ARV treatment as a possible positive prevention strategy: Empirical evidence obtained from a study conducted among PLWHA in Cape Town, South Africa

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Abstract

- **Background:** The wider availability and accessibility of treatment of HIV/AIDS using various classes of anti-retroviral (ARV) drugs among high risk groups such as men who have sex with men (MSM) and intravenous drug users in the west has been shown to increase risk behaviour as a consequence of treatment optimism (also known as behavioural disinhibition or risk compensation).
- **Objective:** The present study investigated HIV risk behaviour among people living with HIV/AIDS (PLWHA) who are on ARV treatment compared to those who are not receiving treatment in Cape Town, South Africa.
- **Methods:** Anonymous questionnaires were completed by 413 male and 641 female PLWHA conveniently sampled from various service providers; 73% were younger than 35 years old; 70% African; 70% unemployed, and 75% unmarried; 49% had been hospitalized for HIV-related conditions; 49.3% (42% males and 58% females) were receiving ARV treatment.
- **Results:** Logistic regression analyses showed that PLWHA on ARV treatment were generally safer in their sexual practices and use of alcohol and other drugs than their counterparts not on ARV treatment.
- **Conclusions:** These findings suggest that ARV treatment might also offer a golden opportunity for promoting positive prevention among PLWHA on ARV treatment in Southern Africa.

Background

- South Africa has the largest number of people living with HIV/AIDS in the world and also now boasts the largest ARV treatment programmes in the world.

- The roll-out of ARV treatment offers an unprecedented opportunity for prolonging the lives of PLWHA.

- However, there are two main unintended negative side effects associated with it.
  - Firstly, there is a possibility of increased risk behaviour as a consequence of treatment optimism associated with receiving ARV treatment which has been mainly shown in high risk groups such as men who have sex with men (MSM) and intravenous drug users. This phenomenon is also known as behavioural disinhibition or risk compensation. Disinhibition is thought to occur mainly because of increases in subjective and physical health status due to successful ARV treatment among PLWHA which prompts a return to risky behaviour. However, several studies conducted among other PLWHA who are on ARV treatment including some sub-Saharan African countries have not shown any evidence of disinhibition.

Background (contd)

- Secondly, as a result of behavioural disinhibition there is a possibility of known emergence and transmission of resistant strains of HIV.

- Both consequences limit the potential population-level benefits of these ARV medications.

Aims of the study and hypothesis

- The present study sought to investigate HIV risk behaviour among PLWHA who are on antiretroviral (ARV) treatment compared to those who are not on such treatment.

- We hypothesized that people on ARV treatment would display reduced risk behaviour compared to their counterparts not on treatment as has been reported in other Sub-Saharan African countries.

Methods

- As part of a larger survey, a self-administered questionnaire was completed by 413 HIV positive men and 641 HIV positive women in Cape Town, South Africa. Five percent needed some assistance from fieldworkers to do so.
- Participants were sampled from local social service and health care providers offering services to PLWHA in Cape Town.
- Of the 1,075 persons who accepted to participate in the survey, 21 (2%) were less than 75% complete, representing an overall 98% completion rate.
- A R20 (US$3) incentive was paid as compensation for participation
- The sample was racially diverse as follows:
  - 68% (n = 714) African,
  - 15% (n = 156) Coloured,
  - 12% (n = 127) Indian, and
  - 5% (n = 47) White.
- and represented a broad spectrum of ages as follows:
  - 28% (n = 305) under age 25, and
  - 28% (n = 293) 36 and older.
- Data were collected using a seven-page questionnaire that was completed in approximately 15-20 minutes as part of a larger survey.
- The questionnaire was available in three languages spoken by the vast majority of people living in Cape Town, namely, Xhosa, English, and Afrikaans.

Questionnaire

The questionnaire used measured, among others, the following:

- Demographic characteristics
- Test history
- HIV risk history
  - STI history
  - Transactional sex
  - Substance use including injection drugs
  - Men having sex with men
- HIV disclosure and discrimination.
  - Disclosure to sex partners in past 3 months
  - General HIV concealment of HIV status from others
  - Discrimination experiences
  - Efficacy for disclosing HIV status to sex partners
- Substance use
- Sexual behaviours
  - The number of sex partners in past 3-months who were HIV positive (concordant), HIV negative (non-concordant), and number whose HIV status was not known.
  - The number of times they had engaged in protected and unprotected vaginal and anal intercourse with HIV positive partners.
  - The number of times they had engaged in protected and unprotected vaginal and anal intercourse with partners who were not HIV positive.
  - The proportion of intercourse occasions that were protected by condoms.

Data Analysis

- Four major sets of analyses were conducted in this study as follows:
  - First, we compared the demographic, health, risk history, and behavioural characteristics between HIV positive men and women.
  - Second, we compared the demographic and health characteristics between HIV-positive men and women who were taking ARV treatment and those who were not doing so.
  - Third, we focused only on the 903 (84%) participants who were currently sexually active and compared persons who were taking ARV treatment to those who were not doing so on sexual risk behaviour and substance use. All analyses were performed using logistic regression with 95% confidence intervals. In addition, comparisons of persons who were taking ARV treatment and those who were not doing so were controlled for potential confounding of participant gender, race, and marital status.
  - Fourthly, and finally, variables found significant in bivariate analysis ($p < .05$) were included in a simultaneous multivariate regression to identify independent predictors.

Table 1: Demographic and health characteristics of men and women living with HIV/AIDS.

Variable	Men (N = 413) n	%	Women (N = 641) n	%	OR	95%CI
Age						
20 and younger	37	9	42	7		
21 to 25	100	24	125	20		
26 to 35	163	40	295	46		
36 and older	113	27	179	27	1.1	0.9-1.2
Race						
African	263	64	448	71		
White	27	7	19	3		
Coloured	65	16	92	14		
Indian	52	13	74	12	0.9	0.8-1.0
Employed	123	30	176	28	1.1	0.8-1.4
Has children	232	56	513	80	0.3**	0.2-0.4
Married	98	25	182	30	0.8	0.6-1.0
Taking ARVs	215	52	297	48	1.2	0.9-1.6
Years since testing HIV positive	2.7	2.5	2.7	2.3	1.0	0.9-1.1
HIV Symptoms	6.1	3.6	6.7	3.8	1.0	0.9-1.0
HIV-related Hospitalizations						
Not hospitalized	182	44	340	53		
One hospitalization	101	25	113	18		
Two or more hospitalization	130	31	188	29	1.0	0.9-1.1

Table 2: Risk history and substance use in the previous 3-months reported by men and women living with HIV/AIDS

Indicator	Men (N = 413) n	%	Women (N = 641) n	%	OR	95%CI
HIV Risk History						
Has had an STI	258	61	356	56	1.3	1.0-1.6
Received money for sex	46	11	65	10	1.1	0.7-1.6
Given money for sex	61	15	37	6	2.7**	1.8-4.2
Injection drug use (IDU)	56	13	25	4	3.8**	2.3-6.2
IDU sex partner	60	14	50	8	1.9**	1.3-2.9
Men who typically has sex with men	78	18				n/a
Substance use						
Alcohol	268	64	277	43	2.3**	1.8-3.0
Dagga	118	28	63	10	3.6**	2.5-5.0
Methamphetamine (Tik)	66	16	48	8	2.3**	1.6-3.4
Mandrax	47	11	27	4	2.8**	1.8-4.7

Note: ** p < .01

Table 3. Demographic characteristics of HIV-positive persons who reported taking ARV treatment compared to those who were not.

Variable	Taking ARVs N	%	Not Taking ARVs N	%	OR	95%CI
Gender						
Men	216	42	196	37		
Women	296	58	331	63	1.2	0.9-1.5
Age						
Under age 25	101	20	193	37	0.4**	0.3-0.5
Race						
African	383	76	314	61		
Coloured	61	12	92	18		
White		15	3	31	6	
Indian	48	10	77	15	1.3**	1.1-1.4
Education:						
Primary or less	155	30	155	30		
Secondary	310	60	328	63		
Tertiary	49	10	39	7	0.9	0.8-1.1
Marital status and family						
Married	161	31	112	21	0.9	0.8-1.0
Has children	387	75	343	65	1.6**	1.2-2.1
Employment						
Employed	150	29	147	28	1.0	0.8-1.3
Sexual preference						
MSM (Among men)	19	9	58	30	0.2**	0.1-0.4

** $p < 0.01$

Table 4. Health characteristics among HIV-positive persons who reported taking ARV treatments compared to those who were not.

Variable	Taking ARVs N	%	Not Taking ARVs N	%	OR	95%CI
Health characteristics:						
Times hospitalised for HIV						
0-1	319	62	405	77		
2-3	121	23	107	20		
4+	71	14	10	2	0.7**	0.6-0.8
	M	**SD**	**M**	**SD**		
Years HIV positive	3.1	2.5	2.3	2.1	0.8**	0.8-0.9
HIV symptoms	6.9	3.9	6.1	3.5	0.9**	0.8-0.9

** $p < 0.01$

Table 5: Risk behaviours by sexually active HIV-positive persons who reported taking ARV treatment compared to those who were not.

Variable	Taking ARVs N	%	Not Taking ARVs N	%	OR	95%CI
Number of partners:						
1	312	60	295	56		
2	61	12	44	8		
3+	77	15	113	21	1.1	0.9-1.3
Partner statuses reported:						
Positive	365	70	357	68	0.9	0.6-1.1
Negative	235	45	256	48	1.1	0.9-1.4
Unknown status	214	41	277	53	1.6**	1.2-2.0
Sex practices with positive partners:						
Unprotected vaginal	210	41	260	49	1.4**	1.1-1.8
Unprotected anal	135	26	163	31	1.2	0.9-1.6
Sex practices with HIV negative and unknown status partners:						
Unprotected vaginal	155	30	194	37	1.3*	1.1-1.7
Unprotected anal	110	21	136	26	1.2	0.9-1.7
Partner not disclosed to	210	41	255	48	1.3**	1.1-1.7
% Condom use with:						
positive partners	70.0	31.4	60.0	31.7	0.3**	0.2-0.6
non-positive partners	61.3	34.7	53.0	32.8	0.4**	0.3-0.8
Substance use:						
Alcohol use	234	45	303	58	1.4**	1.2-1.6
Dagga	54	11	123	24	1.9**	1.5-2.4
Mandrax	19	3	54	10	2.1**	1.4-3.0

* p < 0.05; ** p < 0.01

Table 6. Multivariate logistic regression for factors found significant in bivariate analyses. a

Variable	OR	95.0% C.I.	
		Lower limit	Upper limit
Age	0.58**	0.4	0.76
Race	1.1	0.98	1.3
Has children	0.83	0.7	1.34
Years HIV positive	0.88**	0.83	0.94
HIV symptoms	.88**	0.85	0.92
Unprotected intercourse with HIV-positive partners	1.21	0.86	1.72
Unknown HIV status partners	1.48	0.97	2.25
Unprotected intercourse with unknown status partners	1	0.69	1.55
Partners not disclosed to	0.97	0.62	1.5
Mandrax use	1.34	0.87	2.07

Note: * p < .05, ** p < .01; a Percent condom use is not included in the model because it is redundant with unprotected intercourse.

Summary of main findings

- Although they were equally sexually active (N = 450, 87% for persons on ARVs and N = 452, 86% for those not on ARVs, OR = 0.9, 95%CI, 0.6-1.2), those on ARV treatment tended to have had
  - fewer multiple sexual partners,
  - less unprotected vaginal sex with both positive and unknown partners, and also
  - used condoms more with both types of partners than their counterparts not on treatment.
- More importantly, participants taking ARVs were more likely to have disclosed their HIV status to their sex partners.
- Furthermore, those on ARV treatment used less alcohol, dagga and mandrax than their counterparts on treatment.
- Multivariate regression results for variables found significant in the bivariate tests showed that participant age, years HIV positive, HIV symptoms, and alcohol use were independently associated with receiving ARV treatments.

Conclusions

- The two main findings obtained from this study were that people receiving ARV treatment were generally safer in their sexual practices and also used alcohol and other drugs less.
- Thus, ARV treatment appears to have facilitated a reduction in HIV risk behaviour rather than promote it as has been widely feared might happen due to a change in the perception of HIV/AIDS from a fatal to chronic condition in the present era of wider ARV treatment availability and accessibility including through the public health sector especially in South Africa.
- The finding that there was no behavioural disinhibition or risk compensation evident among people receiving ARV treatment in the present study is generally consistent with findings of other studies from both other sub-Saharan Africa countries and in the West but differs with those obtained from some high risk groups in the USA.
- Despite these limitations, we conclude that our findings have implications for interventions with PLWHA in Southern Africa. In particular, these results suggest the possibility that ARV treatment could in fact be a putative HIV prevention strategy that could be exploited as part of the fight against HIV/AIDS in the region. Therefore, some additional action research into the issue is urgently needed.

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