ANTIRETROVIRALS AND THE USE OF TRADITIONAL, COMPLEMENTARY AND ALTERNATIVE MEDICINE BY HIV PATIENTS IN KWAZULU-NATAL, SOUTH AFRICA: A LONGITUDINAL STUDY

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Abstract

The aim of this prospective study (20 months) was to assess HIV patients' use of Traditional, Complementary and Alternative Medicine (TCAM) and its effect on ARV adherence at three public hospitals in KwaZulu-Natal, South Africa. Seven hundred and thirty-five (29.8% male and 70.2% female) patients who consecutively attended three HIV clinics completed assessments prior to ARV initiation, 519 after 6 months, 557 after 12 and 499 after 20 months on antiretroviral therapy (ART). Results indicate that following initiation of ARV therapy the use of herbal therapies for HIV declined significantly from 36.6% prior to ARV therapy to 8.0% after 6 months, 4.1% after 12 months and 0.6% after 20 months on ARVs. Faith healing methods (including spiritual practices and prayer) declined from 35.8% to 22.1%, 20.8% and 15.5%, respectively. In contrast, the use of micronutrients (vitamins, etc.) significantly increased from 42.6% to 78.2%. The major herbal remedies that were used prior to ART were unnamed traditional medicine, followed by imbiza (Scilla natalensis planch), canova (immune booster), izifozonke (essential vitamins mixed with herbs), African potato (Hypoxis hemerocallidea), stametta (aloe mixed with vitamins and herbs) and ingwe (tonic). Herbal remedies were mainly used for pain relief, as immune booster and for stopping diarrhea. As herbal treatment for HIV was associated with reduced ARV adherence, patient's use of TCAM should be considered in ARV adherence management.

Key words: Traditional, complementary, alternative medicine, antiretroviral treatment adherence, prospective study, HIV patients, KwaZulu-Natal, South Africa

Introduction

Traditional, complementary and alternative medicine (TCAM) broadly comprises herbal remedies, spiritual practices and prayer, traditional Chinese medicines, acupuncture, acupressure, chiropractic care, massage therapy, meditation, visualization, therapeutic touch and micronutrients (vitamins, minerals, and multivitamins). TCAM has been demonstrated to be widely used by people living with HIV (PLHIV), both on and off ARV therapy, as primary treatment for HIV/AIDS and for HIV-related problems (e.g., Babb et al., 2007; Josephs et al., 2007; Langlois-Klassen et al., 2007; Ma et al., 2008; Malangu, 2007; Mills et al., 2005; Peltzer et al., 2008, 2010; Reid et al., 2008). Numerous medicinal plants used by traditional medicine practitioners for the treatment of HIV/AIDS and related conditions in sub-Saharan Africa have been identified (Klos et al., 2009; Lamorde et al., 2010; Theo et al., 2009) including *Hypoxis hemerocallidea* (African potato) and Sutherlandia (Mills et al., 2005a) and micronutrient interventions (Friis, 2006) which could be used as potential therapy for HIV.

There is data to suggest that TCAM impacts on ARV adherence, although the findings are variable and findings are inconsistent across studies (Littlewood and Vanable, 2008; Owen-Smith et al., 2007; Peltzer et al., 2010).

There seem to be no longer-term prospective studies on the use of TCAM and its impact on antiretroviral treatment (ART) adherence in Africa. Therefore, the aim of this longer-term prospective study was to assess HIV patients' use of TCAM and its effect on ARV adherence over a 20 months period at three public hospitals in KwaZulu-Natal, South Africa. Previous studies (with the same sample) had assessed only global categories of traditional, complementary and alternative medicine for HIV at baseline and six months follow-up (Peltzer et al., 2008; Peltzer et al., 2010), while this report describes the details of each traditional, complementary and alternative medicine used and reasons of its use over 4 time points (including 12 and 20 months follow-up) and ART adherence at 12 and 20 months follow-up.

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Methods

This was a prospective study of all adult treatment-naïve patients (N = 735) recruited from the three public hospitals in Uthukela health district in KwaZulu-Natal, South Africa from October 2007 to February 2008. All ARV-naïve patients who were about to start ARVs (18 years and above) and who consecutively attended the HIV clinics during the recruitment period were eligible for this study. Details of the setting, sampling procedure and recruitment have been described elsewhere (Peltzer et al., 2008). Patients were interviewed at 6, 12 and 20 months clinic visits post initiation of ARV follow-up. Patients who failed to attend the planned follow-up were contacted by telephone and up to two home visits before being considered lost to follow-up.
Ethics approval was obtained from the Human Sciences Research Council (HSRC) ethics committee. Permission to conduct the study was obtained from the Provincial Department of Health in KwaZulu-Natal. Informed consent was obtained from each participant.

Measures

Patients were interviewed using an anonymous questionnaire administered by the research team. Information was collected on socio-demographic characteristics, clinical history and health-related characteristics, TCAM use and health beliefs. Following initiation of ARVs, information on side effects, and changing or interrupting ART was also obtained. The use of TCAM was assessed with questions on 8 different TCAM methods over the past six months, the duration of usage, costs and the awareness of the health care provider of using TCAM. Further, participants were asked for what reasons that had used each specific TCAM method. The response options included (a) To treat adverse effects from ARV treatment (e.g. nausea/vomiting), (b) Relaxation, (c) Pain relief, (d) Stress relief, (e) Immune supplementation, (f) Antioxidant, (g) Improve eating, (h) improve overall well-being, (i) Anxiety, (j) Depression, (k) Fatigue, (l) Neuropathy, (m) Diarrhoea, and (i) Other (specify). Clinical data relating to date of HIV diagnosis, HIV acquisition and transmission risk factors, current CD4 cell count, viral load (Chiron 3.0 bDNA), opportunistic infections, HIV and non-HIV medications was obtained from the medical chart.

Adherence assessment

The 30-day visual analog scale (VAS) provided an overall adherence assessment for a longer time interval. The VAS is a valid method of assessing medication adherence (Kalichman et al., 2009) and has been validated in resource-limited settings (e.g. Maneesriwongul et al., 2006). Adherence was calculated as the % of doses taken over those prescribed. Adherence levels assessed from the VAS are defined as follows: full adherence = 100%, partial adherence >/= 95% and < 100%, and non-adherence as < 95% of prescribed doses taken since the last refill.

Data analysis

Scientific names of herbal and other indigenous remedies were as far as possible identified using “HEALTHLIT”, a database including a Dictionary of South African Traditional Medicinal Plants and Zulu Medicinal Plants (Hutchings et al., 1996). Data were analyzed using Statistical Package for the Social Sciences (SPSS) for Windows software application programme version 17.0. Frequencies, means, standard deviations, median and interquartile ranges were calculated to describe the sample. Bivariate analyses using logistic regression were conducted to examine the relationships between overall TCAM use, herbal remedy use and socio-demographic variables, health characteristics, ART adherence and further health-seeking behaviour variables. Multivariate logistic regression included in the model all variables statistically significant at the 5% level in bivariate analyses. No significant interactions were found between socio-demographic variables health-seeking behaviour and health characteristics. In multivariate regressions for ART adherence, adjustment was made for site of care, to account for variations in practice patterns and demographic differences across sites.

Results

A total of 735 patients (217 men and 518 women) completed a baseline questionnaire at Time 1 prior to initiating ART. Follow-up questionnaires were completed at 6 months follow-up by 519 patients within this cohort (139 men and 370 women) who had now been on ART for six months, at 12 months later by 557 patients within this cohort (157 men and 396 women), and 20 months later by 499 patients (126 men and 333 women); 122 (16.9%) participants were lost-to-follow-up (including transfers), and 83 (11.5%) were known to have died, of whom, 75 had already died at six months follow-up, 72 transferred care elsewhere, 14 refused participation, 12 were not initiated on ART and 50 (6.9%) could not be traced. At time 4, HIV medications for 380 (76.3%) patients included Lamivudine (3TC), Stavudine (d4T) + Efavirenz and for 118 (23.7%) Lamivudine (3TC), Stavudine (d4T) + Nevirapine.

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Sample characteristics

The mean age of the participants at baseline assessment was 35.9 years, std deviation= 9.7 years, the educational level

Table 1: Sample characteristics of patients at baseline assessment

Variable	N=735	%
Sex		
Male	217	29.5
Female	518	70.5
Age, range 18-67	35.9	9.7
Age, less than 36	417	56.7
Education		
Grade 7 or less	279	37.8
Grade 8-11	314	42.8
Grade 12 or more	139	18.9
Missing	3	0.4
Religion		
Traditional African religion or none	187	25.5
Main stream Christian	154	20.9
Charismatic	271	36.9
Other	123	16.7
Residence		
Rural (village)	338	46.0
Rural (farm)	125	17.0
Urban (informal settlements)	41	5.6
Urban (formal settlements)	227	30.9
Missing	4	0.5
Employment status		
Housewife/houseman	99	13.5
Unemployed	448	60.9
Employed	148	20.2
Pensioner/disabled/student	25	3.4
Other	12	1.6
Missing	3	0.4
Income		
Formal salary		29.3
Family member contributions	215	18.1
Social grants	133	35.9
	264	
No income	57	
Other	51	7.8
Missing	15	6.9
		2.0
Time since HIV diagnosis		
≤1 year (2007/8)	540	73.5
1-2 years (2006)	73	9.9
>2 years (2005-1995)	122	16.6
CD4 count (cells/uL)= T4: Median=446 (IQR=305-618), T3: Median=261 (IQR=176-387), T2=130 (IQR=72-185) (at baseline: 119; IQR=59-163)		
1-99	106	19.7
100-349	345	64.2
≥350	86	16.0

of the majority (81.0%) was less than Grade 12. Almost three quarters (71.8%) were never married, 61.2% were unemployed and 20.2% employed, more than half (52.3%) had a child care grant, 29.9% had a formal salary and 7.9% had no income. Almost two-thirds (63.3%) resided in a rural area, most (73.5%) had been recently (within the past year) diagnosed as being HIV positive and almost all (96.1%) had disclosed their HIV status to someone. While baseline characteristics were similar between men and women, women were more likely to be younger and receiving social (including child care) grants, and men were more likely to be married or cohabitating, employed and having a formal salary. The median CD4 count at 20 months follow-up was 446 cells/cu.mm compared to 261 cells/cu.mm at 12 months follow-up, 130 cells/cu.mm at 6 months follow-up and compared to 119 cells/cu.mm prior to ARV initiation (see Table 1).

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Table 2: Frequency distribution of the use, costs, awareness of the care provider of different TCAM (Traditional, complementary and alternative medicine) for HIV in the past six months (prior to ART=Time 1(T1), N=735; follow-up one (T2), N=525); follow-up two (T3) (n=556); and follow-up three (T4) (n=499)

				Use duration in weeks	Cost in Rand/month	Health care provider aware of use
		N	%	M (SD)	M (SD)	n (%)
1. Herbal therapies (e.g., Ginseng, Echinacea or St. John's Wort, Hypoxis plant (African potato), cannabis)	T1	269	36.6	10.0 (8.1)	129 (166)	21 (10.2)
	T2	43	8.0	4.0 (1.5)	250 (330)	02 (4.7)
	T3	23	4.1	5.6 (2.0)	77 (80)	01 (4.2)
	T4	03	0.6	5.0 (2.8)	65 (7.1)	03 (0.0)
2. Faith healing including spiritual practices and prayer	T1	263	35.8	11.9 (7.0)	0.4 (1.0)	42 (16.1)
	T2	116	22.1	19.8 (18.6)	0.2 (1.7)	58 (50.4)
	T3	116	20.8	8.4 (12.1)	1.3 (5.1)	37 (31.6)
	T4	77	15.5	4.1 (5.3)	1.0 (2.4)	27 (35.1)
3. Physical/body-mind therapy (e.g. exercise, massage)	T1	37	5.0	13.5 (14.8)	9 (11)	02 (0.5)
	T2	10	1.9	8.9 (6.7)	0.8 (2.6)	06 (60.0)
	T3	03	0.5	5.5 (2.7)	0.0	02 (66.6)
	T4	03	0.6	3.6 (2.8)	0.0	01 (33.3)
4. Micronutrients (vitamins, minerals & multivitamin)	T1	312	42.6	12.5 (9.5)	6 (53)	173 (66.3)
	T2	457	87.4	18.3 (12.4)	8 (20)	449 (98.3)
	T3	525	93.8	22.0 (13.6)	12.2 (20.2)	508 (95.3)
	T4	388	78.2	16.2 (9.0)	36.4 (32.0)	388 (100)
5. Over-the-counter drugs	T1	15	2.1	14.2 (14.1)	159 (202)	04 (22.2)
	T2	48	6.5	4.8 (2.1)	23 (22.3)	28 (58.3)
	T3	14	2.5	7.0 (5.6)	45 (20.3)	13 (72.2)
	T4	04	0.8	1.7 (1.7)	15 (12.3)	04 (100)

[a] The use of micronutrients was excluded from TCAM since mostly vitamins were provided by the health facility

TCAM use

Following initiation of ARV therapy the use of herbal therapies for HIV declined significantly from 36.6% prior to ARV therapy to 8.0% after 6 months, 4.1% after 12 months and 0.6% after 20 months on ARVs. Faith healing methods (including spiritual practices and prayer) declined from 35.8% to 22.1%, 20.8% and 15.5% respectively, and physical/body-mind therapy (exercise and massage) declined from 5.0% to 1.9%, 0.5% and 0.6%. In contrast, the use of micronutrients (vitamins, etc.) significantly increased from 42.6% to 93.8% at 12 months but then decreased to 78.2% at 20 months. At baseline only 10.2% of patients reported that their health care provider was aware of their herbal remedy use. This figure declined to 4.7% after 6 months, 4.2% after 12 months and 0% after 20 months on ARVs. Patients were more willing to disclose faith healing methods than herbal remedies to their health care provider, with the disclosure rate increasing from 16.1% at baseline to 35.1% at 20 months follow-up (see Table 2).

The major herbal remedies that were used prior to ART were unnamed traditional medicine (57), followed by imbiza (43), canova (31), izifozonke (21), African potato (15), stametta (14) and ingwe (10). The use of African potato (9), canova (8) and izifozonke (7) proportionally continued to time 2 (6 months on ART), while the use of stametta (1) and ingwe (2) drastically reduced. Herbal remedy use at time 3 (12 months on ART) was mainly stametta (5), canova (3) and Tre-en-en (4), while African potato, imbiza, ingwe, izifozonke were no longer used, and at 20 months follow-up the use of herbal remedies had virtually stopped. Participants reported the use of herbal remedies for a number of purposes, mainly pain relief, immune booster and stopping diarrhea. Over time it appears the use of herbal remedies for pain relief reduced (African potato, ingwe, izifozonke). Herbal remedies were often obtained over-the-counter (e.g. canova, stametta, ingwe), some from both the traditional healer and over-the-counter (e.g. African potato, izifonzonke) and from the traditional health practitioner only (e.g. unnamed traditional medicine) (see Table 3).

Overall, herbal therapies were believed to be used at 6.1% at time 1 to treat adverse effects of HIV, and at time 2 and 3 (4.3% and 3.3% respectively) for treating adverse effects from ARV treatment. Over time herbal remedies were used at time 1 for pain relief (27.9%), to improve eating (14.7%), improve overall well-being (13.2%), as an antioxidant (9.9%) and for stress relief (17.3%). At time 2 and 3 herbal remedies were used for immune supplementation (65% and 70%). Faith healing was primarily used to improve overall well-being and stress relief, similarly over time. Physical/body-mind therapy was mainly used for stress relief and relaxation, and micronutrients for immune supplementation and improving the overall well being. Finally, over-the-

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counter drugs were mainly used for pain relief. The belief that TCAM can be solely used to treat HIV was shared by 6.1% prior to ART, 1.5% at 6 months and 4.8% at 12 months on ART (see Table 4).

Table 3: The frequency of the use, source and purpose of each TCAM over time (baseline, 6, 12, and 20 months on ART)

	T1 Baseline	T2 (6 months)	T3 (12 months)	T4 (20 months)	Provider [traditional/faith healer]	Over-the-counter*	Purpose
Herbal remedy							
African potato / Zambane/ [Hypoxis hemerocallidea]	15	9			X	X	Immune booster, pain relief
Aloestra Aloe extra, Inhlaba [Aloe Ferox]	4	1				X	Immune booster, stress relief
Berocca		1	1			X	Immune booster
Canova	31	8	3			X	Immune booster, pain relief , stress relief, antioxidant, improve eating
Dubulageqe	6				X	X	Pain relief, stress relief, body cleansing
Ichitha [Scilla natalensis]	5					X	Pain relief, Immune booster
Ikhambi [Eclipta prostrata] [***plants*** are used for skin infections]	2				X		Pain relief, Immune booster
Imbiza yomzimba; Inguduza [Scilla natalensis Planch] *[plant* extracts show antimicrobial activity against pus-forming organisms; causes haemolysis when applied to blood agar; extracts possess antiseptic, anti-inflammatory and healing properties]	44				X		Pain relief, Relaxation, stress relief, Immune booster, antioxidant, improve eating, improve overall wellbeing
Ingwe makoya tonic	10	2				X	Pain relief, Immune booster, improve overall well-being, relaxation, stress relief, improve overall wellbeing
Ingungumbane		2				X	Immune booster
Insimbi	3					X	Pain relief, stress relief, Immune booster
Isibabuli	1				X		Pain relief
Isicoco	1				X		Immune booster
Izifozonke [a formulated mixture of essential vitamins & nutrients blended with quality African Herbs and roots]	21	7			X	X	Pain relief, relaxation, stress relief, Immune booster, diarrhea, depression
Khotha		1	1		X		Relaxation, pain relief
Madudula	1					X	Pain relief
Magogotha		1				X	Aphrodisiac
Mahlokoza	1						Immune booster
Ncinda	1		1		X		Relaxation, Immune booster
Red muti	9	2				X	Pain relief, Relaxation, Immune booster , stress relief, improve eating
Stametta [product containing aloe in combination with vitamins, minerals, herbal extracts]	14	1	5			X	Immune booster, relaxation, pain relief, diarrhea, stress relief, antioxidant, improve eating, improve overall wellbeing
Tre-en-en [phytonutrient supplement including omega-6 and omega-3 fatty acids, and phyto-STEROLS, including beta-sitosterol, gamma-oryzanol, stimasterol, and campesterol, plus octacosanol]			4		X	X	Pain relief; Immune booster

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Ubhejane	5	2			X		Immune booster, diarrhea, pain relief, side effects from ART, stress relief, antioxidant, improve eating
Ukuchata	1					X	Pain relief
Umagadla esheshisa	2	1	2			X	Immune booster , pain relief
Umphumputho [Cephalaria attenuata] [not specified Chemical constituents: not specified Biological properties: not specified]	1					X	Diarrhea
Umtholo obomvo [Acacia caffra]	1				X		Pain relief
Umuthi omhlophe	1				X		Diarrhea, body cleansing
Vukuhlale/Vukwabafile [Myrothamnus flabellifolius]	18		10	3	X	X	Pain relief, side effects from ART, stress relief, antioxidant, improve eating, relaxation
Herbal remedy (unnamed)							
Traditional medicine, bottle	57	3			X		Pain relief, Immune booster , side effects from ART, diarrhea, relaxation, stress relief, antioxidant, improve eating, improve overall wellbeing
Other remedies							
Energy booster, immunizer Insimbi, cell food [Energy booster] Isibabuli [Immune booster] Ncengimpilo[Immune booster] extra power	2	2	6			X	Immune booster, side effects from ART
Epsom salt, Bio-oil, Philani fortified cereal given free to those who are HIV positive and on ARVs	1	2				X	Relaxation, diarrhea,

*Chemist, supermarket, traditional medicine stal (muti or herbal medicine store), garden, bush

Table 4: Frequency distribution of the reasons for different TCAM use (multiple responses possible) over time

T1 (n=735) T2 (n=525) T3 (n=556) T4 (n=499)	**1. Herbal therapies**	**2. Faith healing including spiritual practices and prayer**	**3. Physical/body-mind therapy** (e.g. exercise, massage)	**4. Micronutrients (vitamins, minerals & multivitamin)**	**5. Over-the-counter drugs**
To treat adverse effects from HIV or ARV treatment(e.g. nausea/vomiting)	T1=45 (6.1) T2=2 (4.3) T3=1 (3.3) T4=0	T1=15 (2.0) T2=5 (2.1) T3=24 (12.1) T4=1 (0.8)	T1=3 (0.4) T2=1 (8.3) T3=11 (35.5) T4=0	T1=3(4.1) T2=9 (1.9) T3=59 (9.1) T4=11 (3.0)	T1=# T2=3 (5.4) T3=5 (22.7) T4=0
Relaxation	T1=59 (8.0) T2=5 (10.9) T3=4 (13.3) T4=0	T1=68 (9.3) T2=10 (4.2) T3=6 (3.0) T4=2 (1.6)	T1=13 (1.8) T2=3 (25.0) T3=3 (9.7) T4=3 (0.9)	T1=92 (12.5) T2=1 (0.2) T3=2 (0.3) T4=1 (0.3)	T1=# T2=1 (1.8) T3=0 T4=0
Pain relief	T1=205 (27.9) T2=5 (10.9) T3=3 (10.0) T4=0	T1=134 (18.2) T2=9 (3.8) T3=2 (1.0) T4=1 (0.8)	T1=14 (1.8) T2=0 T3=1 (3.2) T4=0	T1=259 (35.2) T2=9 (1.9) T3=5 (0.8) T4=0	T1=# T2=42 (75.0) T3=12 (54.5) T4=16 (84.2)
Stress relief	T1=127 (17.3) T2=2 (4.3) T3=0 T4=0	T1=160 (21.8) T2=53 (22.3) T3=23 (18.7) T4=0	T1=15 (2.0) T2=5 (41.7) T3=5 (16.1) T4=1 (0.8)	T1=152 (20.7) T2=3 (0.6) T3=2 (0.3) T4=0	T1=# T2=1 (1.8) T3=2 (9.1) T4=0
Immune supplementation	T1=132 (18.0) T2=30 (65.2) T3=21 (70.0) T4=3 (100)	T1=101 (13.7) T2=9 (3.8) T3=19 (9.5) T4=1 (0.8)	T1=13 (1.8) T2=1 (8.3) T3=9 (29.0) T4=4	T1=182 (24.8) T2=284 (59.3) T3=244 (37.7) T4=126 (34.6)	T1=# T2=4 (7.1) T3=1 (4.5) T4=0
Antioxidant	T1=73 (9.9) T2=0 T3=0 T4=0	T1=84 (11.4) T2=1 (0.4) T3=0 T4=0	T1=4 (0.5) T2=0 T3=1 T4=0	T1=111 (15.1) T2=2 (0.4) T3=0 T4=0	T1=# T2=0 T3=0 T4=0
Improve eating	T1=108 (14.7)	T1=92 (12.5)	T1=8 (1.1)	T1=112 (15.2)	T1=#

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	T2=0 T3=0 T4=0	T2=2 (0.8) T3=2 (1.0) T4=0	T2=0 T3=0 T4=0	T2=71 (14.8) T3=121 (18.7) T4=81 (22.3)	T2=0 T3=2 (9.1) T4=0
Improve overall well being	T1=97 (13.2) T2=1 (2.2) T3=1 (3.3) T4=0	T1=179 (24.4) T2=120 (50.4) T3=105 (52.8) T4=78 (63.4)	T1=21 (2.9) T2=2 (16.7) T3=1 (3.2) T4=0	T1=154 (21.0) T2=100 (20.9) T3=208 (32.1) T4=145 (39.8)	T1=# T2=0 T3=0 T3=10
Anxiety	T1=0 T2=0 T3=0 T4=0	T1=0 T2=0 T3=1 (0.5) T4=0	T1=0 T2=0 T3=1 (3.2) T4=0	T1=0 T2=0 T3=1 (0.2) T4=0	T1=# T2=5 (8.9) T3=0 T4=0
Depression	T1=0 T2=1 (2.2) T3=0 T4=0	T1=0 T2=29 (12.2) T3=14 (7.0) T4=5 (4.1)	T1=0 T2=0 T3=0 T4=0	T1=0 T2=0 T3=4 (0.6) T4=0	T1=# T2=0 T3=0 T4=0

#Reasons for over-the-counter drug use was not assessed at baseline

Table 5: Association between TCAM use, socio-demographic variables, CD4 cell count and antiretroviral adherence (>95%) at time 3 (12 months follow-up) and time 4 (20 months follow-up)

	Adherence at time 3		Adherence at time 4	
	VAS Cr OR	VAS AOR [a]	VAS Cr OR	VAS AOR [b]
Men Women	1.00 0.94 (0.51-1.70)	---	1.00 0.67 (0.33-1.36)	---
Age	1.02 (0.99-1.05)	---	0.99 (0.96-1.02)	---
Married/cohabitating Never married	1.00 0.98 (0.53-1.80)	---	1.00 1.08 (0.54-2.13)	---
Education Grade 7 or less Grade 8-11 Grade 12 or more	 1.00 1.13 (0.62-2.07) 0.96 (0.45-2.06)	 --- 	 1.00 1.51 (0.74-3.10) 1.15 (0.46-2.84)	 --- ---
Religion African or none Main stream Christian Charismatic	 1.00 0.38 (0.18-0.79)** 0.49 (0.25-0.95)*	 1.00 2.32 (1.01-5.33)* 1.99 (0.96-4.85)	 1.00 2.24 (1.00-5.04)* 1.34 (0.63-2.87)	 1.00 2.32 (0.96-5.63) 1.58 (0.69-3.60)
Residence Rural Urban	 1.00 4.90 (2.18-11.02)***	 1.00 3.71 (1.56-8.83)**	 1.00 1.50 (1.75-3.02)	 ---
Employment status Housewife/houseman Unemployed Employed	 1.00 0.12 (0.03-0.52)** 0.20 (0.04-0.92)*	 1.00 5.88 (1.35-25.69)* 6.52 (1.23-34.40)*	 1.00 11.26 (1.27-14.07)* 1.51 (0.35-6.48)	 1.97 (0.56-6.98) 1.95 (0.38-9.93)
Income Formal salary Family contributions Social grants No income	 1.00 0.89 (0.35-2.29) 0.45 (0.23-0.89)* 0.23 (0.09-0.58)**	 1.00 1.21 (0.39-3.74) 1.58 (0.65-3.89) 2.48 (0.74-8.26)	 1.00 3.38 (1.16-9.80)* 3.52 (1.37-9.03)** 8.57 (2.77-26.56)***	 2.86 (0.83-9.92) 3.07 (0.98-9.54) 4.78 (1.17-19.54)*
Herbal treatment	0.08 (0.04-0.15)***	0.18 (0.07-0.50)***	0.04 (0.00-0.50)*	0.11 (0.01-1.55)
Faith healing	5.37 (1.65-17.48)**	2.88 (0.84-9.81)	12.78 (1.74-93.86)*	6.78 (0.98-51.89)
CD4 100 ref 101-350 >350	 1.00 1.86 (1.02-3.41)* 5.97 (1.70-20.93)**	 1.00 1.48 (0.73-2.98) 3.31 (0.88-12.43)	 1.00 2.29 (0.66-7.90) 6.72 (1.94-23.31)**	 1.00 2.19 (0.55-8.82) 4.74 (1.18-18.95)*

Significant at *P <.05, **P<.01, ***P<.001

[a] Hosmer and Lemeshow Chi-square 10.97, p.20; Cox & Snell R^2 .13; Nagelkerke R^2 .27

[b] Hosmer and Lemeshow Chi-square 5.39, p.72; Cox & Snell R^2 .08; Nagelkerke R^2 .19

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ART Adherence

At 12 and 20 months using the VAS 89.6% and 91.6%, respectively, reported ART adherence at ≥95%. Bivariate analyses for ART adherence at time 3 (12 months follow-up) found that belonging to traditional African or no religion, urban residence, being a housemaker, having a formal salary, higher CD4 count, the non-use of herbs and faith healing were associated with ART adherence at 12 months, while in multivariate analysis urban residence (OR: 3.7, 1.6-8.8), being employed (OR: 6.5, 1.2-34.4) or unemployed (OR: 5.9, 1.4-25.7), belonging to a main stream Christian church (OR: 2.3, 1.0-5.3) and non-use of herbs (OR: 0.2, 0.1-0.5) were retained. Further, bivariate analyses for ART adherence at time 4 (20 months follow-up) found that belonging to a main stream Christian church, being unemployed, no formal salary income, non-use of herbs, faith healing and higher CD4 count were associated with ART adherence at 20 months, while in multivariate analysis higher CD4 counts (OR: 4.7, 1.2-19.0) and no income (OR: 4.8, 1.2-19.5) were retained (see Table 5).

Discussion

In this prospective study following initiation of ARV therapy the use of herbal therapies and faith healing methods (including spiritual practices and prayer) for HIV declined significantly from prior to ARV therapy to after 6, 12 and 20 months on ARVs, and the use of micronutrients (vitamins, etc.) significantly increased over time. Both herbal and faith healing declined with longer time on ART, which may indicate the effectiveness of ART. The use of micronutrients increased mainly because they were provided in the medical setting.

The study found that major herbal remedies that were used for HIV were unnamed traditional medicine, imbiza, canova, izifozonke, African potato, stametta, ingwe, vukuhlale and aloe. Similarly, Babb et al. (2007) found in a workplace ART clinic in South Africa of 14 patients receiving ART and concomitantly using traditional medicines, it was reported that a total of 22 products, most frequently African potato and Aloe vera were used. In this study patients had used the African potato but later stopped it. Sutherlandia was not used although it is commonly used in other populations. Mills et al. (2005b) examined the effects of two African herbal medicines recommended for HIV/AIDS patients on antiretroviral metabolism. Extracts from Hypoxis and Sutherlandia showed significant effects on cytochrome P450 3A4 metabolism and activated the pregnane X receptor approximately twofold. P-glycoprotein expression was inhibited, with Hypoxis showing 42-51% and Sutherlandia showing 19-31% of activity compared with verapamil. Initiating policies to provide herbal medicines with antiretroviral agents may put patients at risk of treatment failure, viral resistance or drug toxicity. Yet Brown et al. (2008) found *that Hypoxis hemerocallidea* and l-canavanine interact with the efflux of nevirapine across intestinal epithelial cells and therefore can potentially increase the bioavailability of this antiretroviral drug when taken concomitantly. Thus far, biomedical evidence has revealed that 'African potato' extracts possess anti-inflammatory, antineoplastic, antioxidant, antidiabetic and antiinfective properties *in vivo* and *in vitro*. But more laboratory and clinical studies are required to clarify these observations, and to isolate, purify and characterize the active chemical constituents responsible for the herb's pharmaco-therapeutic effects (Owira and Ojewole, 2008). Canova was widely used in this study, it is a homeopathic product, produced according to the Hahnemannian homeopathic method, and seems to stabilize platelet morphology in HIV/AIDS (Smit et al., 2009). There is a need to provide information of the safety and efficacy of different TCAM methods.

The study found that most health care providers were not aware of the use of herbal treatment of their patients, as reported by the patients in this study, this even decreased over time. Reasons for this could be the explicit training patients receive on being discouraged to use herbal treatments and because of social desirability. On the other hand health care providers became more aware over time on the use of faith healing and over-the-counter drugs of their patients. Interventions targeted towards both health care provider and patients many enhance communication of TCAM use, avoid potential adverse events and drug interactions, and enhance ART adherence (Liu et al., 2009).

Limitations

One limitation of this study is the self-report data for both TCAM use and HAART adherence. In addition, only patients and not health workers were interviewed, which could have provided their perspective on TCAM use among their patients. Viral load data were only available for a few participants, and was therefore excluded from the analysis. Finally, the findings are derived from a sample of men and women residing in one district in one province in South Africa. Thus caution is urged in generalizing the findings to other districts and provinces in the country.

Conclusion

High use of TCAM prior to ART seems to continuously decline over 20 months when on ART. Herbal treatment for HIV was associated with non-adherence to ART and should be considered in ART adherence management.

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