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Religiosity and Adherence to Antiretroviral Therapy Among Patients Attending a Public Hospital-Based HIV/AIDS Clinic in Uganda

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Abstract In Uganda, the prevalence of non-adherence to antiretroviral therapy (ART) by HIV/AIDS patients remains high and sometimes this is blamed on patients' religious behavior. A descriptive design was used to examine the relationship between religiosity and ART adherence in a sample of 220 patients attending a HIV/AIDS clinic in a Ugandan public hospital. Participants who self-identified as Pentecostal and Muslim had the highest percentage of members with high religiosity scores and ART adherence. Among Muslim participants (34), 82% reported high religiosity scores and high levels of ART adherence. Of the fifty Pentecostals participants, 96% reported high religiosity scores and 80% reported high levels of ART adherence. Correlation analysis showed a significant relationship between ART adherence and religiosity ($r = 0.618$, $P \leq 0.01$). Therefore, collaboration between religious leaders and HIV/AIDS healthcare providers should be encouraged as one of the strategies for enhancing ART adherence.

Keywords Antiretroviral therapy · Adherence · Religiosity · HIV/AIDS patients · Uganda

Introduction

In Sub-Saharan Africa, HIV/AIDS continues to be a major cause of morbidity and mortality among adults and children (Tusiime et al. 2005). And this is why 70% of the 40 million people living with HIV/AIDS in the world are found in Sub-Saharan Africa (Tusiime et al. 2005).The prevalence of HIV/AIDS in some Sub-Saharan African countries is as high as 7% (UDHS 2006a, b). Government and non-governmental health agencies are

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responding to the challenge posed by HIV/AIDS using both HIV/AIDS prevention and antiretroviral therapy (ART) strategies. The double pronged approach of prevention and treatment of HIV/AIDS using ART has reduced morbidity and mortality and is slowly transforming the grim picture of HIV/AIDS from a lethal and expensive disease to a manageable chronic disease (Maisels et al. 2001; Bozzette et al. 2001; Calvarese et al. 2007). The transformation of HIV/AIDS from a lethal to a manageable chronic disease has been the main outcome of programs and interventions focusing on increasing access to ART in both rural and urban areas.

According to the World Health Organization (WHO 2006), at the end of the year 2003, it was estimated that ART coverage in Asia and Africa was below 5%. In response to this ART under-coverage, WHO and its partners implemented several programs to scale up access to ART, and the efforts have resulted in an overall treatment coverage of 11% of people living with HIV/AIDS in Africa (Boerma et al. 2006). Free ART is channeled through HIV/AIDS care programs managed by both local government agencies and non-governmental organizations (Wanyama et al. 2007; Calvarese et al. 2007). Recent statistics show that in Uganda, over 100,000 people living with HIV/AIDS are currently on ART (Wanyama et al. 2007).

However, increased access to ART has presented other challenges, which were not anticipated such as the emergence of ART-resistant HIV strains especially as a result of non-adherence (Spacek et al. 2006). A less than optimal adherence to ART regimen causes mutation of HIV into medication-resistant strains, progression of HIV infection to AIDS, and death (Tusiime et al. 2005). This new challenge is critical to the success of HIV/AIDS care and related interventions in resource poor settings because health outcomes and quality of life for patients on ART depend on adherence.

Adherence is defined as the extent to which patients follow treatment regimen as prescribed by their healthcare providers (Osterberg and Blaschke 2005). For HIV/AIDS patients who are on ART, a minimum of 95% adherence is required to attain optimal outcomes and this level of adherence is greater than the 80% required for the treatment regimens of other chronic diseases (Parsons et al. 2006; Park et al. 2008; Bangsberg et al. 2004). The dimensions considered when addressing this complex phenomenon of adherence include: type of disease, acuity and chronicity of the disease, treatment regimen, and clinician–patient relationship, patient's knowledge and beliefs about the medication, social support, stable living conditions, and keeping appointments for scheduled hospital visits (Altice and Friedland 1998; Osterberg and Blaschke 2005; Parsons et al. 2006).

Earlier literature on adherence shows that adherence cannot be predicted solely by demographic characteristics such as sex, age, education level, race, socioeconomic status, or occupation (Bartlett 2002). However, some studies show that race and gender are associated with adherence to medication and treatment (Catz et al. 2002; Berg et al. 2006). Specifically concerning ART, the factors that have been found to be associated with adherence to this type of treatment include economic, biological, psychological, and clinical factors (Altice and Friedland 1998; Herrmann et al. 2008). Patient factors such as forgetfulness, other priorities, deliberate decisions to omit doses, lack of information, and emotions are commonly cited as barriers to adherence (Herrmann et al. 2008).

The economic and clinical factors have received the most attention in terms of interventional programs and research focusing on enhancing ART adherence. The economic and clinical factors include issues such as healthcare provider-associated barriers like complex regimens, failure to explain the benefits and side effects of medications, failure to consider patient's lifestyle, cost of medication, and poor therapeutic relationships with

patients (Tusiime et al. 2005). But even after interventions studies and programs, the prevalence of non-adherence in adults with HIV/AIDS is still common in Uganda and other Sub-Saharan African countries and has been reported to fluctuate between sub-optimal levels ranging from 33 to 88% (Talisuna et al. 2005; Friedland and Williams 1999; Asiimwe 2006). And experiences from clinical practice in Uganda show that social–psychological factors such as religiosity and related interventions have been mostly neglected when addressing adherence among HIV/AIDS patients.

In Uganda, religion is one of the most upheld values and it has been noted that in some HIV/AIDS patients' beliefs in divine healing contributes to poor adherence to ART treatment (Wanyama et al. 2007). And even studies conducted in developed countries such as United States of America show that religiosity has an effect on ART adherence (Parsons et al. 2006). In most societies, members of different religious denominations learn from and follow teachings of their religious leaders and scriptures. It is, therefore, not surprising that HIV/AIDS patients who are members of these religions are influenced by the teachings, opinions, ideas, and suggestions of religious leaders on matters related to health, illness, and treatment (Zou et al. 2009; Asiimwe et al. 2003). Indeed, religion can influence people's health, both positively and negatively (Pargament et al. 1998). On the positive aspects, research has shown that religion and religious behaviors help people to cope with chronic diseases (Koenig et al. 2001), while on the negative side, it has been associated with beliefs in false spiritual healing leading to poor adherence to treatment (Wanyama et al. 2007).

Therefore, we hypothesize that when faced with economic, healthcare provider or individual problems concerning HIV/AIDS or ART, many HIV/AIDS patients in Uganda seek guidance, comfort, and divine interventions from their religious leaders, literature, teachings, and prayers. This hypothesis is supported by other studies, which have reported that individuals with chronic ailments have a tendency of resorting to religious beliefs and practices as a means of coping (Koenig et al. 2001). Religious behavior serves as a source of social support and helps to bring peers and family together (Woods et al. 1999). But as mentioned elsewhere, sometimes religious behavior can have a negative influence on some aspects of health.

In Uganda, a highly religious country, some HIV/AIDS patients discontinue ART due to beliefs in spiritual or religious healing and they proclaim that they were physically cured of HIV/AIDS after being prayed for by their religious leaders (Wanyama et al. 2007). This has attracted the attention of the public, and as a result, some religious denominations and their teachings have been talked of in the local media as promoting stigmatization by providing a platform for intolerance towards people with HIV/AIDS and those in high-risk groups such as prostitutes. Therefore, the purpose of this pilot study was to examine the relationship between religiosity and adherence to ART among patients attending a HIV/AIDS clinic based in a public hospital.

Methods

The study used a descriptive design to collect data from a sample of 220 HIV/AIDS patients attending the HIV/AIDS clinic at Mulago Hospital in Kampala, Uganda. The HIV/AIDS clinic is part of Mulago Hospital, Uganda's national hospital. The hospital is a public healthcare facility and provides integrated HIV/AIDS care with services such counseling, testing, health education, HIV/AIDS treatment, occupation therapy, and others, all at no cost to the patients. After the study was approved by Makerere University, Department of

Nursing and Mulago Hospital Research Committee, the investigators embarked on the process of data collection. The first and then every fifth patient who came to attend the clinic on data collection days received a consent form with a cover letter explaining the purpose, benefits, and risks of the study. After reading the cover letter, some agreed to participate in the study while others declined. Of the 460 participants contacted during the data collection days, a total of 220 persons agreed and consented to participate in the study. Data were collected over a period of 28 days (equivalent to 4 weeks). The participants included in this study had to be individuals who were 18 years and above (or emancipated minors) diagnosed with HIV/AIDS and taking ART at the time of the study. The participants had to have started the ART at least 6 months ago at the time of data collection. Individuals who were too sick, unable to respond to questions, or unable to speak or understand English and Luganda (the two languages used during care provision in the hospital) were excluded from the study. The most common reasons cited by the participants who declined to participate were as follows: "I have participated in several studies; I don't have time, and I am not feeling well today."

The HIV/AIDS clinic at the national referral hospital was a suitable setting because it receives patients from the national capital (Kampala) and those coming from and referred from other parts of the country. This ensured a sample with diverse religious behaviors and practices. Prior studies focusing on religiosity and health outcomes have recruited subjects mostly from community-based and hospital-based clinics (Woods et al. 1999; Yi et al. 2006; Newlin et al. 2008).

Measures

The variables measured in this study were self-rated health in past 6 months, ART adherence and religiosity. Self-rated health (SAH) was measured by a single item; "How would rate your health in the past 6 months?" Participants' responses were categorized on a four-point Likert scale as follows: poor (1), fair (2), good (3), and excellent (4). Religiosity was conceptualized broadly as the various aspects of religion and religious behaviors that may affect health behavior. Religiosity was measured using the Behavioral Religiosity Scale (BRS), which consists of four items with individual reliability scores ranging from Cronbanch's alpha .71–.83 (Adamson et al. 2000). The general reliability of the BRS has been reported at 0.76. The four items are as follows: "How often do you visit a religious place to attend a religious service", "How often do you pray", "How often do you read a religious book or magazine or other piece of religious literature", and "How often do you watch religious programs on television or listens to religious programs radio". The possible responses to each question are scored on a scale ranging from 1 to 10. The maximum score that a participant could obtain is 40 (high religiosity), while the least is 4 (low religiosity). When the items of the BRS were analyzed by the investigators, they were found to be cultural neutral in the Ugandan context and, therefore, were used without any modifications.

Adherence was conceptualized as the extent to which patients follow and take their medication as prescribed and recommended by the healthcare provider (Osterberg and Blaschke 2005). Adherence was measured using a visual analog scale. The visual analog scale as measurement of ART adherence was the most feasible strategy in a resource poor setting and considering the outpatient nature of the HIV/AIDS clinic at the national hospital. The visual analogue comprised of a linear 10-cm scale (marked only at the "0 cm" and "10 cm" points) on which participants were required to make a mark indicating their

level of adherence to ART medications in the past 4 weeks. The measurement in centimeters from the zero point up to the mark made by the participant represented the level of adherence. Simple measures of adherence such as keeping appointments, visual analog, and other self-report methods are very critical in ensuring proper patient assessment and treatment monitoring (Parsons et al. 2006; Fairley et al. 2005). Visual analogs are a reliable measure of adherence because a significant correlation has been found between adherence measured using the visual analogue and unannounced pill counts ($r = 0.76$) (Giordano et al. 2004).

Results

Description of the Sample

We interviewed a randomly selected sample of 220 HIV/AIDS patients, and most of them were female (73%), widowed (38%), and in the age range of 15–45 years (84%). Other participants reported their marital status as single or separated (29%) and married or cohabiting (33%). The mean age for the sample was 26.3 years (SD = 8.21), and majority had been on ART treatment for a period ranging from 12 to 24 months (89%). All participants reported having children, and majority (75%) reported having only one child. In terms of religion, most participants self-identified as Christians (80%) and some as Muslims (16%) and others (4%). Those who categorized themselves as Christians belonged to Protestant (29%), Catholic (28%), and Pentecostal (23%) denominations. The other denominations (4%) were Jehovah's Witness, African Traditionalists, and Seventh Day Adventists. The category of others is the same used by the official national census in Uganda because these denominations are mostly not reported or present in the country and combined together are only reported by 2–3% of the population in the country.

Ninety-five percent (95%) of the participants had some kind of formal education, and 5% reported only getting informal education. Of those who reported having formal education, most had primary school level education (56%). Participants were mostly employed in the informal sector (68%) as hairdressers, small-scale vendors, casual laborers, and others. Only 12% were employed in the formal sector with jobs such as primary school teacher and high school teacher, while the remainder reported their employment status as retired (15%) and homemaker (5%).

Adherence to ART

As shown in Table 1, majority of participants (66%) reported optimal ART adherence. However, the mean ART adherence score for the sample was sub-optimal ($M = 8.1$, SD = 1.6). Participants attributed lack of optimal adherence to reasons such as forgetfulness (68%), side effects of ART (45%), and inadequate financial resources to buy recommended food while on ART (40%) and long distance to the healthcare facility (28%). Most participants in this study also perceived their health as either excellent or good (52%).

Religious Denomination and Adherence to ART

Results presented in Table 2 show that the biggest percentage of participants with high ART adherence belonged to the Muslim (82%) and Pentecostal denominations (80%). The

Table 1 Adherence to ART, self-rated health, and reasons for lack of optimal adherence

Variable	Frequency ($N = 220$)/percentage
Level of adherence ($M = 8.1$, SD = 1.6)	
10 cm (=100% adherence)	145 (66%)
9 cm (=90% adherence)	20 (9%)
0–8 cm (0–80% adherence)	55 (25%)
Self-rated health in past 6 months	
Excellent	48 (21.8%)
Good	66 (30%)
Fair	82 (37.3%)
Poor	24 (11%)
Reason for lack of optimal adherence (multiple response)	
Forgetfulness	150 (68.2%)
ART medication side effects	99 (45%)
Inadequate financial resources to buy food	88 (40%)
Long distance to the healthcare facility	62 (28.2%)
Fear to take medications at work and others	27 (12. 3%)

Table 2 Distribution of participants by religious denomination and level of adherence

Religious denomination ($N = 220$)	*n*	Participants with lower level of adherence (0–80%)	Participants with high level of adherence (90–100%)
Muslim	34	6 (18%)	28 (82%)
Protestant	64	18 (28%)	46 (72%)
Catholic	62	14 (23%)	48 (77%)
Pentecostal	50	10 (20%)	40 (80%)
Others	10	6 (60%)	4 (40%)

highest percentages with low ART adherence were participants belonging to the Protestant (28%) and other denominations (60%)—(i.e. Jehovah Witness, Traditionalist and Adventists).

Religiosity of HIV/AIDS Patients

Figure 1 shows that most participants (41%) reported behavioral religiosity scores ranging from 32 to 37, and the mean religiosity score for the sample was 30.31 (SD = 1.21). The participants were grouped into categories of high religiosity (scores ranging from 26 to 40) and low religiosity (scores ranging from 1 to 25). Results presented in Table 3 show that more than 60% of the participants in each denomination reported high religiosity. Participants belonging to the Pentecostal (96%) and Muslim (82%) denominations were more likely to report high religiosity.

Relationship Between ART Adherence ART and Religiosity

We calculated Pearson's product moment correlations (r) between religiosity (scores on the behavioral religiosity scale), ART adherence (Visual analog score), age and self-rated

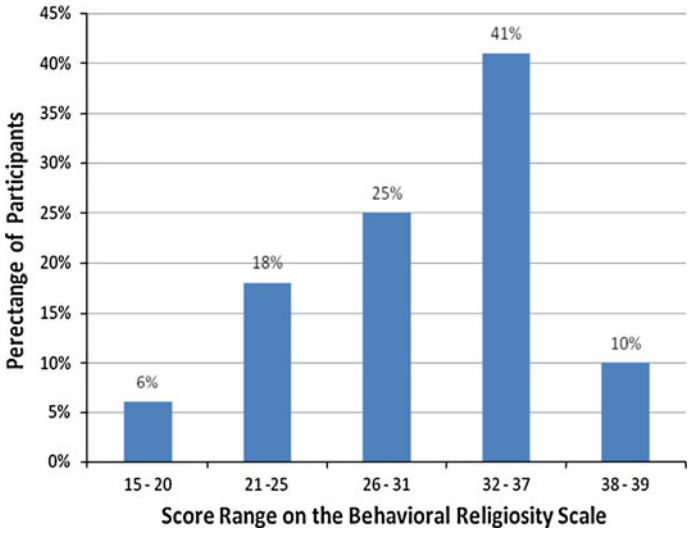

Fig. 1 Bar graph showing distribution of participants by religiosity scores ($N = 220$)

Table 3 Distribution of respondents by religious denomination and degree of religiosity

Religious denomination ($N = 220$)	n	Low religiosity (BRS score = 1–25) Frequency (percentage)	High religiosity (BRS score = 26–40) Frequency (percentage)
Muslim	34	6 (18%)	28 (82%)
Protestant	64	16 (25%)	48 (75%)
Catholic	62	20 (32%)	42 (68%)
Pentecostal	50	2 (4%)	48 (96%)
Others	10	2 (20%)	8 (80%)

health for the whole sample as shown in Table 4. Results show a significant positive correlation between religiosity and ART adherence ($r = 0.618$, $P \leq 0.01$), indicating that in this sample as religiosity increased, adherence to ART also increased and vice versa. Religiosity was also significantly and positively associated with age ($r = 0.208$, $P \leq 0.01$). The results in Table 4 also show that apart from religious behavior and age, the other factor that affects adherence to ART is self-rated health ($r = 0.163$, $P \leq 0.05$). Therefore, HIV/AIDS patients are more likely to have increased ART adherence if they engage in more religious behavior, perceive their health as improving and as they grow older.

Religious Experiences Related to HIV/AIDS

The participants were asked to mention some specific experiences related to their HIV infection and religious settings or encounters. Results presented in Table 5 show that generally the clergy from the different religious denominations talk about HIV/AIDS during prayers and other encounters with their congregation. Additionally, most participants believe that prayers can cure HIV/AIDS if combined with something else.

Table 4 Correlation (Pearson's product moment correlation) between religiosity, ART adherence, age of participants, and self-rated health

Variable ($N = 220$)	REL	ADH	AGE	SRH
Religiosity (REL)	1			
Adherence (ADH)	.618**	1		
Age in years (AGE)	.208**	.233**	1	
Self-rated health in past 6 months (SRH)	−.125	.163*	−.013	1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 5 Experiences related to religion and HIV/AIDS treatment

Experience	Response	Muslim ($n = 34$)	Protestant ($n = 64$)	Catholic ($n = 62$)	Pentecostal ($n = 50$)	Others ($n = 10$)
Clergy talks about HIV/AIDS	Often	22 (65%)	46(72%)	52 (84%)	38 (76%)	8 (80%)
	Not often	12 (35%)	18 (28%)	10 (16%)	12 (24%)	2 (20%)
Prayers by clergy can cure HIV/AIDS	No	32 (94%)	40 (63%)	48 (77%)	20 (40%)	10 (100%)
	Yes	2 (6%)	24 (37%)	14 (23%)	30 (60%)	0 (0%)
Have heard testimonies of person cured of HIV/AIDS	No	34 (100%)	36 (56%)	52 (84%)	10 (20%)	10 (100%)
	Yes	0 (0%)	28 (44%)	10 (16%)	40 (80%)	0 (0%)
Prayers only can cure HIV/AIDS	Disagree	32 (94%)	54 (84%)	52 (84%)	34 (68%)	10 (100%)
	Agree	2 (6%)	10 (16%)	10 (16%)	16 (32%)	0 (0%)
Got prayed for to get cured of HIV/AIDS	No	34 (100%)	42 (66%)	42 (68%)	8 (16%)	10 (100%)
	Yes	0 (0%)	22 (34%)	20 (32%)	42 (84%)	0 (0%)

Discussion

This study examined religiosity and ART adherence among HIV/AIDS patients. We concentrated on the differences in levels of adherences and religiosity among patients who belonged to different religious denominations. Furthermore, we analyzed the specific relationship between religiosity and ART adherence for the whole sample of HIV/AIDS patients who participated in the study. We found that majority of HIV/AIDS patients (66%) had 100% adherence to ART (optimal adherence) and had religiosity scores above 26 (high behavioral religiosity)—(76%). We speculate that living with an incurable and fatal disease such as HIV/AIDS increases religious behavior in those people who have religious values. Similar observations have also been made among patients with other serious illnesses (Koenig et al. 2001). HIV/AIDS patients perceive religious behaviors to be helpful in preserving health, providing strength, control, and empowerment and reducing self-blame (Siegel and Schrimshaw 2002). Religion and religious behavior also provide HIV/AIDS patients with a readily accessible source of social support, means of coping, solace (Koenig et al. 2001; Woods et al. 1999), and a belief that physical healing is possible (Wanyama et al. 2007). Considering the positive benefits of religiosity and high religiosity scores in this study, it is not surprising that majority of the participants (52%) perceived their health as good or excellent.

At this point, it should be noted that although the majority of participants in this study reported 100% adherence and good or excellent self-rated health, a third of the sample

(34%) reported adherence levels which were below the optimal 100%. The number of HIV/AIDS patients with less than optimal adherence (34%) is worrying because this implies that they are not taking full doses of their ART medications as prescribed by healthcare providers and are at risk of developing viral resistance, treatment failure, and AIDS.

With regard to religious denominations, religiosity, and adherence, we found that participants who self-identified as belonging to the Pentecostal and Muslim denomination had the highest religiosity and ART adherence levels. In Uganda, people who belong to the Pentecostal and Muslim denomination are encouraged by their religious leaders and teaching to pray and go to their places of worship more times in a day than other denominations such as Catholics and Protestants who only go to worship on Sunday. It is possible that increased exposure to clergies, religious teachings, and places of worship increases commitment to religion and religious behaviors (high religiosity) among Muslims and Pentecostal.

Bivariate analysis revealed a significant positive relationship between adherence to ART and religiosity. Those with higher ART adherence levels tended to report higher behavioral religiosity ($r = 0.618$, $P \leq 0.01$). Therefore, in this sample of HIV/AIDS patients, religiosity accounted for 38% ($r^2 = 0.382$) of the variance in ART adherence levels. This finding is supported by a growing body of literature from mainly studies conducted outside of Sub-Saharan Africa, which show that religion and spirituality have a positive impact on health behaviors and health outcomes. For instance, studies that sampled people living with HIV/AIDS that mostly belonged in the lower social/economic category or ethnic minority groups such as Hispanic and African Americans have also found that religious support, prayer, and spirituality improve adherence to ART (Konkle-Parker et al. 2008; Sunil and McGhee 2007). And it has been proved at the biochemical level in HIV/AIDS patients that religiosity is associated with improvement in immunity in terms of higher T-helper inducer cells (CD4)—(Woods et al. 1999). The relationship between adherence and religiosity has also been confirmed in children living with HIV/AIDS (Park and Nachman 2010) and among people suffering from other chronic diseases such as congestive heart failure (Park et al. 2008).

In this study, we have shown that HIV/AIDS patients from low social/economic status turn to religion and religious behavior as away of coping. And the increased religiosity tends to be associated with increased adherence to ART medications. Therefore, in resource poor setting such as Uganda, religiosity should be addressed as one of the potential strategies for ensuring optimal ART adherence level among HIV/AIDS patients.

Conclusions

This study directly explored the relationship between religiosity and ART adherence in a sample of Ugandan HIV/AIDS patients. Although the findings of this study are limited by a small sample size and inability to address the disease stage of the participants, they stand with others to confirm the relationship between religiosity and ART adherence and the importance of religiosity in HIV/AIDS care in resource poor settings such as Uganda. The researchers for the current study would like to recommend longitudinal studies because religiosity may change over time and studies to examine the mediators in the relationships between adherence and religiosity. Recognizing the importance and potential benefit of religiosity to HIV/AIDS care, the following considerations deserve emphasis and attention during clinical practice and interactions with people living with HIV/AIDS; Healthcare agencies and healthcare providers should collaborate with the clergy, spiritual leaders, and

other religious leaders to provide patient education that corrects myths and misconceptions about ART and HIV/AIDS; Healthcare providers should engage in clinical practices that ensure holistic and collaborative approaches that encourage religiosity and address the religious and spiritual needs of HIV/AIDS patients. Collaboration between religious leaders and healthcare providers is one of the under-utilized strategies in HIV/AIDS care despite its potential in improving critical aspects such as ART adherence.

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