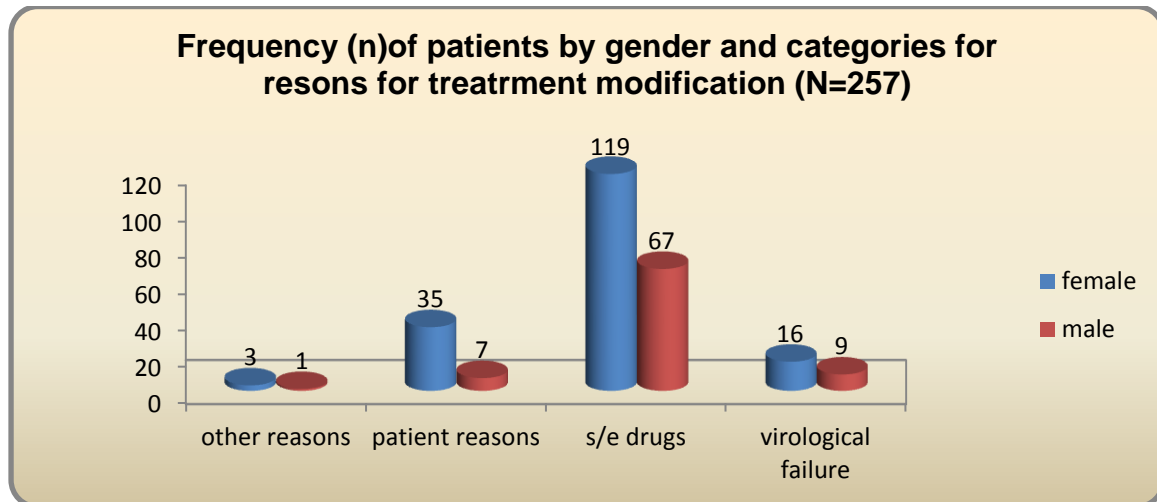


Figure 3: Frequency (n) of patients by gender and categories for reasons for treatment modification. (N=257)

Discussion

Key findings

The study confirms the rationale for changing the HAART guidelines in 2010 in that the largest number of substitutions were for side effects associated with d4T. The need for these substitutions has been largely removed by the use of tdf. Efv required substitution in a much smaller number of patients and no substitutions were recorded relating to side effects caused by 3TC or NVP. The number of unexplained or inappropriate regimen changes appeared small with only 1.6% of cases having no identifiable reason.

The data showed that majority (49.8%) of the patients were in the young middle age, followed by old middle age (44.4%), that means predominance of the patients (94.2%) were between the ages of 25-59 yrs and this age group represents the sexually active population of the community. Though the majority of patients were from the population of child bearing age, they were started on regimen 1a except those who were already pregnant or planning to get pregnant at the time of starting the treatment.

In this study predominantly more patients who had their regimen changed were female (67.3%) than males (32.7%). Similar findings were obtained in a study conducted in Durban.¹¹

Among the reasons for the change or modification of HAART regimen 1, lipodystrophy stands out clearly as the most common reason (72.4%), followed by peripheral neuropathy, pregnancy and virological failure. Stavudine (d4T) was the main drug that was changed because of the side effects experienced by the patients. Out of 257 patients, d4T was changed in 185 patients (71.9%) and lipodystrophy was the main reason (45.5%) for the change of d4T. These findings were similar to a study in Royal Free Hospital, London, UK. In a study done in Mbagathi District Hospital, Kenya, hyperlactataemia/lactic acidosis was the 2nd main adverse drug reaction whilst in my study; it was identified in only one patient.¹² The reason for this could be that lactic acidosis was under diagnosed and under reported or that the patients were transferred to hospitals with their CCMT records.

Limitations of the study

1. Due to the change in the SA National HAART protocol (1 December 2009) and the introduction of a tdf (tenofovir) based regimen as first line treatment, more patients were started on tdf, 3TC and Efv or NVP (1 April 2010) and that was the reason why only 603 (38.9%) patients at the Thusong CCMT met the inclusion and exclusion criteria.
2. The study was conducted at only one CCMT site with predominantly black African population which may limit generalization of the results to other CCMT site with mixed population.
3. Record keeping was not up to standard and missing or inaccurate information in the files could have influenced the accuracy of the results.
4. Although the findings of the study have to some extent been super ceded by the removal of d4T, the study does support the rationale for this policy change and the need for all countries to move away from first-line d4T based regimens.

Recommendations

1. The introduction of HAART drugs to large number of people in countries should be preceded with clinical trials for a longer time in Cohort studies to determine the short and long term side effects to prevent the problems experienced by patients with d4T as 1st line HAART.
2. Continued update of health care personnel's knowledge of side effects in order to detect them early and change the regimen.
3. To continue with improved counselling, health promotion, use of condoms and early detection and treatment of opportunistic infection. To detect risky behaviour early and to prevent subsequent virological failure that will necessitate regimen changes.
4. Future/ follow on study to track whether regimen changes are less with the use of tdf as initial regimen as compared to d4T.

CONCLUSION

Out of 257 patients included in the study the majority were females 173 (67.3%) and males constituted only 84 (32.7%). Patients included in the study were 18 years or older and the majority 128 (49.8%) belonged to young middle age (25-39 yrs) followed by 114 (44.4%) older middle age (40-59yrs), in keeping with the general trends in HIV prevalence studies.²

There was a high percentage (42.6%) of treatment modification or change in the HAART regimen among the patients at Thusong CCMT site who were started on regimen 1 (d4T, 3TC and Efv or NVP) as first line treatment during the period July 2006 – June 2011.

The main drug that was modified in the regimen was d4T (71.9%) mainly because of side effects, lipodystrophy (45.5%) and peripheral neuropathy (16.7%). Efv was changed to NVP (12%) either because the patient became pregnant or she was planning a pregnancy. Only a few male patients had their Efv changed to Aluvia (3.1%) because of the side effect of Efv (nightmares) or because they had started working night shift or became shift workers.

An amount of 2.3% patients defaulted treatment, and 9.7% had virological failure that resulted in the change of their initial HAART regimen.

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To
The Director
West Rand District Council
Johannesburg

Subject: Permission to conduct research at Thusong CCMT Kagiso.

Madam

With due respect I want to state that I have to conduct research for my Masters in Family Medicine at Thusong CCMT in Kagiso. I already got the ethical approval from the research council of the Stellenbosch University. Please allow me to conduct the research at this site. I will be very thankful to you.

Dated: 16/05/2011



**Umnnyango wezempilo no Kuthuthukiswa Komphakathi
Lefapha la Maphelo le Tshebeletso le Ntshetsopele ya Sechaba
Department of Health and Social Development
Departement van Gesondheid en Maatskaplike Ontwikkeling**

WEST RAND DISTRICT COUNCIL

Office of the Director
Enq:Dr Shaikh G K
Tel: 011 953 4515/6
Fax: 0866004183
16th May, 2011

To: Dr Imran S
District Medical Officer
West Rand District Council

PERMISSION TO CONDUCT RESEARCH IN WEST RAND.

Your correspondence on the above matter refers.

Thank you for your request to conduct research in West Rand District.
Permission is hereby granted to you to conduct research in West Rand district.

I am anticipating that you will conduct your research with the knowledge of
Mogale City Sub-district Manager, and the Facility Manager of Thusong clinic.

You are expected to share your finding and recommendation with the district in
order to improve service delivery to the people of West Rand.

Yours,

Ms PULENG MUSO
DIRECTOR, WRDC

West Rand Health District Office, Cnr Luipaard & Vlei Street
Private Bag X 2053, Krugersdorp, 1740
Tel: 011 953 2152 Fax: 011 953 4519



STELLENBOSCH UNIVERSITEIT
UNIVERSITY OF THE WESTERN CAPE

10 May 2011

MAILED

Dr S. A. Imran
Department of Family Medicine
3rd Floor
Fisan Building

Dear Dr Imran

What are the reasons for modifications of the first line anti-retroviral regimen in HIV patient on Highly Active Antiretroviral Treatment (HAART)?

ETHICS REFERENCE NO: N11/04/137

RE : APPROVAL

It is a pleasure to inform you that a review panel of the Health Research Ethics Committee has approved the above-mentioned project on 10 May 2011, including the ethical aspects involved, for a period of one year from this date.

This project is therefore now registered and you can proceed with the work. Please quote the above-mentioned project number in ALL future correspondence. You may start with the project. Notwithstanding this approval, the Committee can request that work on this project be halted temporarily in anticipation of more information that they might deem necessary.

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly and subjected to an external audit.

Translations of the consent document in the languages applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No 61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Please note that for research at primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Hélène Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

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Verbind tot Optimale Gesondheid - Committed to Optimal Health
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UNIVERSITEIT STELLENBOSCH UNIVERSITY
UNIVERSITY OF SOUTH AFRICA

Approval Date: 10 May 2011

Expiry Date: 10 May 2012

Yours faithfully

MS CARLI SAGER

RESEARCH DEVELOPMENT AND SUPPORT

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