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Medication belief, locus of control, and adherence among patients on highly active anti retro viral therapy in Lagos, Nigeria

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Anti-retro viral therapy (ART) is a lifelong treatment and its effectiveness depends critically both on the efficacy of the antiretroviral drugs against the virus and achieving a very high level of adherence (> 95%) to the medications. This study evaluated the relationship between medication beliefs, locus of control and adherence to ART among people living with HIV/AIDS (PLWHA) in Lagos. A cross-sectional descriptive study was conducted on 302 HIV/AIDS clients receiving Highly Active Anti-Retroviral Therapy in the outpatient ART clinics of the 3 selected public health facilities in Lagos State. Only respondents confirmed and diagnosed to be HIV positive and had met the eligibility criteria for initiating ART, and were 18 years and above on Highly Active Anti-Retroviral Therapy (HAART) for not less than a year. A total of 302 HIV positive persons on HAART completed the study. They were mostly females (n=202; 66.9%) with a mean age of 39 ± 10 years. About a third (30%; n=90) of respondents were adjudged non-adherent. Those who were adjudged adherent were significantly younger than the non-adherents (P=0.001). However, there was no significant difference in the mean score for medication beliefs (Concern or Necessity) and locus of control (Internal, Powerful Others or Chance) between those who were adjudged adherent or non-adherent. There was no direct relationship observed between the locus of control, medication beliefs and adherence to medication among patients on HAART in Lagos, Nigeria. Interventions targeting these socio-cognitive parameters may not yield a further increase in adherence.

Key words: Locus of control, medication belief, adherence, highly active anti-retroviral therapy (HAART), HIV/AIDS.

INTRODUCTION

The introduction of Highly Active Anti Retroviral Therapy (HAART) has transformed the treatment of HIV infection by improving the clinical course of the disease and substantially reducing HIV/AIDS associated morbidity.

Early optimism concerning the benefits of these medications has been tempered, however, by evidence that even modest or occasional non-adherence can greatly diminish the benefits of treatment and lead to

serious personal and public health consequences. Research has demonstrated that suboptimal adherence (that is, taking less than 90 to 95% of prescribed doses) is associated with increased risk of adverse virologic and clinical outcomes, including increased viral replication and the development of drug-resistant HIV strains as well as a host of clinically significant health-related setbacks (Barclay et al., 2007). Medication non-adherence, however, continues to be a major challenge to and set-back for the success of retro-viral therapy (Chesney, 2000).

Non-adherence, especially in HIV pharmacotherapy, may result in unnecessary health costs, investigations, and changes in treatment, morbidity and mortality (World Health Organization, 2003). Patients' beliefs about treatment influence treatment engagement and adherence in most clinical treatment settings including during HIV pharmacotherapy (Adefolalu et al., 2014). This is driven mainly by personal beliefs about medications and mediated through the Necessity-Concerns Framework. This framework postulates that medication adherence is influenced by implicit judgments of personal need for the treatment (necessity beliefs) and concerns about the potential adverse consequences of taking it (Horne et al., 2014). The Necessity-Concerns Framework identified individual's beliefs about their medication as playing a key role in adherence, and UK Clinical Adherence Guidelines recommend eliciting and incorporating individual's perceptions of their medication within the consultation (Thorneloe et al., 2017).

Locus of control (LOC) is a personality construct that can influence health behavior including modulating perception of necessity of and concerns about medications. Locus of control influences behavior by dictating the reaction to events and circumstances based on the social cognition of the individual. Rotter (1954) identified an inclination towards internal or external loci of control among persons. Internal locus suggests a perception of outcomes of events and actions being dependent on personal choices, whereas external locus of control suggests a perception that the outcome of events are as a result of external influence beyond their personal control. Locus of control is, however, on a continuum on which people are either internally or externally focused (Rotter, 1960). Locus of control further describes the degree to which individuals perceive that outcomes result from their own behaviors, or from forces that are external to themselves. This produces a continuum with external control at one end and internal control at the other; people who develop an internal locus of control believe that they are responsible for their own success. Those with an external locus of control believe that external forces, like luck, determine their outcomes (Darshani, 2014).

Individuals with an internal LOC believe their reinforcements are contingent on their own behavior, capacities, and attributes. External LOC individuals believe their reinforcements are under the control of powerful others, luck, or fate (Darshani, 2014). Externally-oriented individuals believe that illness is caused by something or someone elsewhere, while internally-oriented individuals believe that illness is caused by their own unhealthy attitudes and actions (Omeje and Nebo, 2011).

Very few studies, globally, have examined the relationship between locus of control and treatment adherence among patients living with HIV. Dearth of such data has also been observed in Nigeria. Yet, available evidence suggests that socio-cognitive factors such as medication beliefs and locus of control can influence adherence to medication use (Obadiora, 2016). In the context of HAART therapy, non-adherence has grave implications for personal health and quality of life as well as broader public health. Therefore, this study evaluated the relationship between medication beliefs, locus of control and adherence to ART among people living with HIV/AIDS (PLWHA) in Lagos.

METHODS

Setting

This study was conducted in Lagos State, located in South-Western Nigeria. As at December 2015, there were 40 ART treatment sites in the state (33 Public and 7 Privates) with an estimated number of PLWHIV in the state put at 217,569 by UNAID.

Participants

A cross sectional descriptive study was conducted on a sample of 302 HIV/AIDS clients receiving Highly Active Anti-Retroviral Therapy in the outpatient ART clinics of the 3 selected public-health facilities in the state. Only respondents confirmed and diagnosed to be HIV positive and had met the eligibility criteria for initiating ART, and were 18 years and above on HAART for not less than a year by December 2014, and had consented to participate in the study were included. Clients with history of psychiatric disorders and those who have missed or stopped ART on medical ground were excluded from the study.

Sampling

A multi-stage sampling method was adopted for the selection of respondents. One rural and one urban Local Government Areas(LGA) were selected by balloting from the 20 official LGAs in the state, and then 3 facilities were selected from the 6 facilities in the selected LGAs by balloting and finally the selection of clients which was conducted using systematic sampling technique.

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Measurements

Adherence

Methods used to measure adherence include subjective ones such as provider and patient reports of adherence, use of standardized patient-administered questionnaires (General and Specific), while objective methods include counting of remaining dosage units, electronic monitoring device (Medication Event Monitoring System, MEMS) and the use of pharmacy prescription records (WHO, 2015). No single method is considered optimal and feasible combinations are expected to provide more accurate information about adherence (WHO, 2015). Nigeria, pharmacy records may be inaccurate and misleading as patients patronize several pharmacies, MEMS would be financially unfeasible and so standardized patient-administered questionnaires are considered the most appropriate in these circumstances.

The primary outcome measure of adherence to HAART was determined in this study using a modified version of the six items, self-reported Morisky Medication Adherence Report Scale with Yes/No responses. Each positive response attracted one point while negative responses attracted zero. A total score less than 75% (4.5/6) was regarded as being non-adherent (Charurat et al., 2010; Najjar et al., 2015). The Morisky scale has been used across many chronic diseases, including HIV/AIDS, as a self-reported measure of adherence to medications and has demonstrated good reliability and predictive validity (Barclay et al., 2007; World Health Organization, 2003; Horne et al., 2013).

Medication beliefs

Medication beliefs were assessed using the nine items of greatest relevance to HAART medication adapted from the beliefs about medicines questionnaire (Cronbach alpha: necessity = 0.74, concerns = 0.80) (Thorneloe et al., 2017). Three of the questions were from the 'necessity' of using HAART medications domain (patients belief about the importance of using a medicine) and five were from the 'concerns' about medications domain (worries about side-effects, interference with normal life, etc). In computing the medication belief scores, positive responses were scored 'one' while negative responses were scored zero. The higher the score in each domain, the higher the belief of respondents in respects of necessity for the medication or concerns about the medications.

Locus of control

Perception of locus of control of participants was measured using the Levenson's Multiple Dimension Locus of Control (LMDLC) Scale (Levenson, 1981). The LMDLC can be used to approximate an individual's generalized expectations of locus of control over everyday life situations. It has scales which can assess both Internal and External locus of control. The external locus of control scales are further divided into Chance and Powerful Others subscales. The Levenson's scale and its adaptations continue to show evidence of good reliability and validity in general populations (Kourmousi et al., 2015).

Ethical considerations

Ethical clearance to conduct the study was granted by the State AIDS Control Agency and the Lagos State University College of Medicine. Written informed consent was taken from all the participating respondents.

Data analysis

Data analysis was performed using Epi Info Software (2008 version 3.4.1) Descriptive statistics in terms of frequencies and means were used to describe socio-demographic variables, medication beliefs, and medication adherence. Fisher's exact test or Pearson's Chi Square (χ^2) test of statistical significance were conducted to assess statistical significant association between socio-demographic variables, medication adherence and belief, as well as locus of control. Furthermore, correlation studies were used to further test for associations between general locus of control and medication beliefs/adherence. Level of significance for all tests was set at p-value <0.05.

RESULTS

A total of 302 HIV positive persons on HAART completed the study. They were mostly females (n=202; 66.9%) with a mean age of 39 ± 10 years. The majority of the respondents had at least secondary school education (80.4%), while about 22% of them had tertiary education. Other aspects of the socio-demographic characteristics are shown in Table 1. Regarding adherence to medication, about a third (30%; n=90) of respondents were adjudged non-adherent (Table 2). Table 2 further shows that the most common nature of non-adherence reported is forgetting to take medication (28.2%; n=85) followed by deliberate alteration of dose (20.9%; n=63). Other common nature of non-adherence to HAART among respondents is shown in Table 2. On medication beliefs, the majority (85.8%; n=259) felt that they would still become very sick despite taking their HIV medications while 80.5% (n=243) of respondents had concerns about the cost of the HAART medications (Table 3). However, 88.1% (n=266) go on to report that taking HIV medications can improve their health and prolong their lives. Other forms of medication beliefs are as shown in Table 3.

Except for the observation that the mean age of those who were adjudged adherent was significantly younger than the non-adherents (P=0.001), there was no significant difference in the mean score for medication beliefs (Concern or Necessity) as well as locus of control scales (Chance, Powerful Others, or Internal) between those who were adjudged adherent or non-adherent (Table 4).

DISCUSSION

The present study shows that about 70% of respondents reported adherence to medication. This is very much higher than what has been reported in similar studies conducted in Nigeria. For instance, in a systematic review by Monjok et al. (2010) most of the studies from Nigeria which used self-reports (as used in the present study) to assess medication adherence reported rates that ranged from 44 to 65% among attendees of general HIV clinics in Nigeria. Since most of the studies included in the

Table 1. Socio-demographic characteristics of respondents.

Variable		Frequency (%)
Sex	Male	100 (33.11)
	Female	202 (66.89)
	Single	93(30.79)
	Married	167 (55.30)
Marital status	Separated	12 (3.97)
	Divorced	5 (1.66)
	Widow	25 (8.28)
	Mean ± SD	39.05 ± 10.42
	<20	2 (0.66)
Age	20-50	255 (84.44)
	>50	45 (14.90)
	Professionals	17 (5.63)
	Highly skilled	50 (16.56)
Occupation*	Semi-skilled	80 (26.49)
	Manual	107 (35.43)
	Unskilled	48 (15.89)
	Primary	44 (14.57)
	Secondary	178 (58.94)
Education	Tertiary	65 (21.52)
	Informal	6 (1.99)
	None	9 (2.98)

Table 2. Adherence to HAART among respondents.

Adherence status		302 (100%)
	I forget to take my ARVs	85 (28.15)
	I altered the dose of my ARVs	63 (20.86)
Drug adherent	I stop taking my ARVs for a while	60 (19.87)
	I decided to miss out a dose	55 (18.21)
	I take less than dose prescribed	53 (17.55)
	Did you take your drug yesterday	46 (15.23)
Overall adherence	Adherent	212 (70.0)
	Non-Adherent	90 (30.0)

systematic review were mostly conducted about a decade ago, passage of time may have improved medication adherence among HIV patients. Most of the factors which have been reported as militating against medication adherence among HIV patients in Nigeria are modifiable and may have improved over time. These factors include cost of therapy, medication side effects, non-availability of ARV drugs, and the stigma of taking the drug (Kourmousi et al., 2015). Improved drug formulation, increased access to drugs, and stigma reduction strategies may have yielded desired impact on medication adherence. A more recent study conducted same catchment area with the present study has also recorded self-reported adherence rate as high as 78% (Kasumu and Balogun, 2014).

Forgetting to take the medications and skipping a dose (ostensibly to avoid side effects) is the leading form of non-adherence in the present study which is consistent with results from other parts of Africa (Kasumu and Balogun, 2014; Byakika-Tusiime et al., 2005). Although a

Table 3. Medication belief of respondents.

Medication belief	No (%)	Yes (%)
Necessity		
Taking HIV medications as prescribed can improve my health and prolong my life	36 (11.9)	266 (88.1)
Taking HIV medications exactly as prescribed decreases the chances of my illness getting worse	130 (43.0)	172 (57.0)
Taking my HIV medications is worth the hassle	180 (59.6)	122 (40.4)
HIV medications will work more effectively if I take them only when I am feeling bad	71 (23.5)	231 (76.5)
Concerns		
If I take my HIV medications as prescribed, I will still become very sick	43 (14.2)	259 (85.8)
Dealing with the side effects of HIV medications is stressful	158 (52.3)	144 (47.7)
Taking HIV medications interferes a great deal with my normal activities	170 (56.3)	132 (43.7)
It is difficult to follow doctors' instructions on HIV medications	103 (34.1)	199 (65.9)
The HIV medications that I'm taking are too expensive for me	59 (19.5)	243 (80.5)

Table 4. Medication belief, locus of control and adherence to HAART among respondents.

Parameter	Total	Adherence		Statistics (t)	P value
		Non-Adherent	Adherent		
Medication belief [specific]					
Concern (Mean ± SD)	2.4 ± 1.1	2.5 ± 1.1	2.3 ± 1.1	1.1	0.292
Necessity (Mean ± SD)	3.5 ± 1.2	3.6 ± 1.1	3.4 ± 1.3	1.5	0.145
Locus of control					
Internal (Mean ±SD)	35.6 ± 8.6	35.4 ± 8.5	35.6 ± 8.7	0.2	0.825
Powerful Others (Mean ±SD)	22.1 ± 13.7	21.9 ± 12.5	22.2 ± 14.2	0.2	0.857
Chance (Mean ±SD)	26.6 ± 9.6	27.4 ± 9.2	26.2 ± 9.7	1.0	0.337

significant proportion of respondents hold a few erroneous beliefs about the medications, something that has been reported in other studies in parts of Africa (Mthembu and Van Wyk, 2014), the overall mean score on medication beliefs among respondents was largely positive. Overall, however, the mean score on medication belief was not significantly associated with medication adherence. The implication is that, even when they may hold certain negative beliefs about the medications, respondents were still as adherent as those who held more positive beliefs. This finding is counter-intuitive as one would have expected that holding a negative notion about medication should translate to poor adherence. Furthermore, literature has not shown consistent relationship between medication beliefs and HIV medication adherence, and where it does, the effect size has been small or medium at best (Langebeek et al., 2014). Being younger was significantly associated with better adherence in the present study. This may have to do with younger persons being better motivated.

Consistent with similar research among HIV-positive patients receiving anti-retroviral drugs (Lynam et al., 2009), the present study found no association or correlation between locus of control and anti-retroviral medication adherence. There has not been robust evidence to suggest that locus of control (general or specific) influences adherence to medication significantly. Granted that internal locus of control has been shown to be associated with medication adherence in some chronic medical conditions such as hypertension (Hong et al., 2006) and depression (Voils et al., 2005), the evidence has not been in any way consistent (McDonald-Miszczak et al., 2000). However, other socio-cognitive or motivational factors, which are similar to the locus-of-control construct, have been found to influence medication adherence. For instance, Williams et al. (2004) showed that autonomous self-regulation, a similar but more volition-mediating concept than locus of control, is a good predictor of adherence to medication among diabetic patients. Similarly, Lynam et al. (2009) reported that self-efficacy, another closely related concept, was a better predictor of medication adherence among patients living with HIV than locus of control. In fact, at least one recent systematic review reported self-efficacy as the single most important predictor of medication adherence among patients on combination anti-retroviral therapy

(Langebeek et al., 2014). The current thinking, therefore, is that while locus of control may not have a direct influence on medication adherence, it may nonetheless influence other closely related constructs such as self-regulation and self-efficacy, which in turn influence medication adherence (Lynam et al., 2009). This theory is however yet to be fully explored.

A key limitation of the present study is that adherence was measured using self-reports. So there is a possibility of false reports by patients, purposefully or accidentally. Also, we juxtaposed the locus of control of respondents towards HIV from their self-reported general locus of control. General locus of control assesses the general world view and attitude to life among respondents and not their specific locus of control in relation to HIV. A HIV-specific locus of control (if there had been any such instrument) or a health-related locus of control may have yielded a more specific and different result.

There is no direct relationship between the locus of control, medication beliefs and adherence to medication among patients on HAART in Lagos, Nigeria. Other than other general interventions to improve adherence, especially among older persons, interventions focusing on medication beliefs may not lead to further improvement in medication adherence among this particular population.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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REFERENCES

Adefolalu A, Nkosi Z, Olorunju S, Masemola P (2014). Self-efficacy, medication beliefs and adherence to antiretroviral therapy by patients attending a health facility in Pretoria. South African Family Practice 56(5):281-285.

Barclay TR, Hinkin CH, Castellon SA, Mason KI, Reinhard MJ, Marion SD, Levine AJ, Durvasula RS (2007). Age-Associated Predictors of Medication Adherence in HIV-Positive Adults Health Beliefs, Self-Efficacy, and Neurocognitive Status. Health Psychology 26(1):40-49.

Byakika-Tusiime J, Oyugi JH, Tumwikirize WA, Katabira ET, Mugyenyi PN, Bangsberg DR (2005). Adherence to HIV antiretroviral therapy in HIV+ Ugandan patients purchasing therapy. International Journal of STD and AIDS 16(1):38-41.

Charurat M, Oyegunle M, Benjamin R, Habib A, Eze E, Ele P, Ibanga I, Ajayi S, Eng M, Mondal P, Gebi U (2010). Patient retention and adherence to antiretrovirals in a large antiretroviral therapy program in Nigeria: a longitudinal analysis for risk factors. PloS One 5(5):e10584.

Chesney MA (2000). Factors affecting adherence to antiretroviral therapy. Clinical Infectious Diseases 30(Supplement_2):S171-S176.

Darshani RKND (2014). A Review of personality types and locus of control as moderators of stress and conflict management. International Journal of Scientific and Research Publications 4(2):1-8.

Hong TB, Oddone EZ, Dudley TK, Bosworth HB (2006). Medication barriers and anti-hypertensive medication adherence: the moderating role of locus of control. Psychology, Health and Medicine 11(1):20-28.

Horne R, Chapman SCE, Parham R, Freemantle N, Forbes A, Cooper V (2013). Understanding Patients' Adherence-Related Beliefs about Medicines Prescribed for Long-Term Conditions: A Meta-Analytic Review of the Necessity-Concerns Framework. PLoS One 8(12):e80633. Published online 2013

Kasumu LO, Balogun MR (2014). Knowledge and attitude towards antiretroviral therapy and adherence pattern of HIV patients in southwest Nigeria. International Journal of Infection Control 10(3):1-8 doi:10.3396/IJIC.v10i3.024.14

Kourmousi N, Xythali V, Koutras V (2015). Reliability and Validity of the Multidimensional Locus of Control IPC Scale in a Sample of 3668 Greek Educators. Social Science 4:1067-1078.

Langebeek N, Gisolf EH, Reiss P, Vervoort SC, Hafsteinsdóttir TB, Richter C, Sprangers MA, Nieuwkerk PT (2014). Predictors and correlates of adherence to combination antiretroviral therapy (ART) for chronic HIV infection: a meta-analysis. BMC Medicine 12(1):142. doi: 10.1186/PREACCEPT-1453408941291432.

Levenson H (1981). Differentiating among internality, powerful others, and chance. In: Lefcourt, H., (ed). Research with the locus of control construct. New York: Academic Press 1:15-63.

Lynam IAN, Catley D, Goggin K, Rabinowitz JL, Gerkovich MM, Williams K, Wright J, MOTIV8 (2009). Autonomous regulation and locus of control as predictors of antiretroviral medication adherence. Journal of Health Psychology 14(4):578-586.

McDonald-Miszczak L, Maki SA, Gould ON (2000). Self-reported medication adherence and health status in late adulthood: the role of beliefs. Experimental Aging Research 26(3):189-207.

Monjok E, Smesny A, Okokon IB, Mgbere O, Essien EJ (2010). Adherence to antiretroviral therapy in Nigeria: an overview of research studies and implications for policy and practice. HIV AIDS (Auckl) 2:69-76.

Mthembu TG, Van Wyk B (2014). 'Patients' knowledge and beliefs about antiretroviral treatment and factors associated with adherence', Health SA Gesondheid 19(1). http://dx.doi.org/10.4102/hsag.v19i1.718

Najjar A, Amro Y, Kitaneh I, Abu-Sharar S, Sawalha M, Jamous A, Qiq M, Makharzeh E, Laban BS, Amro W, Amro A (2015). Knowledge and adherence to medications among Palestinian geriatrics living with chronic diseases in the West Bank and East Jerusalem. PloS One 10(6):e0129240. doi:10.1371/journal.pone.0129240

Obadiora AH (2016). Comparative influence of health locus of control on medication adherence among tuberculosis and HIV-positive outpatients in Edo State , Nigeria. International Journal of Psychology and Counselling 8(3):18-27.

Omeje O, Nebo C (2011). The influence of locus control on adherence to treatment regimen among hypertensive patients. Patient Prefer Adherence 5:141-148. doi: 10.2147/PPA.S15098.

Rotter JB (1954). Social learning and clinical psychology. New York: Prentice-Hall.

Rotter JB (1960). Some implications of a social learning theory for the prediction of goal directed behavior from testing procedures. Psychological Review 67(5):301-316. doi: 10.1037/h0039601.

Thorneloe RJ, Griffiths CEM, Ashcroft DM, Cordingley L (2017). The challenges of assessing patients' medication beliefs: a qualitative study. BMC Health Services Research 17(1):119.

Voils CI, Steffens DC, Bosworth HB, Flint EP (2005). Social support and locus of control as predictors of adherence to antidepressant medication in an elderly population. The American journal of geriatric psychiatry 13(2):157-165.

Williams GC, McGregor HA, Zeldman A, Freedman ZR, Deci EL (2004). Testing a self-determination theory process model for promoting glycemic control through diabetes self-management. Health Psychology 23(1):58-66.

World Health Organization (WHO) (2015). Adherence to Long-Term Therapies: Evidence for Action [Internet].http://www.who.int/chp/knowledge/publications/adherence_report/en/

World Health Organization (WHO) (2003). Adherence to long-term therapies: evidence for action (PDF). Geneva: World Health Organisation. ISBN 92-4-154599-2.