

January 2015

Intersection Of Religious And Antiretroviral Experiences And Its Implications For Medication Adherence In Hiv Positive Individuals In León, Nicaragua

Kimberly Stephanie Vasquez
Yale University, kimberly.vasquez@yale.edu

Follow this and additional works at: <http://elischolar.library.yale.edu/ysphtdl>

Recommended Citation

Vasquez, Kimberly Stephanie, "Intersection Of Religious And Antiretroviral Experiences And Its Implications For Medication Adherence In Hiv Positive Individuals In León, Nicaragua" (2015). *Public Health Theses*. 1299.
<http://elischolar.library.yale.edu/ysphtdl/1299>

This Open Access Thesis is brought to you for free and open access by the School of Public Health at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Public Health Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

Intersection of Religious and Antiretroviral Experiences and Its
Implications for Medication Adherence in HIV Positive Individuals
in León, Nicaragua

Kimberly Vasquez
MPH Candidate: Social and Behavioral Sciences
April 27, 2015

Thesis Advisors: Dr. Danya Keene and Dr. John Pachankis

ACKNOWLEDGMENTS

I would like to give thanks to the following individuals for their support in the completion of this project.

- Dr. Danya Keene, Qualitative Research Advisor
- Dr. John Pachankis, Quantitative Research Advisor
- Dr. William J. Ugarte, Nicaragua Research Preceptor
- Dr. Carlos Lopez, HEODRA HIV Clinic Director
- Student Partnerships in Global Health Research Team
- The staff and patients at HEODRA for their support
- The Downs Fellowship Committee for funding this project
- Friends and family for their inspiration and encouragement.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	2
TABLE OF CONTENTS	3
ABSTRACT	4
BACKGROUND	5
METHODS	8
RESULTS	10
DISCUSSION	18
IMPLICATIONS	19
REFERENCES	20
APPENDICES	25

ABSTRACT

Worldwide, in 2012, there were about 35.3 million people living with HIV/AIDS (PLWHA).¹ Antiretroviral (ARV) significantly improved the livelihood of PLWHA through virological suppression, which has reduced HIV related mortality rates, and decreased the risk of HIV transmission through vaginal and anal sex.^{2,3} Optimal ARV adherence, around 95%, is required to maintain virological suppression.²⁹ In 2000, a review paper reported that nonadherence rates were around 50-70%.³⁰ Suboptimal adherence can lead to increased mortality, HIV transmission, and ARV resistance.^{2,3} Global suboptimal illustrates the importance of identifying barriers and facilitators to ARV adherence.⁷ Research is urgently needed to determine important barriers and facilitators that are specific to developing countries.³ It is crucial to consider the unique ways local factors shape how PLWHA experience and understand their ARV medications.

The main objective of this qualitative study was to understand the ARV medication experiences of PLWHA in León, Nicaragua. 30 semi-structured, interviews were conducted in Spanish at the Hospital Escuela Oscar Danilo Rosales Arguello (HEODRA) Hospital in León, Nicaragua. A grounded theory approach was used to analyze interview transcripts. Religion emerged as a particularly salient aspect of the ARV medication experiences of HIV positive Nicaraguans. A close examination of the intersection of ARV and religious experiences may contribute to the understanding of major issues in PLWHA's lives, which may contribute to ARV adherence. Interview data suggest that ARV medications were experienced in conflicting ways; namely as a source of life, and physical and social disruptions. Religion may reconcile this conflict by providing PLWHA with relief and resilience, which may reinforce their belief in ARVs' life inducing qualities, in spite of physical and social disruptions. This mechanism may strengthen PLWHA's commitment to their ARV medications, thus possibly facilitating ARV adherence. A notable exception emerged through religious faith and followers' stigmatization of PLWHA.

BACKGROUND

ARV Experiences are Geographically-Specific

The literature indicates that ARV experience is geographically specific; therefore there is a need to understand how local social, cultural and economic context uniquely shape adherence. Studies have identified the following barriers to ARV adherence: being female, HIV stigma, fear of HIV disclosure, food insecurity, housing security, financial insecurity, substance abuse, mental health issues, decreased quality of life, work/family responsibilities, poor physician-patient relationships, forgetfulness, suspicion of treatment, complicated regimens, not understanding treatment benefits, number of pills required, being away from medication, falling asleep, medication side effects, access to medication, and long distance from home to treatment facility.^{7-10-19, 31, 32, 35 37, 38}

There is a gap in knowledge surrounding the ways local factors shape adherence in developing, resource-poor nations. In the 2006 systematic review, only 1 of 84 studies was conducted in a developed nation (Brazil in Latin America).³¹ This study cited financial constraints and access to medications as important barriers in developing nations.³¹ In addition, a recent literature search revealed adherence studies in Costa Rica and Peru.^{27,29} Both studies identified regimen characteristics or pill management as barriers.^{27,29} Studies also show that ARV facilitators in developed nations include having a sense of self-worth, seeing the positive effects of the ARV, acceptance of HIV status, understanding the importance of adherence, reminders, and the simplicity of the ARV regimen.³¹ Research concerning facilitators in developing nations is less common.³¹

Religion and ARV Adherence

Some studies have explored the ways that religion intersects with ARV medication experiences. For instance, data demonstrate that PLWHA perceive ARVs as having originated from God. Congolese PLWHA believed that "...God provided the knowledge to make ARVs..." Nigerian PLWHA viewed ARV medication effectiveness to be dependent on Allah's dispositions.⁴² Islamic perspective dictates that Allah influences the

discovery, emergence, and provision of ARVs.⁴³ Islamic faith also encourages PLWHA to seek treatment, since all “...servants of Allah must seek treatment for diseases.”⁴³

The intersection of religious and ARV experiences has several implications for ARV adherence. One study explored ARV adherence in Ugandan PLWHA through a sample that was predominately Christian (i.e. Christian 80%, Muslim 20%, others 4%). Researchers concluded that this sample was more likely to have increased ARV adherence if they had engaged in more religious behavior.⁴⁴ Furthermore, those who self-reported as Pentecostal or Muslim had the highest percentage with high religiosity scores and ARV adherence. Similarly, a study of a predominantly Christian PLWHA in San Diego, CA found that higher annual household income and religious affiliation were predictive of higher adherence.⁴⁵ Data from this study also revealed that PLWHA who viewed their beliefs as making their lives meaningful, creating a connection to a higher form, being important to recovery, and connecting them to humanity were more likely to be adherent.⁴⁵ Participants may remain adherent because they have maintained their personal autonomy, whilst successfully using God to cope with ARV medication challenges.⁴⁵

Religion may also intersect with ARV experiences in ways that may challenge adherence. For example, PLWHA from San Diego exhibited poorer adherence if they believed that God created everything, God will not turn his back on them, and displayed regular participation in religious rituals.⁴⁵ (e.g. prayer, meditation). The religious ritual of particularly Ramadan complicates adherence, since Muslims must fast for a month, but ARVs must be taken with food. In these situations PLWHA must make a challenging choice: either listen to their religious ritual vs. adhere to treatment instructions.⁴⁷ A similar theme emerged in the qualitative, semi-structured interviews of Malawian healthcare providers. Most providers attributed religion to their patients’ nonadherence because patients stopped taking their ARVs after being prayed at in church and during fasting (Muslims).⁴⁶ Congolese PLWHA who believed their HIV was caused by witchcraft also interrupted their ARVs in favor of prayer and traditional mediations. Cultural traditions, such as spiritual healings, also caused 1.2% of a predominantly Christian, Ugandan PLWHA sample to discontinue their ARV medications.⁴⁸

Lastly, one study exploring PLWHA in Tanzania found that ARV adherence was mostly influenced by the participant's education-level and knowledge of ARVs, as opposed to religious beliefs.⁴⁹ In addition, data suggested that HIV stigma was strongly associated with religious beliefs (e.g. HIV is a punishment from or God, PLWHA have not followed the word of God).

Local Context of ARV Experiences in Nicaragua

There are several compelling reasons to study ARV adherence in Nicaragua. For instance, Nicaragua is a previously isolated nation, with a rapidly increasing HIV epidemic and strong stigmatization against PLWHA. Poverty and religion are highly salient in Nicaragua, thus having potential implications for adherence. Nonetheless, a literature review revealed there are no studies on ARV adherence in Nicaragua.

During the 1980s, Nicaragua was isolated due to a ten-year civil war and an American economic blockade. In the 1990s, the end of the war was accompanied with a rapid increase in HIV transmission.⁵ This trend has continued; cases have increased from less than 500 to 1,500.¹ This represents a 200% increase from 2001-2012. Higher estimates indicate the increase might be around 400%.¹ In 2012, Nicaragua had a HIV prevalence rate of 0.3% (9,600 people).¹ In Nicaragua HIV is mostly transmitted through sexual intercourse; 91% heterosexual transmission and 4% men who have sex with men (MSM).⁶ However, MSM transmission is unreported due to the stigmatizing social context.^{6,26} Studies indicate a high seroprevalence of 7.6% among MSM.²⁵

Reasons for increased HIV transmission include low condom use and increased migration after the war.^{4,5} Seasonal migration is common among Nicaraguans who work in nearby countries. Migrant workers, who usually engage in casual/commercial sex, often experience limited healthcare access and stigma.⁵ As a result, they might be less likely to seek HIV testing or treatment.⁵ Stigma is such a pressing issue that the Nicaraguan Government enacted Nicaraguan Law 820, which promotes, protects, and defends the human rights of PLWHA. The objective of the law is to "...guarantee the respect, protection, and defense of the human rights of the people who are affected by this illness [HIV/AIDS]."⁵⁰

Nicaragua (GDP: 10,510 Millions of \$US, in 2012³⁴) is one of the poorest Spanish speaking countries.⁵ Despite of this, the Nicaraguan government has identified ARV treatment distribution as a national priority.⁵ 72% of Nicaraguan HIV patients are currently receiving ARV.¹ This has increased the survival of Nicaraguan PLWHA.⁵ Health-system barriers still contribute to incomplete ARV coverage. These include the delay in HIV status confirmation, the high cost (100 U.S. Dollars) of viral load and CD4 testing, and the delay in delivery of results to providers.⁵

Finally, religion is very salient in Nicaragua. In 2005, data show that Nicaraguans identified with several religious denominations: Roman Catholic 58.5%, Protestant 23.3%, Jehovah's Witnesses 0.9%, other 1.6%, and none 15.7%.⁵¹ This saliency emerged throughout the qualitative interviews, which shaped the focus of this paper.

METHODS

Research Design

The main objective of this study was to understand how HIV-positive Nicaraguans experience their ARV medication regimens. This aim was addressed through an exploratory, qualitative approach. Semi-structured, in-depth interviews were conducted to explore participants' general lifestyle, living with HIV, and their perceptions, attitudes, and behaviors towards ARV medication.

Research Setting

This study was conducted at the Hospital Escuela Oscar Danilo Rosales Arguello (HEODRA) Hospital in León, Nicaragua (population: 201,100 in 2012³⁶). HEODRA is a 400-bed, public hospital that is operated by the Nicaraguan Ministry of Health.⁵² HEODRA serves as the teaching hospital for the Universidad Nacional Autónoma de Nicaragua, León (UNAN-León). Participant recruitment and interviews were conducted at HEODRA's Infectious Disease-HIV/AIDS Clinic. This clinic has a population of about 150 HIV+ patients and is staffed with infectious disease clinicians and a psychologist. The clinic also provides its HIV patients with ARVs,

which are provided by the Nicaraguan Ministry of Health and the World Fund. This study was conducted from July-August 2014.

Sampling and Recruitment

All eligible study participants were 18 years and older, HIV-positive, a patient of the HEODRA HIV Clinic, prescribed to ARV for at least three months, and had never participated in this study. All study participants gave informed consent and were able to communicate in Spanish, the official language of Nicaragua.

30 participants were recruited and fully interviewed in Spanish. Previous studies have indicated that a sample size of about 5-25 participants is sufficient to achieve thematic saturation.^{32,33} A purposive sampling strategy was used to capture sufficient diversity in the qualitative sample. Diversity was considered in various ways, such as gender, age, sexual orientation, and ARV adherence profile.³² Nonadherent patients were defined as those with a history of treatment interruption or loss to clinic follow-up.³² Please see table 1 for participant characteristics.

Patients were mainly recruited from the HEODRA HIV clinic waiting room. Clinicians and support group leaders referred potential participants as well. Most participants were recruited from another ongoing portion of this study, which used quantitative surveys and chart reviews to collect information on the ARV adherence rate and the barriers and facilitators to adherence. Prospective participants were screened for study eligibility, including ARV treatment status, and briefed on study procedures during the consent process.

Data Collection

All interviews were conducted in a private room outside of the HEODRA HIV Clinic. Interviews followed the semi-structured Spanish interview guide from Curioso et. al.²⁹, which was used to assess barriers and facilitators to ARV adherence in Lima, Peru. The interview questions were piloted with a group of local, Nicaragua medical students. Necessary changes were made, based on the students' recommendations, to ensure cultural appropriateness. Clinical providers and researchers from the HEODRA Infectious Diseases Clinic and UNAN-

León reviewed the updated guides. Interview guides were changed to inquire further about motivations to take ARV medication.

The semi-structured interviews lasted a range of 15 minutes - 1 hour and 50 minutes. Patient interviews were audio recorded after consent was granted. The Principal Investigator, who is a Native Spanish speaker, conducted all interviews in Spanish. After participation, all participants received an eight-dollar supermarket gift card as a symbol of gratitude for their time.

Data Analysis

Spanish audio files were transcribed into Spanish by a third-party vendor. Transcripts were compared to the original recordings to ensure accuracy. A grounded theory approach was used to analyze interview transcripts and religion emerged as a salient theme. An iterative process was used to develop a codebook that was applied to all interview transcripts. Periodic research team meetings were held to discuss important codes and themes. The research team reviewed and redefined the initial codebook during these meetings. The finalized codebook contains codes that relate to pre-conceived and emergent themes. Transcripts were initially coded using the review feature on Microsoft Word. Finalized coding will occur using ATLAS.ti software. Spanish quotes that capture central themes were translated into English and every effort was made to preserve integrity.

RESULTS

Part II will focus on participants' ARV medication experiences. Part II will explore how religion intersects with ARV medication experiences and its implications for ARV adherence.

Part I: ARV Medication Experience

ARVs are the "Elixir of Life"

Data suggest that most participants viewed ARV medications as vital to ensuring their health and life. Participants showed their knowledge of ARV's biological mechanisms (i.e. decrease viral load and increase CD4 counts), which may shape the positive perception of their medication. This is demonstrated in the following quote

by Participant 1: ...I have learned that it [ARV] helps us maintain—elevate our CD4 count, maintain the viral load undetectable, it [viral load] decreases constantly so the viral copies we have do not increase in number.” Several interviewees used personification to understand how ARVs control the HIV infection, as Participant 9 explains: ...the virus falls asleep, but, you feel normal...and that pill... if you do not take it, the virus runs. It goes and eats all the CD4 cells.” In some occasions, misunderstandings emerged regarding ARVs’ biological mechanisms (e.g. interchanging the meaning of CD4 and viral load)

The belief that ARVs ensure life was able to influence ARV adherence in our participants. This favorable perception of ARVs was prevalent, including participants who did not understand ARV’s functions. Participant 7 shares his view of ARVs: “I have to take *my elixir of life*, it’s true that I have to take it because I want to be well, I want to have a few more years of life, I want to achieve my dreams, my goals, I want to achieve them. In addition, Participant 3 spoke about how he reconciled painful side effects with his positive view of ARV, “I think that no, they [ARV] do not harm me, because what I think is that they are the best for me. And if I want to live more, I need to take them and not think that they will harm me. In the beginning, I felt very discouraged and weak. They [ARV] were very strong at first, but then you get used to them and they help a lot.” Eventually, ARV medications’ connotation of being instrumental to life encouraged participants to see the value of ARV adherence. This view is shown in the following recollection of Participant 4’s friend with AIDS: “The final stage is that one. She had her mouth full of blisters balls, her tongue—Oh, what horror! When I got to see her, I really wanted to cry. She only looked at me in the eyes, like she wanted to say” “Never, ever stop taking that medication. Look how I am now.”

Participants also viewed ARV as important, since it provided the health and life necessary to ensure their families’ livelihood. This view encouraged ARV adherence, as demonstrated by Participant 8’s comment regarding what motivated his adherence: “...how long will I be alive to tend to my daughter, right? And having the necessary, daily job in order to sustain the family...my health, because without health, I can’t work, I can’t take care of my daughter”. Participant 6 expressed a similar motivator: “Oh, my children...to see them big, at least I could leave my oldest when he already has his career or at least at least he has his family apart from me. I know that if he is there, he will not leave the rest [of her children] alone”. PLWHA’s value of their family even encouraged Participant 19 to

re-adhere to ARVs: “Recently I abandoned them [ARVs] and today I will start to take them. I know that I can’t live without medication and I need to have a healthy life and provide my children with the best.”

ARV Side Effects Contribute to Physical Disruptions for PLWHA

ARV medication experiences were greatly shaped by the severity of ARV medication side effects through physical disruptions of PLWHA’s daily lives. Physical disruptions were characterized by the debilitating physical ailments of ARV medications. Participant 1 described examples of ARV side effects as “...they [those who take ARV] get insomnia, they get wet dreams, welts, issues with their body’s organism, gastritis...liver [issues]”. Participant 2 spoke about a particularly painful experience as follows, “[ARVs] were too strong, and no matter how often I would take it with my stomach full, it would always harm me. Then, I would feel myself starting to spit out blood, because my stomach was becoming more deteriorated each day, because of the [ARV brand name].” Physical disruptions manifested themselves in various forms, as explained by Participant 4: “Strong dizziness...You get up and it is like you are being *carried away* in the wind, and you have to hold on well, if not, then you fall. If you do not control it well, you fall. You have really bad dreams, because it’s [ARV] so heavy.”

Physical disruptions contributed to important ramifications for participants’ ARV adherence. The intensity of medication side effects complicated ARV adherence as demonstrated in the following quote by Participant 16: “When the side effects I felt were strong, I would say to myself “I am not going to take them”. Some of my colleagues would tell me, “You have to take it, that’s just a side effect, later on the side effect will go away”. Even previously adherent interviewees were not impervious to these damaging effects, as demonstrated by Participant 8: “After three days, I felt that I had to go to the bathroom to urinate more times... after two weeks...I became comfortable with the pills...[but]...15 days ago...I stopped taking them because it started for me—I felt disgust, the need to vomit, semi-headache. “Is it the pills?” I stopped taking them. I said to myself I will wait 20 days, and I have not been taking them.”

ARV Medications Contribute to Social Disruptions for PLWHA

Painful ARV side effects also contributed to social disruptions of PLWHA's lives, thus impacting ARV adherence. For instance, some interviewees had to leave their employment due to worsened health from ARV side effects. Participant 6 spoke about her experience with ARV side effects at her workplace: "In my job yes, they knew my [HIV] status and they helped me with the most they could...when they saw that I would get sleepy, I did not feel well [they would say], "Go to the medical room and lay down or go to the bathroom and sit down for a moment." I felt like I had a fever almost all the time." Although Participant 6 was employed in a socially supportive workplace, the side effects proved too burdensome, as demonstrated by the quote "...the medication felt strong for me, then I felt my upset stomach, and instead of being well I felt that I had gotten sick. Then, it came to the point that I even had to leave my job because I no longer could". Regardless of these disruptive challenges, Participant 6 spoke about her attempt to be re-adherent: "I said to myself that today I will start taking it, and I will try to not leave it". However, it can be difficult for PLWHA to become re-adherent when experiencing daily physical ailments. This challenge is demonstrated in Participant 10's description of her work commute: "...when I would go out I would feel such anxiety in the bus or in the pickup truck-- to go home with dizziness, with anxiety in my heart, horrible—I suspended it [ARV] for some time because of the medication".

Participants' ARV experiences revealed that HIV is a highly stigmatized condition in Nicaragua. Several interviewees expressed this concern, as demonstrated in the following descriptions of HIV in Nicaragua:

- Participant 6: "the worst part of HIV is not the disease, it's the stigma..."
- Participant 8: "it's a discriminatory disease..."
- Participant 15: "Even university students...How ignorant are they?...It's in vain, I say. They are university students and they have given [HIV] trainings, I think to myself. And still, there they are, they are ignorant...of what AIDS is—HIV is not AIDS, Ok. The stage of AIDS is when we are, when we are at the end".

- Participant 21:
 - “...because here in Nicaragua, to say HIV, you still cannot dare say—”t’s that I am an HIV carrier...”
 - “Because in Nicaragua, when someone is—when someone recognizes or someone knows—when they notice, then you are discriminated. It’s like—racism and Black people who do not have any rights to anything.”
 - “Then, we are pigs...we do not need to live, we will infect them [community]. But that’s due to the little information that they have...”

This stigmatizing environment may have contributed to social disruptions, since ARV medications symbolized participants’ HIV positive status. As a result, several participants went through great lengths to hide details that could reveal the nature of their medications. For example, Participant 18 shared that her greatest ARV related challenge occurred while she picked up her ARV medications. She explained that she “...I have to come and monitor everything because everyone knows my children—They might tell them something, so I only come. What I do is travel here, I make sure there is nobody and and I go inside quickly. She already knows me, so she gives it to me quickly, so I go upstairs to the pharmacy to pick it up.” Participant 13 described the process involved in bringing her ARV to the workplace: “...calculate the time I have to work, I calculate how long I will be at work and then I bring what [ARV dose] I need to take. When the time comes...I go and hide so nobody sees me...I say I hide because when I take the pill, that does not stop someone from asking, “Why are you taking those pills? Are you sick? Or “What do you have?” So, then, to avoid these questions, better that I do it hidden. I feel good like this.” Other participants were willing to take their ARV in public, but they concealed their reasons for taking their pills. Participant 17 explained: “...the guy I liked look at me various times and he tells me, “Why are you taking those pills?”, then the first times I told him, “Oh, it’s that I was sick with anemia”, I told him that.”

Some PLWHA were unsuccessful at concealing the purpose of their ARV medications, thus indirectly revealing their HIV status. This scenario could potentially be incredibly stressful and socially disruptive for PLWHA. Nonetheless, Participant 5 mentioned an alternative occurrence with a lady he met while they sought

treatment for lung related complications. Participant 5 developed a friendship with her over a year and a half. Throughout this time he noticed that she was also taking ARV medications. He finally asked her about the medications and she replied: “They are mine...its for my lung issues”. “Oh, that’s fine”, I [Participant 5] told her. But after two or three days I kept insisting and I asked: “I know those pills.” Then, she says: “And why do you know them?” “Oh, it’s because my friend has showed me those pills before”, I told her. “And I know what they are for.” Then, she felt like—like bad inside, she must have said to herself: “He knows what I have.” Then, I said: “Don’t worry, I also take those pills.” Then she started to trust me more—she told me that...she had the disease...” This story shows how social support may counter the social disruptions that result from ARV medications, which symbolize a stigmatized condition.

Part II: Intersection of Religious and ARV Experiences May Influence Experience

Religion is a Source of Relief and Resilience for PLWHA

Data suggest that religion is a source of relief and resilience that may help PLWHA overcome challenging situations. Participants received relief through God’s provision of essential needs for their life. For example, interviewees thanked God for granting employment security, food security, housing security, and health (i.e. emotional, mental, and physical wellbeing). Participants discussed how God ensured physical health through the stability of their HIV infection. For example, interviewees believed God ensured low viral loads, high CD4 counts, and the prevention and recovery from HIV-related opportunistic diseases. Participant 11 commented the following regarding her daughter’s defeat over her perinatal HIV infection: “I give thanks to God that my daughter, well, I look at her, she is healthy.” Participant 12 viewed God as a source of resilience while she contemplated the difficulty of disclosing her HIV status: “I did not tell him I was sick...after all those days...oh, beautiful God how can I tell him that I am sick, oh my God? If I tell him that I am sick, he will leave.” Participant 11 was asked to turn to religious faith and followers when her daughter was diagnosed with perinatally transmitted HIV. Her daughter’s doctor recommended that “...when you leave from here [medical center], take her to any church that you—the religion that you follow...Go and take her to the church you want and offer her to God.”

ARV Medications: One of God's Tools to Ensure Life

Intersection of religious and ARV experiences suggest that religion provides relief and resilience that may mediate conflicting ARV experiences. Relief and resilience may shape PLWHA's belief in ARVs' life inducing qualities, even while they endure undesired disruptions. For instance, several participants discussed how God "worked through" ARVs to ensure life. Participant 10 explains this idea: "...if He has sent me this medication because He also has made this medicine to alleviate all of the diseases we have gotten, but I am here because of Him." On the contrary, several participants questioned the impact of ARVs, while they remained faithful to God. Participant 7 contemplated the role God and ARVs had in ensuring his child's HIV negative status: "...my wife and I opted to have a kid, thanks to God my wife is of negative serology and my son came out negative, I don't know at this point if it is a miracle or maybe the treatment does miracles, also it's true I don't know, I simply give thanks to God that my family is healthy..." In several challenging situations, participants lost their faith in ARVs, but remained committed to their belief in God's ability to provide life. Participant 10 spoke about this situation in the following quote: "...I have resigned myself...the doctor told me that in the one year I have taken the medication, the virus has not decreased by much...I said to myself, this will not hurt me, I will overcome this and I don't care what the doctor tells me...I have a God that can do it all and I know that He will take away all this virus...let's think and have faith in God to keep moving forward."

God's Influence Over Physical Disruptions

Interviewees suggested that God provided them with resilience to overcome distressing physical disruptions. For instance, interviewees were grateful God allowed them to overcome painful ARV side effects and successfully integrate their regimen into their daily lives. This idea is discussed by Participant 10: "...but I asked God, God give me the strength to overcome this [ARV side effects], but I felt desperately anxious every time I thought it was time to take the medication. I will have one year taking it [ARV medication] again...thanks to God it [ARV side effects] have all left..." God's role in alleviating ARV side effects is discussed by Participant 19: "...my body will assimilate more [to the ARV] and will control it a little more because in the beginning one cannot control it because it's very strong, but with the faith that I have in my Celestial Father, who is with me always, I know that will help me get

better.” For several subjects, like Participant 15, God’s role withstood the test of time: “...for me it has gone very well, because thanks to God, well, I have eight years and I have not relapsed...”

Religion Influences Supportive Environments that May Alleviate Social Disruptions

Religious faith and followers may address ARVs’ social disruptions by influencing the creation of socially supportive environments. Participant 20 explained this idea: “...thanks to God, my sons... they give me support and they say they have no problem, and that I have been a good mother to them, because I have been mother and father to them, I have worked to raise them, so they do not have a reason to discriminate me or anything.” – Participant 1 discussed how religiously supportive environments may promote ARV adherence: “Thanks to God, the pastor who is there now—the [church] we are assisting, knows our condition and we have stayed there because of that, because they do not discriminate us, they support us. They don’t tell us to leave the treatment [ARV], or anything like that. On the contrary, they tell us to keep on going... When we started to have a congregation, where everyone accepted us and everything, we started to emotionally advance, and we felt better...we no longer have the idea that they [the community] will notice [our HIV status]”.

Religious Faith and Followers May Contribute to Stigmatizing Environments

Religion offered support that helped several participants manage challenging HIV and ARV medication experiences. However, some interviewees described the ways in which HIV stigma intersected with their religious beliefs. This intersection may complicate ARV adherence, since HIV stigma is a barrier to ARV adherence.^{8, 18} Participants described the stigmatizing environment that was created by the religious followers through stories of their HIV status concealment, negative health behaviors (e.g. not seeking HIV care due to fear of rejection from religious congregation or the belief that God will ensure PLWHA’s children’s health), discrimination, and the spread of HIV misinformation. Participant 1 explained that his HIV status made him feel unwelcome in his religious community: “We were outside the church for four years because they discriminated us. The prior pastor was “in charge” of delivering bad information [about HIV] to the other pastors. This [pain] was worse for me spiritually, than the [issues] regarding my health”. This quote exemplifies how HIV stigma can be more disruptive than HIV

health issues. Participant 23 described how her husband was unwelcomed: “There were many people, you know those who are religious, they say they are Christians, but they told me to abandon him [HIV positive husband]. Then, I, in my mind, I would think of so many [bad] things as a woman”.

HIV stigma may also be explored through the belief that God that uses HIV as punishment. Participant 18 discussed this theme in reference to her sister, a sex worker: “...she is in that world still...She comes in with a partner...God can punish her...” Participant 18 also thought that HIV is for “bad mothers” when she was first diagnosed with HIV: “I feel bad because I threw myself, I kneeled at the bottom of the desk, I cried bitterly, I clamored to God and told him, “Why did this [HIV infection] happen to me? I was not a bad mother to my children. I have never left them alone...I looked for food for them.” Religious communities also expressed that HIV was a punishment from God, as Participant 7 explained: “I used to go to a Christian church that I would spend the day at, relaxing, and passing by there was like a picnic, a camp—food, later they speak the word of God...talking about HIV was a punishment from God for the bad people, I would perceive that...”

DISCUSSION

These findings demonstrate that religion interested with ARV medication experiences with potential implications for ARV adherence. Participants revealed they experienced ARV medications as a source of life and disruption. Religion furthered the idea that ARVs are a source of life, since some believed that ARVs were God’s tool for life. This is important, since the literature shows that the belief in ARV’s positive effects is a facilitator to adherence.^{31,38,40} Religion may also provide PLWHA with relief and resilience to manage challenging ARV medication and HIV experiences.⁴⁵ For instance, God influenced the alleviation of ARV side effects, which is also a barrier to ARV adherence.³¹ In addition, religion influenced the creation of socially supportive environments, which is also a facilitator to ARV adherence.^{38,39,40} Nonetheless, in some scenarios, faith and followers created stigmatizing environments characterized by the exclusion and punishment of PLWHA. This practice has important ramifications, since the literature shows that HIV stigma is a barrier to adherence.^{38, 39,41}

IMPLICATIONS

Further research is needed on the role of religion in HIV care and ARV adherence. This research should inform the creation of partnerships between religion and medical communities in Nicaragua. It is essential to develop programs between churches and clinics that capitalize on religion to create interventions that promote HIV health and ARV adherence. These programs should address religion's ability to act as a barrier to adherence, while ensuring that positive religious aspects continue to encourage PLWHA's health and life. Several participants specifically expressed their desire to see more programs and interventions that address HIV stigma through knowledge. Participant 19 expressed this idea: "...help us here in Nicaragua, maybe you [researchers abroad] will send us more information, so the people here, with help, will get rid of that fear that we will infect them with harm." Future interventions should destigmatize HIV by providing knowledge of HIV transmission and emphasizing that everyone is at risk for HIV infection. In addition, these interviewees revealed the importance of emphasizing that God uses ARV adherence as a tool to promote health and life. As a result, every effort should be made to emphasize that HIV is not a punishment from God.

REFERENCES

1. Global report: UNAIDS report on the global AIDS epidemic 2013. "UNAIDS / JC2502/1/E"- Revised and reissued, November 2013
2. The HIV-CAUSAL Collaboration. "The Effect of Combined Antiretroviral Therapy on the overall Mortality of HIV-Infected Individuals." *AIDS* 24.1 (2010). Web.
3. Cohen, Myron S., et al. "Prevention of HIV-1 Infection with Early Antiretroviral Therapy." *N Engl J Med* 365.6 (2011): 493-505. Web.
4. Bastos, Francisco I., et al. "AIDS in Latin America: Assessing the Current Status of the Epidemic and the Ongoing Response." *International journal of epidemiology* 37.4 (2008): 729-37. Web.
5. Espinoza, Henry, et al. "Management of the HIV Epidemic in Nicaragua: The Need to Improve Information Systems and Access to Affordable Diagnostics." *Bulletin of the World Health Organization* 89.8 (2011): 619-20. Web.
6. *UNGASS Nicaragua report, 2003–2005: report on monitoring the declaration of commitment on HIV/AIDS*. Managua: Ministry of Health, Nicaragua; 2005.
7. Steel, G., J. Nwokike, and MP Joshi. *Development of a Multi-Method Tool to Measure ART Adherence in Resource-Constrained Settings: The South Africa Experience*. Center for Pharmaceutical Management Sciences for Health, 2007. Web.
8. Vanable PA, et. al. "Impact of HIV-Related Stigma on Health Behaviors and Psychological Adjustment among HIV-Positive Men and Women." *AIDS Behavior* 10.5 (2006). Web.
9. Tuller DM, et. al. "Transportation Costs Impede Sustained Adherence and Access to Haart i n a Clinic Population in Southwestern Uganda: A Qualitative Study.." *AIDSBehavior* 14.4 (2010). Web.
10. Weiser, Sheri, et al. "Barriers to Antiretroviral Adherence for Patients Living with HIV Infection and AIDS in Botswana." *J AIDS Journal of Acquired Immune Deficiency Syndromes* 34.3 (2003)Web.
11. Ugarte, WJ., et. al. "Measuring HIV- and AIDS Related Stigma and Discrimination in Nicaragua: Results from a Community-Based Study." *AIDS Education and Prevention* 25.2 (2013). Web.

12. Chesney, M. A., et al. "Self-Reported Adherence to Antiretroviral Medications among Participants in HIV Clinical Trials: The AACTG Adherence Instruments." *AIDS Care* 12.3 (2000): 255-66. Web.
13. Buscher, April, et al. "Validity of Self-Report Measures in Assessing Antiretroviral Adherence of Newly Diagnosed, HAART-Naïve, HIV Patients." *HIV Clinical Trials* 12.5 (2011): 244-54. Web
14. Young, Sera, et al. "A Review of the Role of Food Insecurity in Adherence to Care and Treatment among Adult and Pediatric Populations Living with HIV and AIDS." *AIDS and Behavior* (2013): 1-11. Web.
15. Vranceanu, Ana Maria, et al. "The Relationship of Post-Traumatic Stress Disorder and Depression to Antiretroviral Medication Adherence in Persons with HIV." *AIDS Patient Care & STDs* 22.4 (2008): 313-21. Web.
16. Schneider, JohnKaplan, Sherrie H.Greenfield, SheldonLi, WenjunWilson,Ira B. *Better Physician-Patient Relationships are Associated with Higher Reported Adherence to Antiretroviral Therapy in Patients with HIV Infection*. 19 Vol. , 2004. Web
17. Weber, R., et al. "Uptake of and Virological Response to Antiretroviral Therapy among HIV-Infected Former and Current Injecting Drug Users and Persons in an Opiate Substitution Treatment Programme: The Swiss HIV Cohort Study." *HIV Medicine* 10.7 (2009): 407-16. Web.
18. Do, Natalie T., et al. "Psychosocial Factors Affecting Medication Adherence among HIV-1 Infected Adults Receiving Combination Antiretroviral Therapy (cART) in Botswana." *AIDS Research and Human Retroviruses* 26.6 (2010): 685-91. Web.
19. Puskas, Cathy M, et al. "Women and Vulnerability to HAART Non- Adherence: A Literature Review of Treatment Adherence by Gender from 2000 to 2011." *Current HIV/AIDS Reports* 8.4 (2011): 277-87. Web.
20. *Nicaragua: Summary Country Profile for HIV/AIDS Treatment Scale-Up*. World Health Organization, 2005. Web.
21. Wilson, Ira B., Amanda E Carter, and Karina M. Berg. "Improving the Self- Report of HIV Antiretroviral Medication Adherence: Is the Glass Half Full Or Half Empty?" *Current HIV/AIDS Reports* 6.4 (2009): 177-86. Web.
22. Lu, Minyi, et al. "Optimal Recall Period and Response Task for Self- Reported HIV Medication Adherence." *AIDS and Behavior* 12.1 (2008):86-94. Web.

23. "Research Collaborations." *Frontier Science & Technology Research Foundation, Inc.* Web. 09 Dec. 2013. (source of the AACTG surveys)
24. *Guide for HIV/AIDS Clinical Care*. Ed. Ryan White HIV/AIDS Program. Rockville, MD: U.S. Department of Health and Human Services, Health Resources and Services Administration, HIV/AIDS Bureau, 2011. Web. (source for Visual Analogue Scale)
25. Bastos, Francisco I., et al. "AIDS in Latin America: assessing the current status of the epidemic and the ongoing response." *International Journal of Epidemiology* 37.4 (2008): 729-737.
26. Ugarte Guevara, William J., Eliette Valladares Cardoza, and Birgitta Essén. "Sexuality and risk behavior among men who have sex with men in León, Nicaragua: a mixed methods approach." *Journal of Sexual Medicine* 9.6 (2012): 1634-1648.
27. Stout, Brian Douglas, Maria Paz Leon, and Linda M. Niccolai. "Nonadherence to antiretroviral therapy in HIV-positive patients in Costa Rica." *AIDS patient care and STDs* 18.5 (2004): 297-304.
28. Chesney, Margaret A., et al. "Self-reported adherence to antiretroviral medications among participants in HIV clinical trials: the AACTG adherence instruments." *AIDS care* 12.3 (2000): 255-266.
29. Curioso, Walter, et al. "Understanding the facilitators and barriers of antiretroviral adherence in Peru: a qualitative study." *BMC public health* 10.1 (2010): 13.
30. Chesney, Margaret A. "Factors affecting adherence to antiretroviral therapy." *Clinical Infectious Diseases* 30.Supplement 2 (2000): S171-S176.
31. Mills, Edward J., et al. "Adherence to HAART: a systematic review of developed and developing nation patient-reported barriers and facilitators." *PLoS medicine* 3.11 (2006): e438
32. Musumari, Patou Masika, et al. "'If I have nothing to eat, I get angry and push the pills bottle away from me': A qualitative study of patient determinants of adherence to antiretroviral therapy in the Democratic Republic of Congo." *AIDS care* ahead-of-print (2013): 1-7.
33. Badahdah, Abdallah M., and Daphne E. Pedersen. "'I Want to Stand on My Own Legs': a qualitative study of antiretroviral therapy adherence among HIV-positive women in Egypt." *AIDS care* 23.6 (2011): 700-704.
34. "GDP (Official Exchange Rate)". *CIA World Factbook*. Retrieved January 30, 2013.

35. Berg, Karina M., et al. "Gender differences in factors associated with adherence to antiretroviral
36. Instituto Nacional de Estadísticas y Censos, Nicaragua (web).
37. Posse, Mariana, et al. "Barriers to access to antiretroviral treatment in developing countries: a review." *Tropical medicine & international health* 13.7 (2008): 904-913.
38. Kumarasamy, N., et al. "Barriers and facilitators to antiretroviral medication adherence among patients with HIV in Chennai, India: a qualitative study." *AIDS Patient Care & STDs* 19.8 (2005): 526-537.
39. Sanjobo, Nawa, Jan C. Frich, and Atle Fretheim. "Barriers and facilitators to patients\' adherence to antiretroviral treatment in Zambia: a qualitative study." *SAHARA J (Journal of Social Aspects of HIV/AIDS Research Alliance)* 5.3 (2009): 136-143.
40. Watt, Melissa H., et al. "'It's all the time in my mind': Facilitators of adherence to antiretroviral therapy in a Tanzanian setting." *Social Science & Medicine* 68.10 (2009): 1793-1800.
41. Biadgilign, Sibhatu, et al. "Barriers and facilitators to antiretroviral medication adherence among HIV-infected paediatric patients in Ethiopia: A qualitative study." *SAHARA J (Journal of Social Aspects of HIV/AIDS Research Alliance)* 6.4 (2009).
42. Musumari, Patou Masika, et al. "'If I have nothing to eat, I get angry and push the pills bottle away from me': A qualitative study of patient determinants of adherence to antiretroviral therapy in the Democratic Republic of Congo." *AIDS care* 25.10 (2013): 1271-1277.
43. Balogun, Amusa Saheed. "Islamic perspectives on HIV/AIDS and antiretroviral treatment: the case of Nigeria." *African Journal of AIDS research* 9.4 (2010): 459-466.
44. Kisenyi, Rita N., Joshua K. Muliira, and Elizabeth Ayebare. "Religiosity and Adherence to antiretroviral therapy among patients attending a public hospital-based HIV/AIDS clinic in Uganda." *Journal of religion and health* 52.1 (2013): 307-317.
45. Vyas, Kartavya J., et al. "Assessing baseline religious practices and beliefs to predict adherence to highly active antiretroviral therapy among HIV-infected persons." *AIDS care* 26.8 (2014): 983-987.
46. McKinney, Ogbochi, et al. "Determinants of Antiretroviral Therapy Adherence among Women in Southern Malawi: Healthcare Providers' Perspectives." *AIDS Research and Treatment* 2014 (2014).

47. Wasti, Sharada P., et al. "Factors influencing adherence to antiretroviral treatment in Nepal: a mixed-methods study." *PloS one* 7.5 (2012): e35547.
48. Wanyama, Jane, et al. "Belief in divine healing can be a barrier to antiretroviral therapy adherence in Uganda." *Aids* 21.11 (2007): 1486-1487.
49. Zou, James, et al. "Religion and HIV in Tanzania: influence of religious beliefs on HIV stigma, disclosure, and treatment attitudes." *BMC public health* 9.1 (2009): 75.
50. Estrada Y. Aprueban Ley De Promoción, Protección, y Defensa De los Derechos Humanos Ante el VIH y SIDA [Internet]. Portal - Asamblea Nacional de Nicaragua. 2014 [30 May 2014]. Available from: <http://www.asamblea.gob.ni/87130/aprueban-ley-de-promocion-proteccion-y-defensa-de-los-derechos-humanos-ante-el-vih-y-sida/>
51. "Nicaragua: International Religious Freedom Report 2010." State.gov. U.S. Department of State, 17 Nov. 2010. Web. 12 Mar. 2015. <<http://www.state.gov/j/drl/rls/irf/2010/148768.htm>>.
52. "Leon, Nicaragua: Hospital Escuela Oscar Danilo Rosales Arguello (HEODRA) Teaching Hospital." Duke Global Health. Duke University School of Medicine: Hubert Yeargan Center for Global Health, 2004. Web. 10 Mar. 2015. <<http://dukeglobalhealth.org/global-partners/nicaragua>>.

APPENDICES

Table 1. Demographic characteristics ^{a-c}

Characteristic	n=26
Age (Years)	36.42 (22-56)
Salary (monthly, \$)	111.22 (0-444)
Adherence rate (monthly, %)	76.21 (0-100)
Sex	
Female	10 (38.47)
Male ^d	16 (61.54)
Sexual orientation	
Heterosexual	18 (69.23)
Homosexual	4 (15.38)
Bisexual	4 (15.38)
Education level	
No school	2 (7.69)
Middle school (incomplete)	3 (11.54)
Middle school	3 (11.54)
High school (incomplete)	9 (34.62)
High school	3 (11.54)
University (incomplete)	3 (11.54)
University	3 (11.54)

^a Table values are mean (range) for continuous variables and n (%) for categorical variables.

^b Sample size represents data on 26/30 interviewees.

^c Percentages might not add up to 100% due to rounding.

^d Includes two male-female transgender participants.