SPIRITUALITY AND ITS ASSOCIATION WITH IMMUNE STATUS, MEDICATION ADHERENCE AND QUALITY OF LIFE AMONG HUMAN IMMUNODEFICIENCY VIRUS-INFECTED PATIENTS ATTENDING ANTIRETROVIRAL CLINIC IN A TERTIARY INSTITUTION NIGERIA

Nnamani Chioma P.[1,2]*, Nwankwo Obinna K.[1,], Agada Owulo[1], Nwachukwu Ethel O.[1], Obiegbu Nnadozie P.[1]

1. Department of Family Medicine, Nnamdi Azikiwe University Teaching Hospital, Nnewi. Anambra State. Nigeria.
2. Department of Family Medicine, Nnamdi Azikiwe University, Awka, Anambra State. Nigeria.

Corresponding author

Nnamani Chioma Phyllis.
Department of Family Medicine, Nnamdi Azikiwe University Awka, Anambra State, Nigeria,
cp.nnamani@unizik.edu.ng,

ABSTRACT

Background: Spirituality has been recognized as a vital social factor influencing public health, particularly in the context of HIV/AIDS. This study aimed to assess spirituality and its association with immune status, medication adherence and quality of life among adult patients living with HIV/AIDS

Materials and method: This were a hospital-based cross-sectional study. Spirituality, CD4 count, medication adherence and quality of life were assessed among 412 adult HIV-positive patients attending the antiretroviral clinic recruited by systematic random sampling method. A correlational analysis was used to test for association between continuous variables. Statistical significance was set at $P < 0.05$.

Results: There was a significant and increasing positive correlation ($r = 0.24$, $p = 0.001$; $r = 0.49$, $p = 0.001$; $r = 0.73$, $p = 0.001$) between Functional Assessment of Chronic Illness Therapy Spiritual Well-being (FACIT-Sp) scores and CD4+ count. There was a positive but weak correlation between FACIT-Sp scores and the mean medication adherence ($r = 0.36$, $p = 0.045$, $r = 0.25$, $p = 0.001$). There was also a significant and increasing positive correlation between FACIT-Sp scores and the quality of life of the participants ($r = 0.71$, $p = 0.001$, $r = 0.73$, $p = 0.001$, $r = 0.72$ $p = 0.001$, $r = 0.69$ $p = 0.001$, $r = 0.67$ $p = 0.001$, $r = 0.74$, $p = 0.001$, $r = 0.71$ $p = 0.001$).

Conclusion: Spirituality was positively associated with the immune status, medication adherence and quality of life of HIV- positive adults in this study. Routine spiritual assessment is recommended as part of the healthcare services offered to HIV-positive adults.

Keywords: HIV/AIDS, Immune Status, Medication adherence, Nigeria, Spirituality, Quality of Life.

Introduction

Spirituality and religion can influence patients' perceptions of health and disease and how they interact with others.[1] Many patients are spiritual and have religious needs related to their disease, which can affect their mental health, and if these needs are not met, it may affect their quality of life.[2] Spirituality is an intrinsic component of human beings, and it is personalised, abstract, and multifaceted.[1] Spirituality and religion are often used interchangeably but have different concepts.[1] Authors have postulated that spirituality involves a personal quest for meaning in life while religion involves an organized entity with rituals and practices focusing on a higher power or God.[1,2]

The Human Immunodeficiency virus (HIV) infection and its associated pandemic of Acquired Immune Deficiency Syndrome (AIDS) have burdened the population with serious public health and socio-economic challenges over the years.[3] The disease affects not only the patient's physical condition but also their socio-cultural relations, mental health, and financial aspects of life.[4] People living with chronic illnesses such as HIV use spirituality to cope with the illness, as Haddad advocated that they play an essential role in palliating the epidemic.[5]

Literature has demonstrated that spirituality is widely used as a coping mechanism in serious medical and physical conditions.[7] The relationship between spirituality and coping with illness in patients with chronic health conditions like HIV/AIDS and several other physical conditions have been examined in previous studies,[8] and it has been reported that high spirituality helps HIV/AIDS patients cope with their

discharge. The two most reported agents are Candida albicans, and Trichomonas vaginalis, with slight variations in the order they occur depending on the study population, diagnostic methods, and the predominant risk factors.[5-12] In a study conducted in Imo State, Southeast Nigeria, the commonest aetiologic agents identified were Candida albicans and Gardnerella vaginalis.[5] In Southwest Nigeria, the commonest pathogens reported were Candida albicans, Trichomonas vaginalis, Gardnerella vaginalis, and Staphylococcus species,[6,7] while in Northeast Nigeria, Candida species were the most common cause of vaginal discharge among women of reproductive age.[8,9]

Risk factors for bacterial vaginosis (BV) and candidiasis reported in some studies were younger age group, multiparity, higher education, religion, rural residence, and lower abdominal pain.[11,12] The organisms associated with abnormal vaginal discharge often carry deleterious consequences. For instance, Candida albicans, and bacterial vaginosis are said to increase the risk of HIV transmission,[1] prelabour rupture of fetal membranes, low APGAR score at 1 minute, preterm and low birth weight babies.[12] Trichomonas vaginalis is associated with atypical pelvic inflammatory disease (PID) and may increase the risk of infertility.[12] Organisms such as Chlamydia trachomatis and Neisseria gonorrhea, likewise, are known causes of pelvic inflammatory disease, infertility, and chronic pelvic pain. Group B Streptococcus increases the risk for preterm labour and chorioamnionitis, with significant foetal and maternal morbidity.[1,2] Considering the global rise in abnormal vaginal discharge among reproductive-age women,[1] as well as the lack of current data in Imo State,[5] more research is needed to identify the causative agent and assess any change in the microbial pattern.

Therefore, this study aimed to determine the prevalence of abnormal vaginal discharge and aetiologic agents among women presenting with abnormal vaginal discharge at the General Outpatient Clinics of the Federal University Teaching Hospital, Owerri.

METHODOLOGY

Study area

This was a hospital-based cross-sectional study conducted at the General Outpatient Clinics (GOPC), of the Family Medicine Department, Federal University Teaching Hospital, Owerri, Imo state. FUTH Owerri serves as the referral centre for the secondary care health facilities in Imo State and the neighbouring States. The General Outpatient Clinics offer primary and secondary care services.

Study population

Women between the ages of 18 and 45 years who presented to the GOPC and gave consent to participate in the study were included in the study. Women who were pregnant, diagnosed with genital organ malignancies, and who had a history of vesicovaginal fistula or rectovaginal fistula were excluded.

Sample size and sampling technique

A minimum sample size of 368 was determined using the single population proportion formula. Participants who met the inclusion criteria were recruited daily using a systematic sampling method.

Data collection

Data were collected between February and April 2023 using a structured, interviewer-administered, pretested questionnaire. An Accuson® mercury sphygmomanometer was used to measure the blood pressure of subjects. A weighing scale (Seca® model number 786 2021994, designed in Germany, made in China) was used in measuring the weight of the participants. Participants had a barefoot weight measurement while standing straight on the scale with head raised and looking forward after removing extra clothing, removing shoes, and emptying their pockets. The weighing scale was calibrated before each use, and the weight was measured to the nearest 0.1 kg. Weight was measured and reported as a continuous variable. Stadiometer, a standard height-measuring instrument (Seca® model number 786 2021994, designed in Germany, made in China) was used to measure height. Participants stood erect without shoes, cap, or head gear and backing the stadiometer to conduct a height measurement. The horizontal sliding head piece of the stadiometer was adjusted to rest on the top of the participant's head, depressing the covering hair while the participant was facing forward. The height was measured to the nearest 0.1m and reported as a continuous variable.

The questionnaire was developed after a review of literature on similar topics and included sections on the socio-demographic characteristics, presence and characteristics of the discharge, and associated symptoms. In this study, abnormal vaginal discharge referred to any bothersome discharge with at least one associated feature of offensive odour, increased quantity, itching, burning sensation, lower abdominal pain, dyspareunia, dysuria, or in which abnormal microbial aetiology was identified, or both.

disease through engaging in behavioural change, palliating anxiety and other mental problems that could arise as a result of their HIV positive status.[9] It has been observed in the literature that spirituality has different dimensions and has been a significant influence on health beliefs and practices.[10] Cultural norms and values, as well as religion, determine the health-seeking strategies of many Africans.[11] It has been stated that spirituality is a marker of hope, values and transcendence for a majority of Sub-Saharan Africans, especially women with HIV.[12]

According to literature, spirituality and religion are important to many people living with HIV/AIDS.[1] In most regions of Africa, care and support for people living with HIV/AIDS is mostly provided by religious organisations.[13] A diagnosis of HIV can influence patients' spirituality, dramatically shaping their belief in self-competence, their ability to cope with the disease, and even the physiological course of the disease.[14] These people have to deal with their condition and social pressure in the form of stigmatisation and discrimination almost on daily basis. A study carried out in the United States investigated the relationships between positive religious coping (e.g., seeking spiritual support) and spiritual struggle (e.g., anger at God) versus viral load, CD4 count, quality of life, HIV symptoms, depression, self-esteem, social support, and spiritual wellbeing in 429 patients with HIV/AIDS found out that, at baseline, positive religious coping was associated with positive outcomes while spiritual struggle was associated with negative outcomes. In addition, high levels of positive religious coping and low levels of spiritual struggle were associated with small but significant improvements over time. These results have implications for assessing religious coping and designing interventions targeting spiritual struggle in patients with HIV/AIDS. The authors concluded that assessing positive religious coping and spiritual struggle in patients with HIV/AIDS may help health professionals identify and support patients using positive religious coping methods while targeting those individuals whose spiritual struggle may adversely affect their wellbeing.[15] A study was carried out in south-eastern USA among 292 people living with HIV/AIDS to examine religious and psychosocial correlates and predictors of 90% Antiretroviral therapy adherence, observed that there were statistically significant differences in ART adherence rates based on age, depressive symptom status and frequency of religious attendance and prayer. Praying at least once a day was significantly associated with C90% ART adherence (OR = 2.26, 95% CI [1.06–4.79], p\0.05). Social support satisfaction was also significantly associated with ART adherence (OR = 1.52, 95% CI [1.11–2.08], p\0.05) and energy/fatigue/vitality. The authors concluded that about half of PLWH still struggle to achieve optimal ART adherence and are therefore in need of support and that ART adherence rates vary among PLWH and may be based on age, depressive symptom status and religious behavior, frequency of religious attendance and prayer. Additionally, prayer, energy/vitality and social support are significant predictors of ART adherence.[16] Due to the variations across cultures, it is most significant to examine the relationship between religious elements and psychological factors in different contexts, especially as many studies based on religious coping theories have been done in the western and Christian contexts.[6] Also, it is essential for healthcare providers to be aware of the spiritual component of HIV/AIDS and to have updated knowledge on how to address patients' spirituality. A good number of international studies have examined the complexity and interdisciplinary connection between spirituality, health and quality of life, but there is a paucity of local studies, hence the need for this study. In view of this, this study aimed to assess spirituality and its association with immune status, medication adherence and quality of life among HIV-positive patients attending antiretroviral (ARV) clinic in a tertiary institution in Southeast, Nigeria

Material and Methods

This study was conducted at Nnamdi Azikiwe University Teaching Hospital, a Federal government-owned tertiary health institution located at Nnewi, a commercial city located 37km from Awka, the capital city of Anambra State, South-east, Nigeria. The institution is one of the first Antiretroviral therapy (ART) sites established by the Federal Government of Nigeria in mid-2002. It provides comprehensive HIV care and a daily ART clinic with an average attendance of 2,000 on monthly basis.

This was a hospital-based cross-sectional study carried out over a period of 8 weeks. The study participants were adult patients aged 18 years and above who had been on Highly Active Antiretroviral Therapy (HAART) for at least four months. Patients who are critically ill and mentally challenged were excluded from the study.

Using the Cochran formula, a minimum sample size of 384 was calculated. This was based on the standard normal deviate corresponding to the two-sided 95% confidence level ($Z1-\alpha = 1.96$), the estimated prevalence of HIV-infected persons in Nigeria who used spirituality as a coping mechanism was not known; hence, P = 50% (0.5)[17], and the degree of precision was 5.0%. To account for a possible non-response rate of 10.0%, the sample size was adjusted

to a final value of 422 participants.

The study participants were recruited using systematic random sampling method. Based on a monthly patient attendance of 2000 and an estimated daily attendance of 95, 19 patients were recruited daily at a sampling interval of 5 until the required sample size was reached.

Interviewer-based semi structured pre-tested questionnaire was used to collect information on age, sex, race, educational status, occupation, marital status, religion, source of income, amount of income per month, socio-economic class, time of diagnosis and CD4+ T lymphocyte count (immune system). Spirituality was measured using the Functional Assessment of Chronic Illness Therapy Spiritual Well-being (FACIT-Sp-12), a 12-item questionnaire that measures spiritual well-being in people with chronic illnesses. The FACIT-Sp-12 is part of the larger Functional Assessment of Chronic Illness Therapy (FACIT) measurement system that assesses multidimensional Health Related Quality of Life (HRQOL). FACIT-Sp-12 has been translated and linguistically validated in 22 languages and has been used in studies examining the relationships between spiritual well-being, health, and adjustment to illness.[18] It asks patients to describe aspects of spirituality and/or religious faith that contribute to HRQOL over the past 7 days. Response options include a five-point likert scale ranging from 0 (not at all) to 4 (very much). Two items are negatively worded and were reverse coded. Responses were summed to create a total FACIT-Sp-12 score and individual sub-scale scores, with higher scores reflecting higher well-being.

The WHOQOL-HIV brief instrument was used to assess the quality of life in each of the participants. The validity of the WHOQOL-HIV instrument used among HIV/AIDS patients has been documented in Nigeria.19 The WHOQOL-HIV BREF consists of 31 items, with each item graded on a 5-point likert scale. These items are distributed in six domains. The six domains of quality of life are physical health, psychological health, level of independence, social relationships, environment, and spirituality/religion/personal beliefs.

Domain scores are scaled in a positive direction, with higher scores denoting higher QOL. Each item was rated on a 5-point likert scale where 1 indicates low negative perception and 5 indicates high positive perception. Some items such as pain and discomfort, dependence on medication, death and dying, and negative feelings (Q3, Q4, Q5, Q8, Q9, Q10, and Q31) were not scaled in a positive direction, meaning that for these facets, higher scores do not denote higher quality of life. To transform these scores in a positive direction, the formula 6 - x (where x was the facet score) was used. The mean score of items within each domain was used to calculate the domain score.

Adherence was measured using two self-report instruments. The Antiretroviral Medication General Adherence Scale (AGAS) is a 5-item single-dimensional measure that assesses the ease and ability of participants to take Antiretroviral therapy (ART) according to a health care provider's recommendations in the previous 30 days.[20] Responses range from (1) “none of the time” to (6) “all of the time” on a likert scale to questions such as, “I found it easy to take my HIV medications as the healthcare provider advised.” AGAS scores range from 0 to 30, and higher scores indicate higher medication adherence.

A Visual Analogue Scale (VAS) was also used to identify the proportion of all medications taken over a 30-day period. Participants were asked to mark a point on a 100mm line to indicate the percentage of all of their ART medications taken in the previous 30 days. The line was anchored by an empty pill bottle at the bottom (indicating zero), a half-full pill bottle in the centre (indicating 50%), and a full pill bottle at the top (indicating 100%).[20]

A blood sample was collected for the determination of CD4+ count. The antecubital fossa of the upper limb of each participant was cleaned aseptically using a methylated spirit and cotton swab. Two milliliters of venous blood were collected into a sterile labelled vacutainer with Ethylene-Diamine-Tetra-Acetic acid anticoagulant. CD4+ count estimation was done using a Partec Gmbh 2011 CyFlow counter 2 (manufactured by Sysmex Company, Munster Germany). Internal quality control of the CyFlow counter was done by daily running of count check beads of known concentration to ensure that the laser was properly aligned and the analyser was functioning effectively.

Data collected was analysed using Statistical Package for Social Sciences (SPSS) version 23.0. Quantitative variables were presented using mean, median, and standard deviation. A correlational analysis was done to test the association between continuous variables as appropriate. Statistical significance was set at $P<0.05$.

Results

A total of 412 out of the recruited 422 participants participated and completed the study, giving a response rate of 97.6%. Out of this, 234 were males while 178 were females, giving a male-to-female ratio of 1.31:1. The age range 18 to 33 years constituted 50.5%, the male gender accounted for 56.8%, and married participants accounted for 60.4%. Approximately half of the participants (50.5%) attained secondary school education. About 402

respondents, constituting 97.6%, were Christians while 288 respondents (69.9%) were into business as

Table 1: Socio-demographic characteristics of respondents

Socio-demographic characteristics	N (%)
Age (years)	
18-33	208 (50.5)
34-49	164 (39.8)
≥50	40 (9.7)
Sex	
Male	234 (56.8)
Female	178 (43.2)
Marital status	
Single	88 (21.4)
Married	249 (60.4)
Separated	20 (4.9)
Widowed	55 (13.3)
Educational status	
Nil formal	28 (6.8)
Primary	107 (26.0)
Secondary	208 (50.5)
Tertiary	76 (24.5)
Religion	
Christianity	402 (97.6)
Islam	8 (1.9)
Others	2 (0.5)
Occupation	
Civil Service	87 (21.1)
Business	288 (69.9)
Unemployed	37 (9.0)

Table 2 shows the correlation between the FACIT-Sp score and the CD4+ count. There was a significant and increasing positive correlation (r =0.24, p= 0.001; r=0.49, p= 0.001; r =0.73, p = 0.001) between FACIT-Sp score and CD4+ count.

Table 2: Correlation between the CD4+ subgroups and spirituality (FACIT-Sp 12)

CD4+ count(cells/µl)	r**	p-value
<350	0.24	0.001*
350-500	0.49	0.001*
≥500	0.73	0.001*

r**: Pearson correlation coefficient; *Statistically significant

Table 3 shows the correlation coefficient between the FACIT-Sp scores and the mean medication adherence. A positive but weak correlation was observed (r = 0.36, p = 0.045; r = 0.25, p = 0.001).

Table 3: Correlation of medication adherence with FACIT-Sp scores in the respondents

Medication adherence	Frequency (N = 412)	Mean (±SD) (%)	r**	p-value
Good	273	66.3 ± 18.7	0.36	0.045*
Poor	139	33.7 ± 21.2	0.25	0.001*

r =**Pearson correlation coefficient; *Statistically significant

Table 4 shows a strong statistically significant positive correlation between the FACIT-Sp scores and all the quality of life domain scores. (r = 0.71, p = 0.001, r = 0.73, p = 0.001, r = 0.72 p= 0.001, r =0.69 p= 0.001, r =0.67 p= 0.001, r =0.74, p =0.001, r =0.71 p=0.001).

Table 4: Correlation coefficients of mean QoL scores with FACIT-Sp scores

Quality of Life (QoL)	Mean QoL Scores ±SD	r**	p-value
Domain 1			
Good	17.24±2.31	0.71	0.001*
Poor	14.31±1.98		
Domain 2			
Good	16.97±3.45	0.73	0.001*
Poor	14.71±1.87		
Domain 3			
Good	17.88 ±2.01	0.72	0.001*
Poor	14.01±1.89		
Domain 4			
Good	18.01±3.54	0.69	0.001*
Poor	13.85±2.12		
Domain 5			
Good	17.75±5.91	0.67	0.001*
Poor	14.22±1.99		
Domain 6			
Good	16.67±7.81	0.74	0.001*
Poor	13.47±5.66		
Total QoL			
Good	97.22±1.97	0.71	0.001*
Poor	84.33±4.97		

Note: Good Domain QoL ≥ 16, Poor Domain QoL< 16, Good Total QoL ≥ 96, Poor Total QoL< 96

r** = Pearson correlation coefficient; *Statistically significant

DISCUSSION

SPIRITUALITY AND IMMUNE STATUS OF THE RESPONDENTS

This study revealed a significant and increasing positive correlation between spirituality and CD4 count. This showed that people living with HIV/AIDS that used spirituality to cope with the illness seem to have better immune status. The finding from this

study was in agreement with a study carried out in United States among women living with HIV, where higher scores in spiritual well-being was associated with higher CD4 cell percentages.[21] The findings suggested a connection between spiritual well-being components and better immune status among the women.[21] Another study done by Ironson et al. revealed that participants who had a positive view of God as being merciful, benevolent and forgiving had much better preservation of CD4 cells hence, better immune status, while those that had a negative view of God as harsh, judgmental and punishing, lost CD4-cells, therefore, more rapid deterioration of immune status, than those who viewed God positively.[22] This might be due to a better emotional and psychological state resulting from the ability to cope with the stress that comes with the illness due to their belief in a higher being that has control over their condition. Having high spirituality might also result in being more principled and adhering to rules and guidelines, which, in turn, helps the individual adhere to their medications with eventual improvement in immune status. However, a study done by Van Wagoner et al. among gay men found that participants who engaged more in religious activities had lower CD4-cell counts than those who engaged less in religious activities.[23] This might be because the study was conducted among a sample group with similar characteristics without much heterogeneity.

SPIRITUALITY AND MEDICATION ADHERENCE OF THE RESPONDENTS

This study revealed a positive but weak correlation between spirituality and medication adherence. The findings from this study agreed with results from similar studies. In a study done in Calabar, Nigeria, the multiple logistic regression of adherence to HAART with relevant predictors revealed that, for every unit rise in spirituality score, there was a 1.3 times increased likelihood of adherence to HAART.[24] A similar study carried out in Kampala, Uganda, by Tumwine et al. also reported high adherence among highly religious subjects.[25] In another study done in Uganda by Kisenyi et al., correlation analysis showed a significant relationship between ART adherence and religiosity.[26] Vyas et al., in a prospective longitudinal study done in California, USA, also reported adherence to be significantly higher among subjects with higher levels of spirituality and positive religious coping scores, which the authors attributed to the social support acquired through religious institutions.[27] A study by Park and Nachman also demonstrated that subjects with excellent adherence had significantly higher religious belief scores than those with poor adherence.[28] This implies that the use of spirituality by people living with HIV to cope with the illness helped them to adhere to their medications. This may be due to the possibility that higher levels of spirituality resulted in better self-discipline and principles, which would, in turn, improve adherence rates. However, in contrast with the finding of this study, Finocchario-Kessler et al., in their study conducted in USA, found that HIV patients who strongly believed in God's control of their health were significantly less adherent to HAART, and the authors attributed it to religious fatalism.[29] Also, some studies reported that high spirituality levels could adversely affect medication adherence as patients take a passive role in their health care.[30,31] This might also be due to religious fatalism, where the subjects believed that their lives and health had been pre-destined and that they had no control over it and thought there was no need to take care of their health. There was no statistically significant association between medication adherence and spirituality/ religiosity in a study done by Gaines et al. among adolescents living with HIV.

SPIRITUALITY AND QUALITY OF LIFE OF THE RESPONDENTS

In this study, Pearson's correlational analysis showed a strong statistically significant positive correlation between the FACIT-Sp scores and the quality of life domain scores. A study by Damilda et al. demonstrated that spirituality was important in improving the quality of life of African-American women living with HIV/AIDS.[33] A study by Szaflarski also showed that spirituality/religion in people living with HIV improved their health and quality of life directly and indirectly through factors like healthy behaviours, optimism and social support.1 A study by Tsevat et al. supported an association between spirituality or religiousness and better health and quality of life.[34] The authors attributed it to a concept of “the will to live”, which may be a coping mechanism for people living with HIV.[34] A similar study in Zambia also demonstrated that the participant's quality of life had a significant positive relationship with spirituality.[35] This showed that spirituality could help people living with HIV to have improved quality of life. Spirituality may be a source of hope and inner strength to people living with HIV, which improves their self-esteem and helps them live positively and healthily with a resultant improvement in their overall quality of life.

CONCLUSION

This study concluded there was a significant positive relationship between spirituality and the immune status, medication adherence and the quality of life of

HIV-positive persons attending antiretroviral (ARV) clinic of a tertiary health institution in Southeast Nigeria.

RECOMMENDATIONS

Policymakers need to include routine spirituality assessments as part of the health care services offered to HIV- positive persons attending ARV clinics.

LIMITATIONS OF THE STUDY

This study was hospital-based, and as such, the results may not be generalisable to the general population

The instruments used for measuring adherence were self-reported, which could have led to overestimation or underestimation of adherence.

DECLARATIONS

Ethical approval and consent to participate:

Ethical clearance was obtained from the Ethical Committee of Nnamdi Azikiwe University Teaching Hospital (NAUTH). The study was carried out in accordance with the Helsinki Declaration of 1975 on human experimentation. The ethical clearance reference number is NAUTH/CS/66/VOL.10/2017 /002. Informed consent was obtained from the patients. Confidentiality, privacy and anonymity were observed.

Acknowledgements:

We appreciate the patients and staff of the Antiretroviral Clinic of Nnamdi Azikiwe University Teaching Hospital for their cooperation during the data collection period.

Funding: The research was self-sponsored

Conflict of interests: There were no conflicts of interests

REFERENCES

1. Szaflarski M. Spirituality and religion among HIV-infected individuals. Curr HIV/AIDS Rep. 2013;10(4):324–332. doi:10.1007/s11904-013-0175-7
2. Koenig HG. Research on religion, spirituality, and mental health: a review. Can J Psychiatry 2009; 54: 283–291. pmid:19497160
3. Awofala AA, Ogundele OE. HIV epidemiology in Nigeria. Saudi J Biol Sci. 2018; 25(4): 697–703. doi:10.1016/j.sjbs.2016.03.006
4. Clifford O.O, Joshua O.A, Olatunji O.A. "HIV-Stigma in Nigeria: Review of Research Studies, Policies, and Programmes," AIDS Res Treat. 2017; 5812650: 13. https://doi.org/10.1155/2017/5812650
5. Haddad, B. Cartography of HIV and AIDS, Religion and Theology. Religion and HIV and AIDS 2011: pp. 1-20 Charting the Terrain. South Africa: University of KwaZulu-Natal Press
6. Pargament KI, Feuille M, Burdzy D. The Brief RCOPE: Current psychometric status of a short measure of religious coping. Religions, 2011; 2, 51-76. DOI:10.3390/rel2010051
7. Hodge DR, Horvath VE. Spiritual needs in health care settings: a qualitative meta-synthesis of clients' perspectives. Soc Work 2011; 56: 306–316. pmid:22308663 doi: 10.1093/sw/56.4.306
8. Kremer H, Ironson G. Longitudinal Spiritual Coping with Trauma in People with HIV: Implications for Health Care. AIDS Patient Care STDs. 2014; 28(3): 144-154
9. Adams J, Trinitapoli J. The Malawi Religion Project: Data collection and selected analyses. Demogr Res. 2009; 21: 255–288. doi: 10.4054/DemRes.2009.21.10.
10. Agadjanian V, Yabiku ST. Religious Affiliation and Fertility in a Sub-Saharan Context: Dynamic and Lifetime Perspectives. Popul Res Policy Rev. 2014; 33: 673–691. doi: 10.1007/s11113-013-9317-2. pmid:26500383
11. Arrey AE, Bilsen J, Lacor P, Deschepper R. Spirituality/Religiosity: A Cultural and Psychological Resource among Sub-Saharan African Migrant Women with HIV/AIDS in Belgium. PLoS ONE 2016;11(7): e0159488. https://doi.org/10.1371/journal.pone.0159488
12. Mkandawire-Valhmu L, Kako PM, Kibicho JW. Perceptions of the character of God as narrated by East African women living with HIV. J Christ Nurs 2012; 29: 164–172. pmid:22866377 doi: 10.1097/cnj.0b013e3182587f57
13. Manzou R, Schumacher C, Gregson S. Temporal dynamics of religion as a determinant of HIV infection in East Zimbabwe: a serial cross-sectional analysis. PLoS One 2014; 9: e86060. Doi: 10.1371/journal.pone.0086060. ; PONE-D-13-27552 [pii]. pmid:24465868
14. Kremer H, Ironson G, Kaplan L. The fork in the road: HIV as a potential positive turning point and the role of spirituality. AIDS Care. 2009; 21: 368-377. doi:10.1080/09540120802183479
15. Trevino KM, Pargament KI, Cotton S, Leonard AC, Hahn J, Caprini-Faigin CA, et al. Religious coping and physiological, psychological, social, and spiritual outcomes in patients with HIV/AIDS: cross-sectional and longitudinal findings. AIDS Behav. 2010; 14: 379–389.
16. Dalmida SG, McCoy K, Koenig HG, Aretha M, Marcia MH, Tami T, et al. J Relig Health. 2017; 56: 2144. https://doi.org/10.1007/s10943-017-0377-1
17. Omair A. Sample size estimation and sampling techniques for selecting a representative

sample. J Health Spec. 2014;2:142-7
18. Munoz AR, Salsman JM, Stein K, Cella D. Reference Values of the Functional Assessment of Chronic Illness Therapy – Spiritual Well-Being (FACIT-Sp-12): A Report from the American Cancer Society's Studies of Cancer Survivors. Cancer. 2015; 121(11): 1838–1844. http://doi.org/10.1002/cncr.29286
19. Fatiregun A., Mofolorunsho K., Osagbemi K. Quality of life of people living with HIV/AIDS In Kogi State, Nigeria. Benin J Postgrad Med. 2009; 11(1) doi: 10.4314/bjpm.v11i1.48823.
20. Holstad MM, Essien JE, Ekong E, Higgins M, Teplinskiy I, Adewuyi MF. Motivational Groups Support Adherence to Antiretroviral Therapy and Use of Risk Reduction Behaviors in HIV Positive Nigerian Women: A Pilot Study. African J Reprod Hlth. 2012; 16(3):14-27.
21. Dalmida SG, Holstad MM, DiIorio C, Laderman G. Spiritual Well-Being, Depressive Symptoms, and Immune Status Among Women Living with HIV/AIDS. Women & Hlth. 2009; 49(2-3):119-143. doi:10.1080/03630240902915036.
22. Ironson G, Stuetzle R, Ironson D, Balbin E, Kremer H, George A, et al. View of God as benevolent and forgiving or punishing and judgmental predicts HIV disease progression. J Behav Med. 2011; 34: 414-425. https://doi.org/10.1007/s10865-011-9314-z
23. Van Wagoner N, Mugavero M, Westfall A, et al. Church attendance in men who have sex with men diagnosed with HIV is associated with later presentation for HIV care. Clin Infect Dis. 2014;58(2):295–299. doi:10.1093/cid/cit689
24. Ayuk AE, Udonwa N, Gyuse A. Influence of Spirituality and Religion on Adherence to Highly Active Antiretroviral Therapy in Adult HIV/AIDS Patients in Calabar, Nigeria. Recent Adv Bio Med. 2017; 3: 48-57
25. Tumwine C, Neema S, Wagner G. Reasons why high religiosity can co-exist with and precipitate discontinuation of anti-retroviral therapy among different HIV clients in Uganda: an exploratory study. Religions (Basel). 2012; 3:817-32.
26. Kisenyi RN, Muliira JK, Ayebare E. Religiosity and adherence to antiretroviral therapy among patients attending a public hospital-based HIV/AIDS clinic in Uganda. J Rel Hlth. 2013; 52(1): 307–317.
27. Vyas KJ, Limneos J, Qin H, Mathews WC. Assessing baseline religious practices and beliefs to predict adherence to highly active antiretroviral therapy among HIV-infected persons. AIDS Care 2014; 26 (8): 983–987.
28. Park J, Nachman S. The link between religion and HAART adherence in pediatric HIV patients. AIDS Care. 2010; 22(5):556-61
29. Finocchario-Kessler S, Catley D, Berkley-Patton J, Gerkovich M, Williams K, Banderas J, et al. Baseline predictors of ninety per cent or higher antiretroviral therapy adherence in a diverse urban sample: The role of patient autonomy and fatalistic religious beliefs. AIDS Pat Care STDS. 2011; 25 (2): 103–111
30. Martinez J, Lemos D, Hosek S. Stressors and sources of support: the perceptions and experiences of newly diagnosed Latino youth living with HIV. Adolescent Medicine Trials Network. AIDS Pat Care STDS. 2012 May; 26(5):281-90.
31. Nozaki I, Kuriyama M, Manyepa P, Zyambo MK, Kakimoto K, Bärnighausen T. False beliefs about ART effectiveness, side effects and the consequences of non-retention and non-adherence among ART patients in Livingstone, Zambia. AIDS Behav. 2013; 17(1):122-6.
32. Gaines J, Cheng YI, Wang J, Lyon ME. Does Spirituality or Religion Hinder or Help Adherence to Highly Active Antiretroviral Therapy Among Adolescents Living with HIV? J Adol Hlth. 2014; 54(2), S59–S60.
33. Dalmida SG, Holstad MM, Diiorio C, Laderman G. Spiritual Well-Being and Health-Related Quality of Life Among African-American Women with HIV/AIDS. Appl Res Qual Life. 2011;6(2):139–157. doi:10.1007/s11482-010-9122-6
34. Tsevat J, Leonard AC, Szaflarski M. Change in quality of life after being diagnosed with HIV: a multicenter longitudinal study. AIDS Pat. Care STDs. 2009; 23(11): 931-937.doi: 10.1089/apc.2009.0026
35. Mweemba P, Zeller R, Ludwick R, Gosnell D. Quality of Life of Zambians Living with HIV & AIDS. Med J Zambia. 2009; 36(4): 143-150