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Psychosocial aspects of ART counseling: A comparison of HIV beliefs and knowledge in PMTCT and ART-naïve women

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Abstract

Antiretroviral therapy (ART)-readiness counseling has been deemed critical to adherence, instilling knowledge, and promoting positive beliefs and attitudes. In the landscape of changing policy in South Africa, some ART initiators have had prior ART-readiness counseling (e.g., for prevention-of-mother-to-child-transmission [PMTCT] programs). The extent to which previous

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counseling resulted in retained knowledge and belief is unknown, which may be important to the promotion of women's ART adherence. We compared 320 women living with HIV and initiating ART, with and without prior PMTCT on HIV knowledge, treatment, beliefs, and attitudes. The PMTCT group held more accurate beliefs and more positive attitudes about ART. Both groups lacked understanding of basic HIV biology. Non-disclosure of HIV status was high. Thus, in individuals re-initiating therapy, some knowledge about HIV and its treatment was not well retained. Tailored education and counseling may be critical to adherence, with a focus on biological concepts that impact ART resistance.

Keywords

antiretroviral therapy (ART); beliefs; counseling; HIV; knowledge; resistance

South Africa has the world's highest HIV prevalence at 12.2% (Shisana et al., 2014), with women of childbearing age the most affected (29.7%; Health Department, Republic of South Africa., 2013). In the last decade, the South African national antiretroviral therapy (ART) treatment program has been revised several times, with significant implications for people living with HIV infection (PLWH). Two hallmarks of the program are ART-readiness counseling and prevention of mother-to-child transmission (PMTCT; South African National AIDS Council [SANAC], 2007).

ART-readiness counseling was rolled-out in the early 2000s in South Africa, based on emerging research at that time detailing how counseling could help PLWH best prepare for and remain adherent to ART (Boateng, Kwapong, & Agyei-Baffour, 2013). In an attempt to inform patients about ART and prevent adherence problems from the time of treatment initiation, the South Africa Department of Health outlined the curriculum for ART counseling, with different regional departments of health adopting and adapting those guidelines (Bekker et al., 2014; Commonwealth Regional Health Community Secretariat, 2002; Richter, van Rooyen, Solomon, Griesel, & Durrheim, 2001). Readiness counseling has been shown to be a critical component of instilling knowledge about HIV and ART, and of promoting positive beliefs and attitudes about HIV treatment and disclosure, all shown to be related to adherence (Colombini et al., 2014). Counseling sessions typically include lessons and discussions about the benefits of adherence, potential barriers to adherence, clarification of treatment regimens, and guidance for adherence support in the form of a treatment buddy and disclosure of HIV status (National Department of Health, 2015; Remien et al., 2013). Typically, once counseling is complete, patients receive their first ART prescription. PMTCT ART counseling mirrored standard ART readiness counseling, except for inclusion of additional information regarding breastfeeding and when treatment would be stopped post childbirth (National Department of Health, 2015). However, some research has indicated that many patients who go through readiness counseling continue to lack knowledge related to drug resistance and health outcomes (Nachega et al., 2005; Nozaki et al., 2013).

In 2010, in an effort to put South Africa on track to eradicate HIV in newborns and to improve the health of mothers (Bhardwaj et al., 2014), the national ART guidelines for pregnant women testing positive for HIV were changed. Prior to 2010, pregnant women

received the standard pre-ART commencement readiness counseling sessions; in 2010, fast-tracking (the immediate commencement of ART and provision of readiness counseling) for pregnant women started (Shisana et al., 2014). Prior fast-track recipients of PMTCT received a short course of ART during pregnancy and the postnatal period to protect the infant during breastfeeding (Shisana et al., 2014). At that time, after completing PMTCT, most women stopped ART until they met criteria for lifelong therapy only to undergo ART readiness counseling again when eligible for lifelong ART. The eligibility criteria for lifelong ART has changed considerably over the past decade, from a CD4+ T cell count of 250 cells/mm³ or lower in 2006, to 350 cells/mm³ or lower in 2011, to 500 cells/mm³ or lower in 2015 (Pillay, White, & McCormick, 2012; SANAC, 2007). Today, the CD4+ T cell count is no longer an eligibility criterion for initiating ART; ART is expected to be initiated at any CD4+ T cell count.

As a result, there is a new urgency to initiate ART sooner rather than later for all PLWH. With ART now being available to PLWH regardless of CD4+ T cell count, there is an increase in patients seeking treatment, putting additional pressure on treatment programs. Readiness counseling in the South Africa treatment program is also moving toward fast-tracking for all adults. Fast-tracking for all adults involves commencement of ART at the second counseling session, which typically occurs 1 week after the first counseling session. The third session is a follow-up session to review early treatment acceptance and uptake (Médecins sans Frontières, 2015). This rapidly expanding program is increasing counseling and treatment demand in an already resource-limited setting. With the increasing numbers of individuals enrolling into therapy, some of whom may have previously received counseling, it may be useful to know whether knowledge and beliefs about HIV and ART are retained from previous counseling. This could help to tailor counseling sessions to individual patient needs by customizing the education messages and biomedical content, as well as to inform the number and duration of readiness sessions required to reduce the human resource burden (Hodgins, Gnich, Ross, Sherriff, & Worlledge-Andrew, 2016; Nozaki et al., 2013). Individuals who retain high levels of information from previous counseling could potentially be started on ART more rapidly. No research to date has examined whether previous exposure to ART counseling from PMTCT leads to more accurate knowledge and beliefs about HIV and its treatment after re-initiating ART-readiness counseling for lifelong ART. This knowledge would be instrumental in informing effective and appropriate ART counseling and education for patients at different stages in the course of ART.

Our aim was to assess whether HIV knowledge, HIV-treatment knowledge, HIV beliefs, attitudes toward ART, and attitudes to disclosure were affected by previous exposure to counseling. We examined data from women who had previously received PMTCT and were about to commence lifelong ART, and women who were ART naïve with no prior ART counselling and about to commence ART. We hypothesized that the PMTCT group would have better knowledge about HIV disease and treatment, have more positive attitudes toward ART, and have more positive attitudes toward disclosure. We also conducted an across-group individual item analysis to identify the largest knowledge gaps in and between groups, and to examine the role of socio-economic-status (SES) related factors on HIV-related knowledge. Based on previous research conducted in South Africa (Nachege et al., 2005), we hypothesized that the largest knowledge gap would be related to biological concepts and

processes associated with HIV, such as viral load (VL) and drug resistance, and that higher education would be associated with better HIV-related knowledge (Nozaki et al., 2013).

Methods

Study Design

Data were collected as part of a larger randomized controlled trial (RCT) of a multimedia, laptop-based, lay-counselor-delivered ART-readiness intervention for ART initiators (Masivukeni) conducted in Cape Town, South Africa (Remien, 2012). All participants gave informed consent and were interviewed for study purposes prior to ART counseling and ART initiation. Participants completed questionnaires and surveys aimed at exploring HIV knowledge, beliefs, and ART knowledge. Domains included: HIV-related knowledge and beliefs, self-efficacy, insight, and disclosure. All procedures received approval from the Human Research Ethics Committee of the University of Cape Town and the Institutional Review Board of the New York State Psychiatric Institute.

Setting

Our study was conducted at two Department of Health (DoH) community primary care HIV clinics, located in peri-urban Cape Town, that served individuals from a low socioeconomic background. Both clinics had large populations of patients that reflected the demographics of the broader South African epidemic.

Participants

Inclusion criteria for the main RCT were: (a) HIV infected; (b) eligible by South Africa Department of Health guidelines for ART initiation (CD4+ T cell count of < 350 cells/mm³) and ready to initiate mandatory counseling; (c) English- or isiXhosa-speaking; (d) ART initiation for the first time, or following previous PMTCT; (e) capable of consent; (f) willing to bring a treatment support partner to the intervention; and (g) willing to use an electronic monitoring device for medication management (this was a primary outcome of the RCT). For our nested study, only women who had previously received PMTCT ($n = 106$) and those who had never received ART ($n = 214$) were included. Interviews were conducted at the clinics by trained study staff prior to participants being randomized to receive standard of care ART counseling or intervention/experimental ART counseling.

Measures

After providing informed consent and before ART-readiness counseling, participants completed a battery of demographic, medical, and HIV-focused psychosocial measures. All measures were translated into isiXhosa from English and back-translated into English using standard procedures (Preciagio & Henry, 1997). The following measures were regarded as key to understanding treatment readiness.

HIV/AIDS Knowledge Inventory (HAKI; Kalichman & Simbayi, 2003) consisted of 11 items and assessed current knowledge about the causes and transmission routes of HIV. Participants were asked specific questions about what causes HIV and how it is transmitted (e.g., *Is HIV the virus that causes AIDS?*) and given the response options of *Yes* = 1 and *No*/

Don't know = 0. A total score was computed, such that higher scores indicated more correct knowledge of the disease and its transmission (Cronbach's $\alpha = .59$).

HIV/AIDS Treatment Related Knowledge Inventory (HTRK; Wagner, Remien, Carballo-Dieuez, & Dolezal, 2002), consisted of 12 *True/False* items with correct answers scoring 1 and incorrect/don't know answers scoring 0, assessed participants' knowledge of HIV treatment. For example: *CD4 counts are used to measure immune system functioning*. A total score was computed such that higher scores indicated more correct knowledge about HIV treatment (Cronbach's $\alpha = .80$).

HIV Insights and Beliefs Scale (HIBS), consisted of 8 *True/False* items, was developed by the research team, and assessed cultural beliefs that might impact HIV treatment. An example item is: *HIV is caused by bewitchment or curse*. Scientifically correct answers scored 0 and incorrect answers scored 1. Higher scores indicated more traditional beliefs informed by traditional culture (Cronbach's $\alpha = .79$).

Beliefs about Medications Questionnaire (BAM; Horne, Weinman, & Hankins, 1999), consisted of 18 items rated on a 5-point scale, assessed beliefs and attitudes toward taking general medications and ART. Higher score responses indicated more favorable attitudes toward ART and medicine in general, and stronger beliefs that ART was important and weaker beliefs that ART posed problems. Two subscales were also computed. The Necessity Subscale (NS) assessed to what extent an individual believed that ART was truly important for his/her health, where higher scores indicated stronger beliefs that ART was important. The Concern Subscale (CS) assessed to what extent an individual believed that ART posed a problem for his/her health and life, where higher scores indicated stronger beliefs that ART was problematic. Cronbach's alpha for this measure was .63.

Attitudes toward HIV disclosure (ATD), consisted of 5 items rated on a 4-point scale, assessed how much participants agreed or disagreed with statements such as, *In general, disclosing my HIV status to other people in my community can be helpful to me*. Items were summed to create a total score; higher scores indicated more favorable attitudes toward disclosing one's HIV status (Cronbach's $\alpha = .68$).

Adherence Self-Efficacy (ASE), consisted of 14 items from Adult AIDS Clinical Trials Group adherence instruments (Chesney et al., 2000) rated on a 5-point scale, assessed participants' confidence that they would be able to take medications under different circumstances (e.g., when drinking alcohol). Items were summed to create a total adherence self-efficacy score in which higher scores indicated more self-efficacy (Cronbach's $\alpha = .94$).

Statistical Analyses

Descriptive statistics were generated for all psychosocial measures. Independent sample t-tests were used to compare the means of age and composite scores on study questionnaires (see Table 2) between groups. Chi-square tests or Fischer's exact tests (where expected cell frequencies were < 5) were used to compare discrete demographic and clinical variables (Table 1), and individual items on all study questionnaires (Tables 3 & 4) between groups. To determine whether there were HIV knowledge gaps in the PLWH in general, we did an

across-group individual item analysis of questionnaire items. The proportions of correct and incorrect responses to individual items are reported (see Tables 3 and 4). We used statistical packages SPSS (Version 23) and R (the exact package) for statistical analyses.

Results

Demographic and Clinical Characteristics

Three hundred and twenty women were included in the nested study. The mean age was 33.28 ($SD = 14.78$) years, 96.3% ($n = 308$) were isiXhosa speakers, 39.40% ($n = 126$) were employed, 31% ($n = 99$) had completed primary schooling (7 years or greater), 98.8% ($n = 316$) were South African, and 95.60% ($n = 305$) earned less than R5000 (USD 385) per month. Of the 106 who had received previous ART counseling for PMTCT, the mean time between the last course of PMTCT and current initiation was 4.20 years ($SD = 2.65$ years; range = < 1 year – 12 years). As shown in Table 1, there were no between-group differences for demographic or medical characteristics, or for duration of clinic attendance.

Overall Between Groups Analysis

An analysis of total scores across individual measures showed that the PMTCT group scored higher than the ART-naïve group on the *HIV Insight and Beliefs Scale* ($t(318) = 2.22, p = .014$) and *Beliefs About Medication-CS* subscale ($t(315) = -1.82, p = .035$), indicating that the PMTCT group had fewer beliefs based on traditional ideas about HIV and fewer concerns that ART would pose problems for health and life (Table 2). There were no other significant differences between individual measures.

In multivariate linear regression analyses, education, age, income, TB status, employment, and previous use of ART were not significantly associated with total scores on *Attitude Towards Disclosure* and *Beliefs About Medication-NS*. However, these predictor variables were significantly associated with scores on the remaining measures as follows.

HIV/AIDS Knowledge Inventory—Education was significantly associated with higher scores on this measure ($F(4.36), p = .038, R^2 = 0.01$), indicating that more education was significantly associated with more accurate knowledge about HIV.

HIV/AIDS Treatment Related Knowledge Inventory—Older age and higher education were significantly associated with higher total scores (more accurate treatment knowledge) on this measure ($F(5.46), p = .005, R^2 = 0.03$).

HIV Insight and Beliefs Scale—Being in the PMTCT group was associated with higher scores on the HIV Insight and Beliefs Scale total scores ($F(3.95), p = .048, R^2 = 0.01$), such that women in the PMTCT group held less traditional beliefs about and more medically-based insight into HIV.

Beliefs About Medication-CS—Education, tuberculosis (TB) status, and previous use of ART were significant predictors of total scores on this measure ($F(3.74), p = .012, R^2 = 0.04$), where being in the ART-naïve group, not having TB, and having a higher education were associated with stronger beliefs that ART would pose a problem.

Adherence Self-Efficacy—Higher income was significantly associated with higher total scores on Adherence Self-Efficacy ($F(5.74)$, $p = .017$, $R^2 = 0.15$).

Individual Item Analyses Between Groups

We then analyzed individual items in order to assess if there were specific knowledge gaps within the broader domains of the questionnaires between groups.

HIV/AIDS Knowledge Inventory—There were no statistically significant between-group differences on any item in the HIV/AIDS Knowledge Inventory.

HIV/AIDS Treatment Related Knowledge Inventory—Analyses revealed that on one item regarding drug resistance, a higher proportion of ART-naïve patients (58.9% vs. 45.3%; $p = .011$) answered more correctly than PMTCT patients (see Table 3; *Resistance to a particular drug means that the drug is not working because the virus is no longer susceptible to it*).

HIV Insights and Beliefs Scale—Between-group analyses revealed more ART-naïve women answered *Yes* to the question, *HIV can be treated by religion or prayer*, than PMTCT women (8.4% vs. 2.9%, respectively; $p = .048$), although rates for both groups were low.

Beliefs About Medication measure—Between-group analyses revealed that a greater proportion of ART-naïve women (45.3% vs. 18.1% PMTCT; $p = .04$) strongly agreed with the statement, *People who take medicines should stop their treatment for a while every now and again*, compared to women in the PMTCT group.

Attitudes Toward HIV Disclosure scale—There were no statistically significant between-group differences on this scale.

Adherence Self-Efficacy—Between-group analyses revealed that ART-naïve women were more likely than the women in the PMTCT group to agree with the statements that they could still take their medication when: (a) it meant changing their eating habits (96.7% of the ART-naïve vs. 90.6% PMTCT; $p = .016$); (b) their daily routine was disrupted (93.5% of the ART-naïve vs. 90.6% PMTCT; $p = .023$); and (c) they had difficulty swallowing tablets (94.9% of the ART-naïve vs. 92.4% PMTCT; $p = .017$). Though statistically significantly different, both groups had very high agreement with all three statements.

Individual Item Analyses Across Groups

We then analyzed individual items in order to assess if there were specific knowledge gaps within the broader domains of the questionnaires across groups.

HIV/AIDS Knowledge Inventory—Across-group analysis revealed that more than 80% of patients correctly answered all questions from the HIV/AIDS Knowledge Inventory (see Table 3).

HIV/AIDS Treatment-Related Knowledge Questionnaire—More than 75% of patients (see Table 3) correctly answered 6 of the 12 questions regarding HIV treatment

knowledge. Fewer than 64% of patients correctly answered the remaining six questions, which pertained to ART resistance (questions 4–5) and VL (questions 7–10).

HIV Insights and Beliefs Scale—More than 80% (see Table 4) of patients accurately knew their disease status, that HIV is caused by a virus, and that ART treated HIV. Notably, 59% of women did not know how they became infected, and only 36.7% of patients believed that HIV could be treated with medicines from a clinic.

Beliefs About Medication—Across groups on the Beliefs About Medication measure (Necessity Subscale [NS] and Concern Subscale [CS]), 80% of patients responded favorably to NS questions indicating beliefs that ART was important. On the CS measure, 65% of patients were concerned about becoming too dependent on ART, 86.9% believed that ART would disrupt their lives, and 84.1% worried about taking ART.

Attitudes Toward HIV Disclosure—Across groups on Attitudes Toward HIV Disclosure, more than 60% reported favorable attitudes toward disclosing their status to family and friends. However, about half (49.3%) of the patients indicated that disclosing their status to others would be difficult, 46.5% disagreed that HIV disclosure to others could be helpful in medication management, and 40% were not interested in disclosing their status to more people.

Adherence Self-Efficacy—Across groups, more than 85% of patients felt confident they could take their medication on all the Adherence Self-Efficacy scenarios, indicating high-anticipated adherence self-efficacy.

Discussion

Overall, patients demonstrated a good level of basic knowledge and medically accurate beliefs about HIV. Our first hypothesis, that the PMTCT group would have better knowledge about HIV and treatment, was partially supported; women who had received prior ART counseling as part of PMTCT held more accurate beliefs about HIV and tended to be less likely to be skeptical of the benefits of ART. ART-naïve women had a stronger belief that ART interruption was acceptable. Our second hypothesis, that the whole patient population would demonstrate a lack of knowledge related to biological processes associated with HIV (such as VL and drug resistance) and related health outcomes, was supported. Our third hypothesis, that PMTCT women would have a more positive attitude to disclosure was not supported. Disclosure remains a major difficulty for women living with HIV. These findings have important significance for tailoring counseling resources and customizing the counseling education message.

ART-naïve pregnant women initiating treatment for the first time expressed more concerns about taking ART. Despite this, they were most confident that they would be able to take their treatment under difficult circumstances. These effects were not seen in the PMTCT group. This suggests that ART-naïve women may need assistance when encountering unanticipated difficulties once they have initiated ART, and that women who had previous PMTCT experiences with ART had adjusted to these concerns and expectations. Tailoring

counseling sessions to include problem solving related to taking ART under difficult circumstances during counseling sessions may be beneficial to patients (Robbins, Spector, Mellins, & Remien, 2014).

The strongest association we found in our linear regression analyses was between higher income and increased patients' beliefs that they would be capable of taking their ART. This may be due to higher income patients having more resources to support their ART efforts, for example, money to buy food, taking time off from work or other activities for medical appointments and to collect medications, and perhaps having more personal agency (Nachega et al., 2015; Peltzer & Pengpid, 2013).

Previous ART use (PMTCT group) was associated with fewer traditional beliefs about HIV and increased HIV-related medically-based insight. This suggests that PMTCT counseling may do what it is supposed to, that is, instill greater understanding about HIV and the need for ART (Govender & Coovadia, 2014). It is also possible that becoming pregnant and having children may lead to increased motivation to understand the virus and prevent transmission, as well as promote maternal health. Women may pay more attention to their own health in the context of being pregnant or needing to care for children.

Beliefs that ART would pose a problem were magnified in patients who were ART-naïve and who did not have TB, suggesting that patients with little or no prior experience with taking medication for serious medical conditions tended to be more skeptical about its benefits. Patients with a higher education also had more skepticism regarding ART, despite higher education being associated with better HIV knowledge (Nozaki et al., 2013). The skepticism may be justified considering the adverse effects associated with ART; however, patients with higher education may also be exposed to more sources of information, the Internet, for example, without the requisite knowledge to successfully discriminate between good and bad sources of information regarding ART.

Analysis of individual questions uncovered some important knowledge gaps and misconceptions in both PMTCT and ART-naïve groups. A small number of ART-naïve patients believed that prayer could treat HIV (Nozaki et al., 2013). While many studies have indicated that spiritual faith has been associated with better patient-reported physical health across chronic health conditions, including HIV, other studies have shown mixed results (Arrey, Bilsen, Lacor, & Deschepper, 2016; Kremer, Ironson, & Porr, 2009). For example, prayer is unlikely to be effective as a treatment for HIV in the absence of ART (Bonelli & Koenig, 2013; Jim et al., 2015; Nozaki et al., 2013; Szaflarski, 2013). However, religion and spirituality are critical to many people, particularly those in sub-Saharan Africa, and can play an important role in HIV care and treatment with regard to understanding and coping with illness, and should not be excluded from counseling (Arrey et al., 2016).

ART-naïve patients were more confident that they would be able to take their ART when faced with obstacles, for example when changing their eating habits, daily routine interruptions, or when having difficulty swallowing tablets. PMTCT patients may know from experience that adherence might be more difficult under these conditions. Counseling models that include a problem solving component, such as Masivukeni (Remien et al.,

2013), may be instrumental for patients to find solutions for these obstacles and to improve adherence. These sessions could be tailored to the needs of the patient by either addressing how to overcome unanticipated obstacles to taking ART in ART-naïve patients, or ways by which to overcome known and new obstacles to taking ART in patients who previously received ART (Kagee et al., 2011).

The ART-naïve group, surprisingly, had better knowledge concerning ART resistance, but they also believed that taking breaks from medication was recommended. Two concerns here are that more than half of the PMTCT group (women who may be at an increased risk of developing resistance) lacked understanding about ART resistance, had a poor grasp of how drug resistance developed, and, by implication, of the importance of adherence (Hamers et al., 2012). Nachege et al. (2005) highlighted this key gap in counseling and the need to reinforce that missing doses could lead to drug resistance and poor health outcomes. Furthermore, the large percentage of women (37% across groups) who questioned the effectiveness of medicine dispensed from the clinic, believed that ART would disrupt their lives (87%), and worried about taking ART (84%), was concerning, as such beliefs could impact adherence adversely (Nozaki et al., 2013). This finding overlapped with women believing that prayer might be an effective method of treating HIV. While these concerns may not have been misguided, particularly taking the side-effects of ART into consideration, it pointed to a need for counselors to help patients weigh risks and benefits of ART (Nozaki et al., 2013).

Regarding basic treatment principles, both PMTCT and ART-naïve patients had poor understandings of the basic biological concepts of VL, the relationship between VL and CD4+ T cell count, and ART resistance. While knowledge of basic key biological treatment principles may not always be required for good adherence (Laws, Danielewicz, Rana, Kogelman, & Wilson, 2015), it has often been associated with adherence and related to HIV transmission including, for example, the reduced risk of infecting a partner when the VL is undetectable (Loutfy et al., 2013). Thus, poor understanding of these concepts may lead to further infections and/or health complications.

Disclosure remained a major obstacle for patients in our study. Our expectation that the PMTCT groups would have a more positive attitude toward disclosure because of their longer disease status was not met. Many women reported that they found it hard to disclose their status and did not anticipate gaining any real value from it. Disclosure has traditionally been poor in South Africa and was marred by issues of stigma (Dlamini et al., 2009; Feigin, Sapir, Patinkin, & Turner, 2013; Simbayi et al., 2007). Lack of disclosure was accentuated by the large percentage of patients (60%) in our study who did not know how they acquired HIV. Innovative strategies, such as taking a couple-orientated approach to HIV-counseling (Matthews et al., 2014; Orne-Gliemann et al., 2013; Remien et al., 2006; Remien et al., 2005) and identifying treatment partners for social-support (Remien et al., 2013) may be beneficial to patients.

There were limitations to our study. The study involved cross-sectional analyses and patients who have been living with HIV may have acquired HIV-related knowledge from sources other than counseling. Thus, we cannot prove causality from our findings. Some of the

statistically significant data cited here reflect small differences between groups and may not translate into real clinical relevance. The HIV knowledge inventory had a moderate to low Cronbach's α of .59. These data were from a larger study, thus, study inclusion for the RCT (e.g., agreeing to bring a treatment support partner and using an electronic monitoring device to measure ART adherence) may have led to sampling bias and influenced treatment uptake for our analyses. Finally, although some of the findings were statistically significant, it is not fully understood if these differences are indeed clinically meaningful.

Conclusion

In summary, most of the women in our study had an adequate level of general knowledge about HIV, and held beliefs that were consistent with the medical view of HIV in general. A sound medical knowledge base is likely important, but not sufficient, for better adherence. Of more concern were the findings that many women had difficulties with disclosure that might have been beneficial to them, that the perception that taking breaks from ART was recommended, and that, despite prior counseling, PMTCT women still had trouble understanding basic biological health concepts such as VL and resistance to ART. These knowledge gaps and treatment needs could be addressed more effectively during counseling (Langebeek et al., 2014), particularly if counseling could be tailored toward more individual needs of the patient (Remien et al., 2013). While it should not be assumed that knowledge and beliefs about HIV and ART are not retained from previous counseling sessions, HIV knowledge in patients is limited in some areas, despite previous counseling. Gauging patient knowledge at counseling onset in order to customize the counseling and education message, may be one way of tailoring the counseling education messages (Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008; Hodgins et al., 2016), ensuring that education and counseling is effective at different stages of treatment for each patient (Nozaki et al., 2013).

Tailoring counseling by customizing the education message to specific needs of patients and addressing the simple biological concepts integral to understanding the importance of adherence should be incorporated in the South African policy for counseling.

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Key Considerations

In our study:

- Previous ART counseling received as prevention-of-mother-to-child-transmission
- (PMTCT) led to medically accurate beliefs about HIV and a positive attitude about ART.
- Patients lacked understanding of basic biological concepts such as viral load and ART resistance.
- Patients who received previous ART counseling should be re-educated when they initiate ART at a later stage.
- Tailoring HIV counseling to address simple biological concepts that are integral to understanding the importance of adherence may improve ART adherence.
- Disclosure remains problematic for a large percentage of women.

Table 1

Patient Demographic and Clinical Characteristics of Total Sample and Based on Group (ART-Naïve vs. PMTCT)

Characteristic	Total (N = 320)	ART-Naïve (n = 214)	PMTCT (n = 106)	p
Age, mean years (<i>SD</i>)	33.3 (14.8)	33.8 (15.7)	32.3 (12.7)	.420
Pregnant, % (<i>n</i>)	14.8 (46) ^a	15.8 (33) ^d	12.7 (13) ^g	.478
TB, % (<i>n</i>)	18 (56) ^a	21.5 (45) ^d	10.8 (11) ^g	.021 *
Born in South Africa, % (<i>n</i>)	98.8 (316)	98.6 (211)	99.1 (105)	.728
Home language, % (<i>n</i>)				.722
isiXhosa	96.3 (309)	96.3 (206)	97.2 (103)	
isiZulu	0.9 (3)	1.4 (3)	0 (0)	
English	0.3 (1)	0.5 (1)	0 (0)	
Afrikaans	0.6 (2)	0.5 (1)	0.9 (1)	
Other	1.6 (5)	1.4 (3)	1.9 (2)	
Education, % (<i>n</i>)				.164
High school or greater (> 12 years)	31 (99)	32.3 (69)	28.3 (30)	
Employed, % (<i>n</i>)	39.4 (126)	41.1 (88)	35.8 (38)	.364
Employment type, % (<i>n</i>)				.370
Full-time	66.7 (84)	70.5 (62)	57.9 (22)	
Part-time	28.6 (36)	26.1 (23)	34.2 (13)	
Self-employed	2.4 (3)	1.1 (1)	5.3 (2)	
Informal job/hawker	2.4 (3)	12.3 (2)	2.6 (1)	
Monthly income, % (<i>n</i>)				.053
R0 – R1500	45.1 (144) ^b	40.4 (86) ^e	54.7 (58)	
R1551 – R5000	50.5 (161) ^b	54.9 (117) ^e	41.5 (44)	
Greater than R5000	4.4 (14) ^b	4.7 (10) ^e	3.8 (4)	
Duration of HIV outpatient clinic attendance, % (<i>n</i>)				< .001 *
Less than 6 months	53.4 (171)	57.0 (122)	46.2 (49)	
Less than 1 year	15.3 (49)	18.7 (40)	8.5 (9)	
Less than 3 years	19.4 (62)	17.3 (37)	23.6 (25)	
More than 3 years	11.9 (38)	7.0 (15)	21.7 (23)	
Had HIV related illness or opportunistic infection, % (<i>n</i>)	33.5 (107) ^b	35.7 (76)	29.2 (26)	.470
Currently being treated for TB, % (<i>n</i>)	17.5 (56)	21.0 (45)	10.4 (11)	.018 *
Ever been treated for TB, % (<i>n</i>)	17.2 (55)	15.9 (34)	19.8 (21)	.381
Adherence in first month, mean adherence rate (<i>SD</i>)	85.1 (21.9) ^c	84.7 (22.7) ^f	85.9 (20.5) ^h	.672

Note.

^aData based on 311 participants;

^bData based on 319 participants;

^cData based on 286 participants;

^dData based on 209 participants;

^eData based on 213 participants;

^fData based on 190 participants;

^gData based on 102 participants;

^hData based on 96 participants;

* Significant *p* value comparing number of ART-Naïve and PMTCT patients; ART = antiretroviral therapy; PMTCT = prevention of mother to child transmission; TB = tuberculosis; R = rand.

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Table 2

Between Group Comparison and Total Group Scores of Accuracy of HIV/Treatment Knowledge and HIV Insights and Beliefs, Beliefs About Medications, Attitudes Toward Disclosure, and Adherence Self-Efficacy Between ART-Naïve and PMTCT Patients

Scale	Total (N = 320)	ART-Naïve (n = 214)	PMTCT (n = 106)	p
HIV/AIDS Knowledge Inventory (HAKI) ^a	20.86 (1.47)	20.86 (1.52)	20.86 (1.36)	.487
HIV/AIDS Treatment Related Knowledge (HTRK) ^b	19.35 (2.92)	19.44 (3.02)	19.18 (2.71)	.227
Beliefs About Medications Questionnaire (BAM) NS ^c	21.66 (2.86) ^j	21.62 (2.99)	21.76 (2.59) ^m	.328
Beliefs About Medications Questionnaire (BAM) CS ^d	15.56 (2.12) ^k	15.72 (2.22) ^l	15.26 (1.88) ^m	.035*
Attitudes Towards Disclosure (ATD) ^e	11.55 (3.09)	11.38 (3.09)	11.90 (3.07)	.079
Adherence Self-Efficacy (ASE) ^h	67.45 (7.20)	67.79 (6.35)	66.76 (8.67)	.140
HIV Insight and Beliefs Scale (HIBS) ⁱ	14.16 (1.10)	14.06 (1.13)	14.35 (1.02)	.014*

Note.

^aHAKI: Higher scores = more correct responses/more accurate knowledge about HIV (where DK is wrong);

^bHTRK: Higher total scores = less correct/accurate knowledge about HIV Treatment (where DK is wrong);

^cBAM NS: Higher NS scores indicate stronger beliefs that ARVs are important;

^dBAM CS: Higher CS scores indicate stronger beliefs that ARVs pose problems;

^eATD: Higher scores = more favorable attitudes toward disclosure;

^hASE: Higher scores = more anticipated adherence self-efficacy;

ⁱHIBS: Higher scores = less insight and more folk beliefs;

^jData based on 319 patients;

^kData based on 317 patients;

^lData based on 212 patients;

^mData based on 105 patients.

ART = antiretroviral therapy; PMTCT = prevention of mother to child transmission; ARV = antiretroviral; DK = don't know.

Table 3

Between Group Comparison and Total Group Scores of HIV and Treatment Knowledge on Individual Questions

Question	Total (N = 320)	ART-Naïve (n = 214)	PMTCT (n = 106)	p
	Total % Accurate (n)	Total % Accurate (n)	Total % Accurate (n)	
HIV/AIDS Knowledge Inventory (HAKI)				
1. Is HIV/AIDS spread by kissing	85.3 (273)	83.2 (178)	89.6 (95)	.063
2. Can a person get HIV/AIDS by sharing kitchens and bathrooms with someone who has HIV/AIDS	93.8 (300)	93 (199)	95.3 (101)	.213
3. Can you get HIV/AIDS by touching someone with HIV/AIDS	97.2 (311)	97.2 (208)	97.2 (103)	1.000
4. Can men give HIV/AIDS to women (<i>true</i>) ^a	95.3 (305)	95.8 (205)	94.3 (100)	.218
5. Can women give HIV/AIDS to men (<i>true</i>)	91.6 (293)	91.1 (195)	92.5 (98)	.344
6. Must a person have many different partners to get HIV/AIDS	94.1 (301)	93.9 (201)	94.3 (100)	.442
7. Does washing after sex help protect against HIV/AIDS	85.6 (274)	86.4 (185)	84(89)	.276
8. Can a pregnant woman give HIV/AIDS to her baby (<i>true</i>)	85.6 (274)	85.5 (183)	85.8 (91)	.468
9. Can a person get rid of HIV/AIDS by having sex with a virgin	92.5 (295)	93.4 (199)	90.6 (96)	.181
10. Is HIV the virus that causes AIDS (<i>true</i>)	83.8 (268)	85(182)	81.1 (86)	.186
11. Is there a cure for HIV/AIDS	82.2 (263)	82.7 (177)	81.1 (86)	.364
HIV/AIDS Treatment Related Knowledge (HTRK)				
1. Antiretroviral medication aims to reduce or suppress the activity of the HIV virus in the body (<i>true</i>)	87.8 (281)	86.4 (185)	90.6 (96)	.145
2. Taking antiretroviral medications on time helps keep the right amount of medicine in one's system (<i>true</i>)	85 (272)	84.6 (181)	85.8 (91)	.383
3. Resistance can be caused when a drug is not taken on schedule, or when doses are reduced or missed (<i>true</i>)	83.8 (268)	85 (182)	81.1 (86)	.186
4. Resistance to a particular drug means that the drug is not working because the virus is no longer susceptible to it (<i>true</i>)	54.4 (174)	58.9 (126)	45.3 (48)	.011 *
5. If the HIV virus is resistant to one medication, then it may be resistant to others (<i>true</i>)	63.1 (202)	63.6 (136)	62.3 (66)	.411
6. CD4 counts are used to measure immune system functioning (<i>true</i>)	80 (256)	79.4 (170)	81.1 (86)	.361
7. Viral load measures the amount of HIV virus in the blood (<i>true</i>)	40 (128)	39.7 (85)	40.6 (43)	.441
8. If an HIV+ person has an "undetectable" amount or "less than detectable level" of virus, it means that person is no longer able to infect someone else	37.2 (119)	39.7 (85)	32.1 (34)	.092
9. Sometimes lab results say that a person's viral load is "undetectable" or "less than detectable level". This means that there is no virus left	40 (128)	42.5 (91)	34.9 (37)	.095
10. An elevated viral load over time will lead to a decline in CD4 count (<i>true</i>)	53.8 (172)	53.7 (115)	53.8 (57)	.498
11. Taking antiretroviral therapy exactly as prescribed is likely to reduce viral load (<i>true</i>)	75.6 (242)	74.3 (159)	78.3 (83)	.216
12. Taking antiretroviral therapy exactly as prescribed is likely to increase CD4 count (<i>true</i>)	74.4 (238)	74.8 (160)	73.6 (78)	.410

Note.

^aTrue indicated the question is correct as stated;

* Significant p value comparing number of ART-Naïve and PMTCT patients; ART = antiretroviral therapy; PMTCT = prevention of mother to child transmission.

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Table 4

Between Group Comparison and Total Group Scores on the HIV Insight and Beliefs Scale Individual Items

Question	Total (N = 320) Total % Accurate (n)	ART-Naïve (n = 214) Total % Accurate (n)	PMTCT (n = 106) Total % Accurate (n)	p
HIV Insight and Beliefs Scale				
I have HIV infection	99.4 (318)	99.5 (213)	99.1 (105)	.306
I know how I became infected ^a	40.8 (130)	39.4 (84)	43.4 (46)	.219
HIV is an infection by a virus/germ ^a	96.6 (309)	95.3 (204)	99.1 (105)	.134
HIV is not caused by bewitchment or curse ^a	82.4 (263)	80.8 (172)	85.8 (91)	.206
HIV cannot be treated with medicines from a clinic ^a	36.7 (117)	33.6 (72)	42.9 (45)	.142
HIV cannot be treated by religion or prayer ^a	93.4 (298)	91.6 (196)	97.1 (102)	.048*
HIV cannot be treated by traditional medicine	77.7 (248)	76.6 (164)	80 (84)	.389
I would take medicine for HIV even if I had received prayer or traditional medicine for it ^a	90.3 (287)	90.1 (192)	90.5 (95)	1.000

Note.

^aFischer's Exact Test used instead of Chi-square;* Significant *p* value comparing number of ART-Naïve and PMTCT patients; ART = antiretroviral therapy; PMTCT = prevention of mother to child transmission.