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Homelessness, Mental Illness, Substance Abuse, and HIV: An Insidious Syndemic

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Mahatma Gandhi once said that the measure of a country's greatness is in how it treats its least fortunate members. In his last public speech, Hubert Humphrey echoed the same sentiment when he said "...the moral test of government is how that government treats those who are in the dawn of life, the children; those who are in the twilight of life, the elderly; those who are in the shadows of life; the sick, the needy and the handicapped" (Remarks at the dedication of the Hubert H. Humphrey Building, November 1, 1977, Congressional Record, November 4, 1977, vol 123, p. 37287). The obligation of a civilization to care for the sick and downtrodden goes back in history at least to Aristotle.

Homelessness and precarious housing environments have been shown to be associated with chronic conditions, poor physical and mental health, greater risk for HIV infection, inadequate health care, and early death.¹ It is clear that homelessness amplifies other risk factors and puts particular groups at greater risk for infection including women, youth, and racial and sexual minorities.^{2,3} Homelessness and unstable housing is an important indicator of extreme poverty, and is thought to be both causal and a result of the AIDS epidemic in the United States. Rates of HIV among homeless and unstably housed people are as much as 16 times higher than in the general population,³⁻⁵ and several investigators have found that more than half of People Living With HIV and AIDS (PLWHA) report experiencing homelessness or housing instability after learning about their diagnosis.^{6,7}

Homeless persons with Serious Mental Illness (SMI) are at increased risk for contracting and transmitting HIV.⁸⁻¹⁰ This increased vulnerability to HIV is thought to be due to risky sexual behavior, prostitution, vulnerability to sexual victimization, Injection Drug Use (IDU) and high rates of alcohol use as well as other substances. Others have found that adherence to HIV treatment regimen is poorer among homeless persons and persons with SMI. This creates a threat to individual health as well as constituting a public health threat due to higher viral loads and a greater potential for developing treatment resistant virus strains. Therefore, homeless persons with SMI can serve as a vector of HIV transmission. Methods for improving continuity of care between identification of people engaging in high risk behaviors, testing for their HIV status, improving their access to infectious disease care, and reinforcing linkage and adherence to care over time is of great public health significance. These patterns of co-occurring chronic conditions have been described as a syndemic.¹¹ Syndemics occur when two or more diseases or health conditions interact synergistically, and interact to contribute to excess burden of disease in a population. Syndemics arise when co-occurring health-related problems cluster by person, place, or time. This often occurs in persons with SMI who experience rates of other chronic conditions and high risk behaviors such as smoking, obesity, and drug use. Syndemics models have often included broad measures of physical and mental health, often referred to as Health-Related Quality of Life (HRQOL) to assess alternative interventions and health reform strategies.¹²

Recent efforts have produced some of the most comprehensive studies yet that establish the increased risk for individuals who are SMI, substance abusers, and HIV+. For example, our team first conducted a cross-sectional study¹³ using Medicaid claims data in Philadelphia as well as welfare eligibility files to

estimate the treated prevalence of SMI and HIV and the probability of receiving an HIV diagnosis in the presence and absence of a co-occurring SMI. The results indicated that the treated period prevalence of HIV among persons without an SMI diagnosis was .3% compared to .8% of those with a schizophrenia diagnosis and 1.7% of those diagnosed with an affective disorder, for a total risk among those with SMI of 1.6%. The odds of having an HIV diagnosis given a diagnosis of schizophrenia was 1.52 after controlling for age, race, and length of time on welfare; the odds given a diagnosis of affective disorder was 3.87 after controlling for the same variables. We concluded that the rate of HIV was significantly elevated among persons diagnosed with SMI and that the risk for those with affective disorder was even higher than for schizophrenia.

The addition of substance abuse into the syndemic mix markedly raises the risk of co-morbid SMI and HIV seropositives. Several studies using convenience samples found high rates of HIV infection among persons newly admitted to New York City inpatient psychiatric facilities (5-8%), among homeless men with SMI (19%) and among those persons dually diagnosed with an SMI and substance abuse (23%).¹⁴ A large multi-site study of HIV prevalence that was conducted with psychiatric inpatients and outpatients in Connecticut, New Hampshire, Maryland and North Carolina found rates of 3.1%, or approximately ten times the rate observed in the general population.¹⁵ A large sample of persons with schizophrenia spectrum disorders treated through the Veterans Administration found an important interaction where people with schizophrenia and co-morbid substance abuse were much higher risk for HIV, but in the absence of any substance use diagnosis, people with schizophrenia alone were actually at substantially lower risk for HIV than the general VA population.¹⁶ Comprehensive screening for HIV risk among psychiatric inpatients should include a substance abuse screen. A recent study conducted in Philadelphia and Baltimore showed that persons in treatment for mental illnesses in inpatient and outpatient clinical settings were about 4 times as likely to be infected with HIV as others living in those cities, and about 16 times the rate in the general US population.¹⁷

People who are homeless, mentally ill, and impaired by substance use or abuse may also be non-adherent to HIV treatment. For those who do get tested and know their HIV positive status, consistent adherence to ART has resulted in significant reductions in viral loads and CD4 counts.^{18,19} Increasing linkage to care and adherence to treatment can result in more global health benefits due to reductions in community viral load as well as more efficient use of infectious disease care and greater utilization of substance abuse and mental health.²⁰ Unfortunately, current estimates are that 45% to 55% of those who test positive for HIV infected never enter treatment.²¹⁻²³ Perhaps even more alarming are those who manage to enter treatment but are not retained²⁴⁻²⁷ since those people are at increased risk for developing treatment resistance.²⁸ The timing of treatment is also important. Standard of care has changed since research has shown that early initiation of ART has a potent effect on reduction of viral load.²⁹

Particularly concerning is the finding that persons engaged in injection drug use are disproportionately non-adherent and they also represent one of the most potent transmission vectors if they share needles.³⁰

As with any innovation in public health, questions regarding the cost effectiveness of integrative mental health, substance abuse, and infectious disease services. Costs associated with the service utilization of SMI with HIV is an area of interest and one in which our investigational team has demonstrated considerable experience. Rothbard, Blank and colleagues studied the economic costs associated with inpatient and outpatient care for persons with SMI and HIV³¹ and found that together, persons with SMI, HIV/AIDS or both made up only 6.2% of the Medicaid population but used 36% of the total expenditures. The SMI were 5.7% of the Medicaid population but used 30% of the total costs (7.9 times the costs of controls). Persons with HIV/AIDS were 0.3% of the population but used 2.5% of the costs (12.2 times the costs of controls), and persons with both SMI and HIV/AIDS made up only 0.2% of the population but used 3.0% of the resources (22.1 times the costs of controls). Clearly the group with co-occurring SMI and HIV/AIDS had the highest costs.

In order to better understand undetected metabolic and infectious disease in persons with SMI admitted to psychiatric inpatient care and to consider the potential benefits of initiating screening in these settings our team designed a remnant blood study.⁸ The study sample included 600 adult psychiatric patients with a diagnosis of serious mental illness admitted to two inpatient facilities. The subjects were primarily Medicaid recipients at high risk for metabolic illness and infectious diseases. We used an observational/naturalistic research design to gather evidence of the rates and types of undetected metabolic and infectious diseases in the inpatient population that would require interventions. Individual patient charts were abstracted to obtain data on diagnoses, demographics, treatment histories and pharmacological history prior to admission. Lab results from tests ordered by the unit were combined with lab results using discarded blood samples to obtain test results for blood glucose, cholesterol, triglycerides, HIV, hepatitis B and C, and hemoglobin A1c. Once information was entered and coded, all individual identifiers, other than the study ID was dropped from the files and data was linked. The final data set demographic information, prior treatment history, current treatment, pharmacologic history and lab results. The lab results showed that over 10% were HIV infected, 32% had Hepatitis B, 21% had Hepatitis C, 22% had high cholesterol levels and over 59% had Body Mass Indices (BMIs) above 25. The high incidence of somatic co-morbidities has been consistently documented in persons with psychiatric conditions. Perhaps because persons with long-term and persistent psychiatric disorders such as schizophrenia are more likely to suffer multiple chronic social and behavioral deficits, the majority of medical conditions do not receive adequate follow-up care. Next, we designed and demonstrated the effectiveness of an individually tailored treatment for syndemic persons called

Preventing AIDS Through Health (PATH).³²⁻³⁵ The PATH intervention utilized Nurse Health Navigators (NHNs) who were integrated into the model because of prior research which found improved outcomes for persons with HIV/AIDS with their involvement. HIV positive participants were recruited from among those already in treatment and if they also had a case manager for a serious mental illness, they were eligible for the study. We randomly assigned participants to the PATH intervention or control groups. PATH participants received an integrated intervention tailored to their own communication and comprehension needs which we describe as an “intervention cascade”. The intervention cascade included memory aid devices, education regarding side effects and other treatment aspects, and active community outreach provided by a nurse who delivered community-based care management at a minimum of one visit/week and coordinated their medical and mental healthcare for one year. In a Randomized Controlled Trial (RCT) 238 community-dwelling HIV- positive subjects with SMI who were in treatment at urban public mental health clinics from 2004-2008 were sampled. The main outcome measures were viral load and CD4 count at baseline and 12 months, and costs. Longitudinal models for continuous log viral load showed that the intervention group exhibited a significantly greater reduction in log viral load than did the control group at 12 months ($d = -0.384 \log_{10} \text{copies/mm}^3$ (95% CI = $-0.165, -0.606, p < 0.05$). Parallel process latent growth curve analyses demonstrated robust effects for biomarkers as well as indicators of mental health symptoms and health related quality of life through 24 months.³³ The PATH project tested the effectiveness of an individually tailored, community-based intervention delivered by a nurse health navigator to improve outcomes of individuals with HIV/SMI, and it demonstrated that persons with mental illnesses can be taught to adhere to HIV treatment successfully. This study demonstrated that persons with an SMI and HIV can achieve undetectable viral loads with appropriate supportive services.

In sum, delivery of comprehensive and individually tailored health care to homeless persons with HIV, mental illness, and substance abuse or dependence is complex and costly. However, to not provide that comprehensive care to people with these complex co-occurring conditions is very likely to be even costlier, both in terms of morbidity and mortality to those individuals, but also to the larger community where they live and with whom they interact. Not only is it the right thing to do, it is probably less costly in the long run than not providing adequate care.

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Editorial

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Potential Therapy of HIV/AIDS and Ebola Outbreak with Pregnancy Hormone, Human Chorionic Gonadotropin

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HIV is a retrovirus that destroys hosts' immune system. AIDS is a late stage HIV infection. About 35 million people are living worldwide with HIV/AIDS, mostly in sub-Saharan Africa. Although there is no known cure, advances are constantly being made on how to better prevent and/or treat HIV/AIDS patients. Current anti-viral therapies are quite expensive, have side effects and do not work for everyone. Thus, there is a substantial unmet need for cost effective treatments, particularly in developing countries.

Human Chorionic Gonadotropin (hCG) is a hallmark hormone of pregnancy. Its levels rapidly increase during the first trimester, reaching a peak by about the 9th week followed by a rapid decline to about one-tenth of the peak levels. Contrary to the previously held belief, hCG has many more roles other than rescuing corpus luteum during early pregnancy. These actions in toto are considered to favor pregnancy initiation, maintenance and then facilitating labor progression at the end of pregnancy. hCG along with its structural and functional homolog, Luteinizing Hormone (LH), can regulate many non gonadal tissues in both genders.¹

Some obstetricians empirically believed that hCG has antiviral properties, but there is no definitive scientific evidence. The notion that hCG may have an anti-HIV effects come from the findings that babies born to HIV positive mothers are typically infected during vaginal delivery, when baby's mucosal surfaces are covered with virus laden maternal blood and body fluids. This led to American College of Obstetricians and Gynecologists' recommendation to deliver the babies of HIV positive mothers by Caesarian section, following a course of antiviral therapy. There are also notable studies demonstrating that urinary purified hCG suppresses HIV replication, reverse transcriptase, gene transcription and protein synthesis. Since urine derived hCG is not 100% pure, it is naturally questionable whether the effects are truly attributable to hCG or to contaminants present in the hCG preparations. However, the intrinsic anti-HIV effect of hCG was confirmed by recombinant hCG, which is 100% pure, can inhibit HIV transmission from virus positive lymphocytes to virus negative trophoblasts. However, recombinant hormone was less effective than urinary purified hCG, which suggests that some unidentified contaminant might act synergistically with hCG.²

Fetus seems to be protected from maternal HIV in utero, but what it is that is protecting is unknown and is difficult to investigate in pregnant women. Pregnancy is a complex physiological state in which many hormones fluctuate in a temporal specific manner. To identify the protective factor(s), transgenic HIV mouse model had been developed. In this model, hCG has been shown to have a protective effect. This effect is mimicked by LH, but not by follicle stimulating hormone, thyroid stimulating hormone, prolactin, estradiol or progesterone. Although there are no in depth studies to precisely determine how hCG acts, preliminary data indicates that it works in part by decreasing serum TNF- α levels. The other unexplored mechanisms include, activation of cells of immune system, altered of secretion of other cytokines and chemokines, interference with viral entry into cells, their replication, infectivity and so forth.

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These findings suggest that hCG could be placed in a mix of treatment options for HIV/AIDS. hCG is non-toxic and has relatively few, if any, harmful side effects. hCG is already used for other clinical indications. It is quite inexpensive, compared with anti-viral drugs. Finally, affordable therapies can advance the efforts to control the spread of HIV/AIDS in sub-Saharan African countries and elsewhere. So what do we have to lose by simply trying hCG for the prevention and/or treatment of HIV/AIDS?

Like HIV, Ebola is also a RNA virus. Ebola is transmitted like HIV but it is much more contagious. Both are killers, while Ebola is a direct killer by destroying every cell it comes in contact with, HIV kills indirectly by disabling the host immune system which allows other pathogens to invade and kill. While HIV and Ebola are clearly very different viruses, they probably employ similar strategies to enter host cells by using their surface glycoproteins and host cell surface receptors and subsequently use the host cells machinery to make viral proteins that help them proliferate, spread and evade host immune system. Many of these molecular details are known for HIV and they are mostly unknown for Ebola. Ebola outbreak is devastating the West African countries of Guinea, Liberia and Sierra Leone and threatens other countries. Intensive supportive therapy and blood transfusions from Ebola survivors are the current best options for treating infected individuals. There may not be any other new definitive treatments in the near future. If hCG has anti-viral effect on one RNA virus, it may also have a similar effect on another RNA virus. Although this is highly speculative, but it may not be too far-fetched. The world is desperate for anything that might contain the Ebola outbreak before it makes a big leap from West Africa to other parts of the world. Therefore, it might be worth considering hCG in a rapid clinical trial in Ebola infected patients. Synthesis of recombinant hCG or making urine purified hCG could be rapidly scaled up to meet the world's demand, if proven effective. In light of the dire circumstances, there is little to lose and perhaps much to gain.

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The Need for a New Generation of HIV Diagnostics

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Despite remarkable advances in the prevention and treatment of HIV, over 35 million individuals currently live with active HIV infection and worldwide, there were nearly 2.1 million new cases of HIV in 2013.^{1,2} The benefits of rapid testing to determine HIV infection are well established - the introduction of Highly active antiretroviral therapy (HAART) treatment within four hours of exposure has been shown to dramatically limit both virus spread and progression to AIDS.³ Equally critical is the need to continuously monitor virus load in individuals on HAART and/or other HIV therapies. With the expansion of HAART in countries with poor access to and/or quality of health care, individual variations in HAART effectiveness may be infrequently monitored. Negative outcomes of this well-intended expansion may be that individuals on HAART assume they are either virus-free or incapable of spreading infection - whereas the opposite status would have potentially tragic outcomes. Lastly, as we look to the future and the implementation of HIV vaccines, the capacity to monitor virus directly, not just the presence of antibodies to HIV, is increasingly critical.

Diagnostic tests to detect HIV based on the presence of circulating antibodies are portable, relatively rapid and low cost (e.g., OraQuick In-Home HIV Test \$40USD) and are thus suitable for in-home use. However, these tests have inherent limitations. First, as the presence of antibodies to HIV requires an inductive phase of immune activation, which may vary among individuals, these kits cannot reliably measure HIV infection until weeks after initial contact. Second, these tests are not quantitative. Third, such assays are not suitable for monitoring the status of chronic HIV infection, as antibodies to HIV are constitutively present at high levels. Lastly, while such kits may have utility in measuring the induction of an immune response to HIV vaccines, they are not suitable for assessing virus infection in individuals who may have received such a vaccine. Traditional approaches to directly measure the presence of virus, by DNA/RNA based PCR or by ELISA methods, are quantitative and characterized by high sensitivity (50 particles/ml and 3.5 pg/ml respectively). Unfortunately, these tests require relatively sophisticated accompanying infrastructure in the form of access to a health clinic or diagnostic lab, and accordingly they are more expensive (\$100-300USD per assay) and restrictive to use.

As a result, even patients with access to excellent care are often monitored infrequently, and many HAART subjects with limited access to health care professionals are simply not monitored at all. Alere Inc. has marketed a more recent improvement on these approaches in the form of both a point-of-care HIV antibody/p24 antigen test (Alere Determine™ HIV-1/2Ag/Ab Combo) and of a self-contained PCR-based screening method/device for use in local clinics (Alere™ q HIV-1/2 Detect). While these constitute important advances in both diagnostics and care, the need remains for a point-of-care test that is both quantitative and affordable.

In summary, while each of the approaches noted above offer advantages, none achieve the desired ultimate goal of direct virus measurement using a low cost, point-of-care device that is sensitive, quantitative and, when desired, directly linked to a health care professional for follow on decisions. This analysis also suggests that continued refinement of assays based on the

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traditional molecular technologies of ELISA, Western blot and PCR are likely not viable solutions.

Recent progress in micro-electronics and micro-mechanical fabrication technologies opens exciting possibilities for the development of a new class of devices to measure chemical and biological elements.⁴ High frequency Bio Nano Sensors (BNS) are small microchip size, solid-state devices with disk, plate or prism shapes that are implanted with a system of metal electrodes used for interfacing the sensor with electronic circuits. They are label-free, inexpensive, portable and simple to use, and can sense gases, fluids and solid materials with high accuracy and reproducibility. BNS are thus well suited for applications in analytical labs as well in point-of-care settings. Among several BNS detection systems, piezoelectric high frequency technology provides a particularly attractive platform. These devices are compatible with integrated circuit, and micro and nanoelectromechanical systems, show excellent aging characteristics, and are capable of measuring multiple components in one sensor package. Sensors based on this technology can be manufactured using standard photolithography and are relatively inexpensive to produce.

Piezoelectric sensors function as resonant electromechanical units that can be excited at their fundamental and harmonic frequencies to generate acoustic waves having different penetration depths. This sensing attribute provides the distinctive capability of 'slicing' biological interfaces simultaneously at different depths, thus improving selectivity, sensitivity and reliability during detection. Of the many types of piezoelectric sensors several have also been developed for medical applications, including the use of immunosensors in which antibodies or antigens are immobilized on the sensor surface.⁵ Examples of this approach include the measurement of virus and virus antibodies, including herpes virus, hepatitis virus, swine fever virus, and at least in one indication the measurement of HIV-1/2 with both specificity and speed.⁶

In conclusion, it's time for health care workers and virologists to look increasing to technologies resting classically in the domains of physics, engineering and information technology to advance new approaches to HIV diagnostics - ones that no longer rely on either the historical business model of laboratory medicine or approaches of molecular medicine. While BNS need to improve both in the sensitivity of detection and the miniaturization of component parts, this technology holds great promise for a markedly new approach to HIV diagnostics and care. In theory, BNS technology also enables the simultaneous measurement of multiple parameters of health status beyond the level of antibody and virus, such as CD4 counts. These measurements when conducted at home or in local clinics could then be electronically linked to a health care professional ushering in a new era of remotely managed integrated health care.

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Research

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Religious and Psychosocial Covariates of Health-Related Quality of Life in People Living with HIV/AIDS

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ABSTRACT

HIV/AIDS is a chronic, highly stigmatized illness that requires significant lifestyle adjustments, including consistent adherence to Antiretroviral Therapy (ART) in order for People Living With HIV/AIDS (PLWH) to survive and maintain good immune health. PLWH often report poor or moderate Health-Related Quality of Life (HRQoL) that is worse than the general population. This may be related to the psychological and physiological demands of HIV disease and the sociodemographic stressors associated with it. The role of religious coping, religiosity, and social support in the mental and physical dimensions of HRQoL is less known, although recent studies highlight that PLWH rely on spirituality/religion to cope with HIV-associated stressors. This study examined the effects of religious coping, religiosity, depressive symptoms, medication adherence, and social support satisfaction in various dimensions of Health-Related Quality of Life (HRQoL) in a sample of 292 PLWH. Majority of participants were African-American (90.1%) and 56.2% were male. Mean age was 45 years and, on average, participants lived with HIV for nearly 11 years. Descriptive statistics, correlations, Analysis of Variance (ANOVA), and hierarchical multiple linear regression were used to analyze the data. Income, sex ($\beta = .14$), age ($\beta = -.14$), depressive symptoms ($\beta = -.27$), and social support satisfaction ($\beta = .17$) significantly predicted physical HRQoL. Results indicate that income ($\beta = .13$), sex ($\beta = .14$), medication adherence ($\beta = .13$), negative religious coping ($\beta = -.18$), religious attendance ($\beta = .13$), religiousness ($\beta = .16$), and social support satisfaction ($\beta = .27$) significantly predicted mental HRQoL. Depressive symptoms ($\beta = -.38$), positive religious coping ($\beta = .24$), and social support satisfaction ($\beta = .16$) significantly predicted general HRQoL. Participants, who were female, prayed less than daily, attended religious services less than weekly or who were non/less religious had significantly poorer HRQoL. The findings confirm the importance of religion, mental health, medication adherence and social support in the HRQoL of PLWH, which should all be routinely assessed by clinicians.

KEYWORDS: HIV/AIDS; Health Related Quality of Life; Religion; Coping; Social support; Adherence.

INTRODUCTION

People Living With HIV/AIDS (PLWH) often report poorer Health-Related Quality of Life (HRQoL) than that of the general population,¹ especially after the diagnosis of HIV.² This may be related to the psychological and physiological demands of HIV disease, social stressors, or demographic factors. Religion and spirituality are important social determinants

of health and public health,³ especially in the context of HIV/AIDS⁴ and may be used by PLWH to cope and improve their HRQoL.^{2,5} Religion and spirituality serve as central guiding forces in the daily life of many people,^{6,7} including People Living With HIV/ADS (PLWH).⁸⁻¹¹ Growing evidence supports an association between spirituality or religiousness and, both, better health^{6,7,12-16} and better quality of life.^{2,5,6,8,17-22} Mueller et al.⁶ review found that most studies identified significant associations between spirituality/religiousness and better health outcomes, including better coping skills and better health-related quality of life (even during terminal illness). The association between spirituality or religiousness and health outcomes may be explained by a number of variables, including coping style,^{23,24} psychological factors,²⁵ and social support.^{26,27} However, more research in this area and among PLWH is necessary. This is particularly important since HIV is a chronic, highly stigmatized disease and requires significant lifestyle adjustments in order for PLWH to survive and lead relatively healthy, quality lives. The purpose of this paper is to identify associations among religious and psychosocial correlates and covariates of Health-Related Quality of Life (HRQoL) among PLWH in the Southeastern US and also differences in mean HRQoL scores between groups based on socio-demographic and religious factors.

Spiritual/Religious Coping and Health Related Quality of Life among PLWH

Researchers have identified significant associations between spiritual or religious coping and a variety of health outcomes, including psychological health, physical HRQoL in PLWH.^{25,28-32} The quality of life (QoL) literature highlights significant positive associations between spirituality/religiousness and overall QoL or HRQoL.^{5,8,20,21,25, 28,30,33-37} However, only few studies specifically examined the association between religious coping and HRQoL among PLWH.^{2,8,20,21,25,30} Additionally, only few studies have examined differences in HRQoL between groups based on religious factors in PLWH.^{2,5,8,19,22}

Cross-sectional and longitudinal studies by Tsevat and colleagues^{2,5,19} reported that spiritual well-being and religious coping significantly improved the QoL of PLWH. These associations have also supported by additional longitudinal studies. For example, Mrus et al.²¹ studied 450 PLWH over a 12 to 18-month period and found that levels of spirituality/religiousness were associated with all baseline and follow-up HRQoL outcomes (except for "symptom bother" at baseline). They found that positive religious coping scores were positively related to overall HRQoL function, organized religious activity was positively related to higher health ratings and intrinsic religious coping was inversely related to overall HRQoL function. Change in positive religious coping and religious activity were also shown to relate to HRQoL outcomes at follow-up.²¹ Likewise, in a 24-month prospective study of 226 men with HIV from the Southeastern U.S, Frame et al.²⁵ found that spiritual coping was not related to any mental HRQoL, but spiritual growth was associated with and significantly predicted all HRQoL outcomes at both time points. After controlling for covariates (race, education, age, marital status and CD4 cell counts), a 1 unit increase of spiritual growth

was associated with a 4.74 unit increase in overall QoL ($p < .0001$), a 6.4 unit increase in role functioning ($p = .0215$), a 12.38 unit increase in emotional well-being ($p < .0001$), and a 9.49 unit increase in energy scores ($p < .0001$), at each time point.²⁵

Although several researchers have identified a relationship between spiritual/religious variables, such as religious coping, and QoL, Weaver et al.³⁰ found that religious coping was not related to QoL in a sample of HIV-positive women. As such, the findings in this area remain mixed. Overall, the relationships between religiousness/spirituality and QoL outcomes may be partially explained by the use of religious and spiritual coping strategies, but more research is needed to specifically examine the effect of religious coping on QoL outcomes among PLWH and to investigate mediators of this relationship and mean differences in HRQoL outcomes based on socio-demographic and religious factors.

Religiousness, Religious Coping, Social Support in PLWH: Trends and Links to HRQoL

Persons' degree or level of religiousness and frequency of religious practices may affect their decisions to engage (or not engage) in religious forms of coping and may also impact their reported HRQoL. Studies show that people report a significant increase in religiousness or spirituality after an HIV diagnosis.^{32,38-40} This increase may reflect an effort to cope with the physiological and psychological demands of living with HIV disease. PLWH face many stressors related directly to HIV symptoms, as well as, psycho-social stressors,^{17,18,41,42} such as stigma and disclosure.⁴³ A number of studies have found that religious and spiritual coping are important ways of dealing with HIV-related stress^{32,44-46} and spiritual perspective is an important correlate and predictor of mastery over stress in PLWH.⁴⁷

Levels of spirituality/religiousness are not uniform among PLWH across demographic variables.³² Two of the most common demographic trends among PLWH are that women more than men^{27,48,49} and people of color more than Whites are more spiritual/religious^{11,36} and use more spiritual and religious coping.⁴⁶ For example, a national, longitudinal study of 2266 PLWH,¹¹ found that non-White patients reported significantly higher religiousness and spirituality than White patients. Residence in the South was also associated with higher spirituality and patients with a high school or college degree reported higher religiousness than those who did not graduate from high school.¹¹ Grimsley³⁶ also found a significant relationship between ethnicity and spirituality such that average spirituality scores were higher for black patients than for white patients, but he found no significant differences in spirituality between men and women.

Other researchers have examined differences in spiritual coping practices among PLWH. Bader et al.⁴⁸ found similar demographic trends in the use of religious and spiritual coping as seen levels of spirituality and religiousness. Researchers also found that ethnic minorities more than whites use religion and spirituality to cope with HIV disease.^{11,36,45,46,49,50} Tarakeshwar et al.²⁷ found that greater spiritual coping was associated with

being female, being an ethnic minority, having less education, earning lower income, and being heterosexual.

PLWH often use religious and spiritual beliefs and practices to help them cope with their situation.^{31,44} In one study of 80 women with HIV, researchers found that high social support and having a spiritual perspective (frequency of spiritual attendance/activities, forgiveness and importance of spirituality) were significant predictors of mastery over stress.⁴⁷ One randomized controlled trial of a spiritual mantram repetition intervention among PLWH³³ demonstrated that certain spiritual practices seem to have some QoL benefits. Borman et al.³³ found that, the mantram group improved more in QoL *during* group meetings, but the control group improved more at 22-weeks. Although no mantram group effects were noted, quality of life, total existential spiritual well-being and mean peace scores were all positively related to mantram practice by self-report or by using counters.³³

Studies have shown that social support is positively associated with QoL in PLWH-cross-sectionally^{51,52} and over time.^{53,54} Burgoyne R and Renwick R⁵³ found that older age, lower satisfaction with social support were associated with a decline in HRQoL from baseline to the 6 month follow up and that adherence to Antiretroviral Therapy (ART) was associated with an increase in HRQoL. Swindells et al.⁵⁴ assessed 41 PLWH over a four year follow-up and identified bidirectional associations between social support and HRQoL and longitudinal data showed that poorer mental HRQoL predicted poorer emotional and informational social support.

Guiding Framework

The study was guided by the following model (Figure 1), which is based on findings from the literature. The model depicts proposed relationships between religious coping and HRQoL.

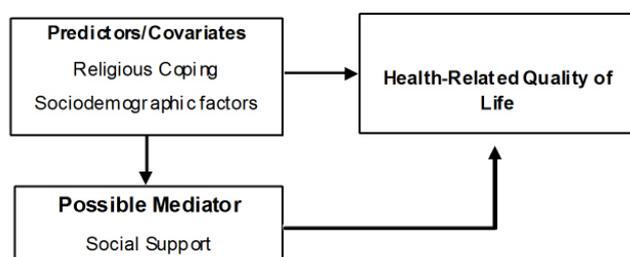


Figure 1: Model of relationships between religious coping and health related quality of life.

METHODS

Recruitment and Data Collection

The sample was recruited over a six month period from an outpatient infectious disease clinic at a large university-affiliated health center and an AIDS service organization in the Raleigh-Durham area of North Carolina. Approval was obtained

from the University Institutional Review Board. Each participant provided written informed consent prior to being enrolled into the study. The sample included 292 HIV-infected men and women. Eligibility criteria required participants to be HIV-infected, 18 years of age or older, able to speak and understand English and mentally competent as determined by a screening assessment with the Mini Mental Status Exam (MMSE; scores ≥ 27).⁵⁵ The MMSE was administered by the Principal Investigator (PI) or a trained research interviewer and all other questionnaires were administered once using the Audio Computer Assisted Self Interview (ACASI) on laptop computers. Each participant received monetary compensation.

Measures

Demographic

Socio-demographic information was collected using a 20-item form, which asked participants about their age, race/ethnicity, gender, and year of HIV diagnosis, approximate annual and monthly income, highest level of education completed, and employment/occupation status.

Religiosity and religious practices

A modified version of the Brief Multidimensional Measure of Religiosity/Spirituality (BMMRS)⁵⁶ was used to assess religious/spiritual involvement, perspectives and behavior. Thirty-three of the original 38 items were used to assess frequency of prayer, frequency of religious service attendance, daily spiritual experiences, meaning, values/beliefs, forgiveness, religious and spiritual coping, religious support, religious/spiritual history, commitment, organizational religiosity, religious preference, and overall self-ranking (as a religious or spiritual person). There is no total score.

Religious coping

The short version of the Religious Coping Scale (RCOPE)⁵⁷ was used to assess religious coping. The Brief RCOPE is a 14-item scale that measures 2 dimensions: positive religious coping and negative religious coping, with 7 items each.⁵⁷ Participants rate their use of individual coping strategies when dealing with difficult life situations using a 4-point rating scale from (1) "not at all" to (4) "a great deal". Positive religious coping items include strategies such as seeking spiritual support and benevolent reappraisals. The negative religious coping scale contains items such as, "I questioned God's love for me" and "I wondered whether God had abandoned me". Higher summary scores represent more frequent use of the respective negative or positive religious coping strategy. In this study, Cronbach's alpha was 0.86 for the negative RCOPE and 0.92 for the positive RCOPE subscales.

Depressive symptoms

The Center for Epidemiological Studies Depression scale (CES-D) was used to assess symptoms of depression over the previous 7 days.^{58,59} The scale consists of 20 items, each of

which is scored on a 4-point frequency scale from (0) “rarely” to (3) “most or all” of the time. The CES-D scale reliability has been established and the scale has been successfully used in samples of people living with HIV/AIDS.^{60,61} Cronbach’s alpha was 0.91 in this study.

Medication adherence

Medication adherence was assessed using the Antiretroviral General Adherence Scale (AGAS). The AGAS is self-report tool comprised of 5 items that focus on the ability and ease of taking antiretroviral medications, as prescribed by the healthcare provider, within the previous 4 weeks.^{62,63} 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. For this study, Cronbach’s alpha was 0.78.

Social support

Satisfaction with social support was assessed using the Social Support Questionnaire -6 (SSQ -6)⁶⁴ that assess the number of available people that the individual feels he or she can turn to for support and the individual’s degree of satisfaction with the perceived support available. Responses are given on a 6-point Likert scale (very dissatisfied to very satisfied). The SSQ-6 has high internal reliability, with alphas from .90 to .93. Cronbach’s alpha for this study was 0.91.

Quality of life

HRQoL was measured by the RAND-36-Item Health Survey 2.0.⁶⁵ This is a 36-item tool that measures HRQoL life in eight dimensions (subscales).⁶⁵ Subscale response sets were recoded per a scoring key provided by RAND researchers where a high score denotes a more favorable state of health with a range of 0-100 (from lowest to highest). Cronbach’s alphas for the subscales were: 0.90 (physical functioning), 0.86 (role limitations due to physical functioning), 0.86 (role limitations due to emotional functioning), 0.68 (energy/fatigue scale), 0.82 (emotional well-being), 0.55 (social functioning), 0.85 (pain), and 0.76 (general health). Reliability coefficients greater than 0.75 for all subscales except social functioning have also been reported by others.^{66,67} The RAND 36 scale has no total score. Composite scores for physical and mental HRQoL were used. The physical health composite score is comprised of physical function, role limitations due to physical health, bodily pain, and general health subscale scores.^{65,68,69} The mental health composite score is comprised of vitality (energy/fatigue), social functioning, role limitations due to emotional or personal problems, and emotional well-being subscale scores.^{65,68} Cronbach’s alpha were 0.80 for the physical HRQoL composite and 0.75 for the mental HRQoL composite.

Data Analysis Procedures

Data were analyzed using the Statistical Package for

the Social Sciences (SPSS) version 22.0. Descriptive statistics included means, standard deviations, frequencies, and cross-tabulations were calculated. Histograms, box-plots and normality tests (Shapiro-Wilk) were used to examine the normality of the data. Bivariate correlations were employed to examine associations between variables of interest and between (dummy-coded) socio-demographic variables identified within the literature to be associated with HRQoL. We also conducted one way Analysis of Variance (ANOVA) to examine differences in mean HRQoL scores between groups based on race, education, religiousness, prayer and religious attendance. The F test (F-statistic and p -value $< .05$) indicated significant mean differences in HRQoL scores between groups based on dichotomous religious and socio-demographic covariates.

Hierarchical multiple linear regression was used to examine the variance in physical and mental HRQoL explained by religious coping. Physical and mental composite scores of HRQoL were calculated and transformed linearly into T scores as recommended by RAND researchers.⁶⁸ The physical health composite score is comprised of physical function, role limitations due to physical health, bodily pain, and general health subscale scores.^{65,68} The mental health composite score is comprised of vitality (energy/fatigue), social functioning, role limitations due to emotional or personal problems, and emotional well-being subscale scores.⁶⁸ Three separate hierarchical regression models were used to examine predictors of HRQoL dimensions (physical, mental and general). A 4-block regression model was conducted using the enter method. Significant dummy coded or continuous socio-demographic covariates were entered in the first block, significant clinical variables were entered into the second block, significant religious variables entered in the second block and social support was entered in the last block. Social support was entered in the last block in order to examine unique variance explained in these HRQoL dimensions by social support and also to explore social support as a mediator of the expected association between religious coping and HRQoL. For each model, the ANOVA test (F-statistic and p -value < 0.05) for each block provided an evaluation of the overall significance of the models and various statistics, including Beta coefficients, standard error of the Betas, R-square, and R-square change, provided evaluation of the significance (p -value $< .05$) of each independent variable. R-squared and adjusted R-squared indicated the overall variance explained by each block in the model and the R-squared change statistic indicated the amount of unique variance explained in each respective HRQoL dependent variable by the added independent variable or block of variables. All reported regression coefficients are standardized coefficients and significance of each independent variable coefficient was at five percent alpha. We also explored social support as a mediator of the association between religious coping and HRQoL, using Baron and Kenney’s guidelines.⁷⁰

RESULTS

Sample Characteristics

The sample consisted of 292 HIV-infected participants

in the Southeastern US. Their socio-demographic characteristics reflected those living with HIV in this region and nationally (Table 1). Participants' mean age was 45.1 years ($SD=7.75$). The sample was predominantly male (56.2%), Black or African American (90.1%) and U.S. born (98.3%). Approximately one third of participants were married or in a committed relationship (27.1%). More than half of the sample (58.2%) self-identified as heterosexual and almost a third identified as sexual minorities (18.8% "gay or homosexual" and 9.1% as bisexual). Majority of (88.6%) participants were unemployed or receiving disability compensation and nearly three fourths (73.0%) were impoverished, with annual incomes less than \$11,000. Approximately half (53.1%) obtained a high school diploma or equivalent and one third (33.1%) completed some higher education. On average participants had been living with HIV for 10.8 years ($SD=7.8$).

Variable	n	%	
Race/Ethnicity			
Black	263	90.4	
White	18	6.2	
Birth Sex			
Male	163	56.2	
Female	127	43.8	
Educational level			
Less than high school	40	12.1	
High school or G.E.D.	154	53.1	
College or Technical School	85	29.3	
Grad or Professional School	11	3.8	
Marital Status			
Married	35	12.0	
Divorced/ Separated/ Widowed	106	36.4	
Single/Never Married	106	36.4	
Committed Relationship	44	15.1	
Employment Status			
Part-time	23	8.0	
Unemployed or on Disability	256	88.6	
Annual Income			
< \$11,000	200	73.0	
≥ \$11,000	74	25.3	
Sexual Orientation			
Straight or Heterosexual	167	58.2	
Gay or Homosexual	54	18.8	
Bisexual	26	9.1	

Religious Service Attendance			
Never	25	8.6	
1-2 times per year	45	15.5	
1-2 times a month or so	106	33.2	
More than once a week	124	42.8	
Prayer			
Never	10	3.4	
Less than once per month	15	5.2	
Once or few times monthly	27	9.3	
Once or several times per week	46	15.8	
Daily or more often	192	66.2	
Identification as Religious Person			
Very	80	27.7	
Moderately	108	37.4	
Slightly	56	19.4	
Not at all	7	2.4	
Religious Affiliation			
Christian/Catholic/Adventist/Methodist	83	28.5	
Baptist	139	48.9	
Jewish, Muslim or Buddhist	13	0.6	
Muslim	7	2.5	
Buddhist	4	1.4	
Belief in God, No Affiliation	24	8.5	
Atheist or No Belief In God	4	1.4	
Depressive symptomatology			
Depression symptoms (CESD ≥ 16)	164	56.2	
Non-depression symptoms (CESD <16)	125	42.8	
Variable	M	SD	Range
Age	45.1	7.75	19 - 67
Years HIV-infected	10.8	6.96	1 - 35
HIV medication adherence	24.3	5.87	5 - 30
Depressive symptoms	19.3	12.84	0 - 57
Positive religious coping	16.6	5.06	0 - 21
Negative religious coping	4.9	5.34	0 - 21
Total religious coping	21.5	7.29	0 - 42
Social support satisfaction	30.5	8.2	5 - 36

Table 1: Sample Characteristics

A large percentage (65.1%) of participants identified as being a 'moderately' or 'very' religious person and only 2.4% identified as being a non-religious person. Participants were predominantly Christian (77.4%) - almost half of whom were Baptist (48.9%). A large proportion of the sample engaged in regular religious service attendance (76.0%, ≥ 2 times/week or 1-2 times/month) and frequent prayer (66.2%, daily or more often).

On average, the sample reported a high amount of depressive symptoms during the 7 days prior to the interview (Table 1). According to a cut-off score established by Radloff⁵⁹ of 16 or above, scores on the CES-D reflecting depressive symptomatology may indicate probable depression. The average CES-D score was moderately high (19.3 ± 12.8) and more than half of the participants (56.2%) had depressive symptoms (CES-D scores ≥ 16 , Table 1). On average, participants reported high satisfaction with their social support (30.5 ± 8.2) and moderate adherence to antiretroviral therapy (24.3 ± 5.9). Participants also reported moderate HRQoL in all dimensions (Table 2), on average.

Correlates and Covariates of HRQoL

All independent and outcome variables were determined to be non-normally distributed using histogram, box-plots and normality tests (Shapiro-Wilk). Therefore, Spearman's Rho correlations were used to identify significant covariates of HRQoL (Table 2). Physical HRQoL composite scores were significantly inversely correlated with depressive symptoms ($r = -.46$), negative religious coping ($r = -.28$), age ($r = -.12$), years HIV-positive ($r = -.12$) and significantly positively correlated with social support satisfaction ($r = .33$), medication adherence ($r = .22$), and income ($r = .22$). Better physical HRQoL was also significantly associated with being male ($r = .18$) and being married or in a committed relationship ($r = .21$). Mental HRQoL composite scores were significantly inversely correlated with depressive symptoms ($r = -.74$) and negative religious coping ($r = -.36$). The high correlation between mental HRQoL and depressive symptoms was likely due to multicollinearity and overlap in the mental health aspects assessed.

Mental HRQoL was significantly positively correlated with positive religious coping ($r = .18$), social support satisfaction ($r = .42$), medication adherence ($r = .34$), and income ($r = .16$). Better mental HRQoL scores were also significantly correlated with being a male ($r = .12$), being married ($r = .17$), attending religious services weekly or more ($r = .26$), praying daily or more often ($r = .14$), and self-identification as a 'very' or 'moderately' religious person ($r = .17$).

General HRQoL was significantly: inversely correlated with depressive symptoms ($r = -.37$), negative religious coping ($r = -.26$), years HIV-positive ($r = -.16$), and age ($r = -.15$) and positively correlated with positive religious coping ($r = .29$), social support satisfaction ($r = .34$), and medication adherence ($r = .22$). Better general HRQoL was also significantly correlated with self-identification as a 'very' or 'moderately' religious person ($r = .12$).

Depressive symptoms, medication adherence, negative religious coping, and social support satisfaction significantly related to all HRQoL scores. Marital status significantly correlated with both HRQoL composites and 7 of the 8 subscale scores. Positive religious coping significantly correlated with the mental HRQoL composite and 4 subscale scores. Income significantly correlated with both HRQoL composites and 6 subscale scores. Religious attendance and religiousness significantly correlated with mental HRQoL and 4 subscale scores. Other variables were less consistent correlates across HRQoL dimensions.

Regression Results Predicting HRQoL Scores

The model estimating physical HRQoL (Table 3) showed that physical HRQoL scores significantly: *increased by* (1) 0.20 points for every dollar increase in income ($\beta = .20$, $p = .001$), (2) .14 points for males ($\beta = .14$, $p = .024$), and (3) .17 points for every unit increase in social support satisfaction ($\beta = .17$, $p = .015$) and *decreased by* (4) .14 points for every year increase in age ($\beta = -.14$, $p = .026$) and (5) .27 points for every unit increase in depressive symptoms ($\beta = -.27$, $p = .000$). The *F*-test for the full model was significant ($F = 9.51$, $p = .000$), thereby supporting the fit of the model, which explained 27.0% of the variance in physical HRQoL (Adjusted $R^2 = .270$). Demographic variables accounted for 13.1% (R-Square change = .131, Significant *F* change = .000), clinical variables for 14.7% (R-Square change = .147, Significant *F* change = .000), and social support for 2.1% (R-Square change = .021, Significant *F* change = .015).

Results from the model estimating the mental HRQoL composite (Table 3, middle) showed that income ($\beta = .13$, $p = .032$), sex ($\beta = .14$, $p = .002$), medication adherence ($\beta = .13$, $p = .04$), negative religious coping ($\beta = -.18$, $p = .005$), religious attendance ($\beta = .13$, $p = .04$), religiousness ($\beta = .16$, $p = .01$), and social support satisfaction ($\beta = .27$, $p = .000$) explained significant variance in mental HRQoL. Mental HRQoL scores *increased by* 1) 0.13 points for every unit increase in income, 2) .14 points for males, and 3) .13 points for every unit increase in medication adherence, 4) .13 points for participants who attend religious services weekly or more often, 5) .16 points for participants who identify as a 'moderately' or 'very' religious person, and 6) .27 points for every unit increase in social support satisfaction. Mental HRQoL scores *decreased by* .18 points for every unit increase in negative religious coping.

The *F*-test for each block and the full model was significant ($F = 9.05$, $p = .000$), supporting the fit of the model. The full model explained 26.6% of the variance in physical HRQoL (Adjusted $R^2 = .266$), significantly accounted for by demographic variables (6.2%) (R-Square change = .062, Significant *F* change = .003), medication adherence (7.4%) (R-Square change = .074, Significant *F* change = .000), religious variables (10.5%) (R-Square change = .105, Significant *F* change = .000), and social support satisfaction (5.8%) (R-Square change = .058, Significant *F* change = .000). Negative religious coping was significant in Block 3 ($\beta = -.23$, $p = .000$, not shown) and also remained significant in the final block when social support satisfaction was

HRQoL Variables	1	2	3	4	5	6	7	8	9	10
1. Physical HRQoL ^a	-									
2. Mental HRQoL ^b	.72***									
3. General health	.62***	.48***	-							
4. Physical role limitations	.85***	.63***	.37***	-						
5. Emotional role limitations	.58***	.85***	.32***	.61***	-					
6. Vitality (Energy/fatigue)	.68***	.80***	.55***	.52***	.53***	-	-			
7. Emotional well-being	.52***	.81***	.46***	.38***	.54***	.63***	.63***	-		
8. Social functioning	.61***	.84***	.35***	.50***	.56***	.63***	.42***	.46***	-	
9. Physical functioning	.81***	.51***	.40***	.57***	.37***	.42***	.42***	.57***	.54***	-
10. Pain	.77***	.57***	.37***	.51***	.39***	.42***				
Covariates										
Depressive symptoms	-.46***	-.74***	-.37***	-.39***	-.53***	-.56***	.20**	.10	-.04	.05
Positive RCOPE	.08	.18**	.29***	.04	.14*	.21***	-.43***	-.33***	-.26***	-.18**
Negative RCOPE	-.28***	-.36***	-.26***	-.22***	-.25***	-.21***	.34***	.34***	.24***	.30***
Social support ^c	.33***	.42***	.34***	.22***	.33***	.36***	.33***	.31***	.21***	.15*
Medication adherence	.22***	.34***	.22**	.16*	.25***	.26***	-.04	-.04	-.09	-.08
Years HIV-positive	-.12*	-.05	-.16**	-.05	-.07	.01	.02	-.01	-.08	-.08
Age	-.12*	.01	-.15*	-.04	.04	.02	.07	.11†	.17**	.15*
Sex ^d	.18**	.12*	-.01	.19***	.12†	.10	.11†	.17**	.26***	.14*
Income ^e	.22**	.16**	.11†	.19**	.13*	.14*	.14*	.16**	.16**	.20***
Marital status ^f	.21***	.17**	.14*	.16**	.11†	.16**	.26***	.26***	-.02	.10†
Religious attendance ^g	.08	.26***	.07	.07	.19**	.18**	.18**	.11†	.03	.05
Prayer ^h	.08	.14*	.10†	.07	.12*	.10	.15**	.15*	.03	.10†
Religiousness ⁱ	.09	.17**	.12*	.02	.10†	.18**	62.4	67.0	58.7	60.4
M	50.0	50.0	53.5	47.9	52.4	53.1	23.8	29.4	28.6	29.9
SD	11.0	11.0	21.2	11.0	44.2	21.6	8 - 100	0 - 100	0 - 100	0 - 100
Range	25.0- 8.5	25.0- 68.5	5.0- 95.0	26.9-69.7	0 - 100	0 - 100				

^aPhysical health-related quality of life composite score. ^bMental health-related quality of life composite score. ^cSocial support satisfaction: scored from 1 for very dissatisfied to 6 for very satisfied. ^dBirth Sex: 0 = female, 1 = male. ^eAnnual income: 0 = < \$11,000, 1 = ≥ 11,000. ^fMarital status: 0 = separated, widowed, divorced, never married, 1 = married or in a committed relationship. ^gReligious attendance: 0 = less than weekly, 1 = weekly or more. ^hPrayer: 0 = Less than daily, 1 = Daily or several times daily. ⁱReligiousness: 0 = 'not at all and 'slightly', 1 = 'very' and 'moderately'. *p < .05. **p < .01. ***p < .001. †p < .10.

Table 2: Religious, Psychosocial and Demographic Covariates of Health-Related Quality of Life: Correlations and Descriptive Statistics

entered into the model, which suggests that the association between negative religious coping and mental HRQoL is not mediated or explained by social support satisfaction.

The model estimating general HRQoL (Table 3, bottom) was a good fit ($F = 6.06, p = .000$) and shows that depressive symptoms, positive religious coping, and social support satisfaction explained significant variance in general HRQoL. General HRQoL scores increased by .24 points for every unit increase in positive religious coping ($\beta = .24, p = .002$) and by .16 points for every unit increase in social support satisfaction ($\beta = .16, p = .024$) and decreased by .38 points for every unit increase

in depressive symptoms score ($\beta = -.38, p = .004$).

The full model explained 20.3% of the variance in general HRQoL (Adjusted $R^2 = .203$). Demographic variables (age, marital status) significantly accounted for 3.2% of this variance (R-Square change = .032, Significant F change = .029). Clinical variables (years HIV-positive, depressive symptoms, medication adherence) significantly accounted for 13.2% variance (R-Square change = .132, Significant F change = .000). Religious variables (negative and positive religious coping, prayer, religious attendance, religiousness) significantly accounted for 6.1% of this variance (R-Square change = .061, Significant F

Variable	Overall F-test	Beta ^a	Standardized Beta	t	df	p-value	R ²	Adjusted R ²	R ² Change	Sig. F Change
Dependent: Physical HRQoL^b										
Block 1 (Demographic)	7.65				4, 203	.000	.131	.114	.131	.000
Income ^c		5.10	.20	3.36		.001				
Sex ^d		3.18	.14	2.28		.024				
Age		-.20	-.14	-2.24		.026				
Marital status ^e		2.18	.09	1.39		.167				
Block 2 (Clinical)	10.99				7, 200	.000	.278	.253	.147	.000
Years HIV-positive		-.07	-.04	-.66		.513				
Depressive symptoms		-.24	-.27	-3.68		.000				
Medication adherence		.16	.08	1.21		.226				
Block 3 (Religious)	9.69				8, 199	.000	.280	.251	.002	.413
Negative RCOPE		-.09	-.04	-.63		.531				
Block 4 (Social Support)	9.51				9, 198	.000	.302	.270	.021	.015
Social Support ^f		.24	.17	2.46		.015				
Dependent: Mental HRQoL^f										
Block 1 (Demographic)	4.84				3, 219	.003	.062	.049	.062	.003
Income		3.08	.13	2.16		.032				
Sex		3.05	.14	2.30		.002				
Marital status		2.30	.09	1.59		.113				
Block 2 (Clinical)	8.59				4, 218	.000	.136	.120	.074	.000
Adherence		.24	.13	2.04		.042				

Block 3 (Religious)	7.52				9, 213	.000	.241	.209	.105	.000
Negative RCOPE		-.37	-.18	-.28		.005				
Positive RCOPE		-.07	-.03	-.42		.673				
Prayer ^g		-.28	-.01	-.19		.853				
Religious attendance ^h		2.88	.13	2.01		.046				
Religiousness ⁱ		4.19	.16	2.56		.011				
Block 4 (Social Support)	9.05				10, 212	.000	.299	.266	.058	.000
Social Support		.38	.27	4.19		.000				
Dependent: General HRQoL^j										
Block 1 (Demographic)	3.59				2, 216	.029	.032	.023	.032	.029
Age		-.33	-.12	-1.83		.068				
Marital status		1.10	.02	.349		.728				
Block 2 (Clinical)	8.34				5, 213	.000	.164	.144	.132	.000
Years HIV-positive		-.35	-.11	-1.75		.082				
Depressive symptoms		-.38	-.22	-2.90		.004				
Adherence		.40	.10	1.50		.136				
Block 3 (Religious)	6.03				10, 208	.000	.225	.187	.061	.007
Negative RCOPE		-.14	-.03	.47		.643				
Positive RCOPE		.98	.24	3.07		.002				
Prayer		.68	.02	.21		.833				
Religious attendance		-5.97	-.14	-1.94		.053				
Religiousness		.63	.01	.18		.855				
Block 4 (Social Support)	6.06				11, 207	.000	.244	.203	.019	.024
Social Support ^d		.43	.16	2.27		.024				

^abetas and p-values reported are from the final block in each model and p-values, R2, Adjusted R2 and R2 change are reported for each step in the model and includes the block of variables in that step and previous steps. ^bPhysical health-related quality of life composite score. ^cAnnual income: 0 = < \$11,000, 1 = ≥ 11,000. ^dBirth Sex: 0 = female, 1 = male. ^eMarital status: 0 = separated, widowed, divorced, never married, 1 = married or in a committed relationship. ^fSocial support satisfaction scored from 1 (very dissatisfied) to 6 (very satisfied). ^gMental health-related quality of life composite score. ^hReligious attendance: 0 = less than weekly, 1 = weekly or more. ⁱPrayer: 0 = Less than daily, 1 = Daily or several times daily. ^jReligiousness: 0 = 'not at all' and 'slightly', 1 = 'very' and 'moderately'. * < .05, ** < .01

Table 3: Hierarchical Regression Results for Health-Related Quality of Life Components

change=.007), and social support satisfaction significantly accounted for 1.9% unique variance (R-Square change=.019, Significant F change=.024). Only positive religious coping was significant in Block 3 ($\beta = -.27, p = .001$, not shown) and also remained significant in the final block of the model when social support satisfaction was entered into the model, which suggests that the relationship between positive religious coping and general HRQoL is not mediated or explained by social support satisfaction. Religious attendance was a significant predictor of general HRQoL in Block 3 ($\beta = -.144, p = .044$, not shown), but only approached significance ($\beta = -.137, p = .053$) in the final block once social support was entered into the model. This sug-

gests that the once significant association between religious attendance and general HRQoL was mediated by social support.

Group Differences in Mean HRQoL Scores

Results of one way ANOVA (Table 4) showed that participants who were female, prayed less than daily, attended religious services less than weekly or who identified as a 'not at all' or only 'slightly' religious person had significantly lower mean scores on several of the HRQoL dimensions, indicative of poorer HRQoL. Compared to males, females had significantly lower mean scores on: mental HRQoL (48.5 vs. 51.2), physical

HRQoL (47.8 vs. 51.8), and physical functioning (53.2 vs. 62.8). On average, females also reported less role limitations due to physical problems (39.1 vs. 54.8) and less bodily pain (55.4 vs. 64.3), which are indicative of significantly better HRQoL in these dimensions. Participants who prayed less than daily (compared to participants who prayed daily or more often) had significantly poorer mental HRQoL (47.8 vs. 51.2) and emotional well-being (56.5 vs. 65.5). On average, participants who attended religious services less than weekly (vs. those who attended weekly or more often) had significantly lower mental HRQoL (47.4 vs. 53.4), social functioning (57.8 vs. 63.8), emotional well-being (56.8 vs. 69.8), and vitality (less energy: 49.5 vs. 57.9), but they also reported less role limitations due to emotional problems (45.4 vs. 61.8), which are indicative of better HRQoL in this dimension. Participants who identified as non-religious or slightly religious (vs. more religious participants) reported significantly lower mental HRQoL (46.9 vs. 51.1), general health (48.9 vs. 55.2), energy (46.3 vs. 55.5), emotional well-being (56.0 vs. 64.7), and social functioning (60.0 vs. 69.4).

Group Differences in Mean Religious Coping Scores

In order to better understand the role of religious coping in HRQoL, we also examined mean differences in religious coping scores between groups based on demographic factors previously identified in the literature (race, education) using one way ANOVA. Results indicated that, on average, Blacks (compared to non-Blacks) reported significantly higher positive religious coping scores ($M = 16.8 \pm 4.8, n = 263$ vs. $M = 14.7 \pm 6.6, n = 28$; $p =$

.033). Similarly, participants with a high school diploma/equivalent or higher (compared to those with less than a high school diploma or equivalent) reported significantly higher positive religious coping, on average ($M = 17.0 \pm 4.8, n = 263$ vs. $M = 14.1 \pm 5.9$; $p = .011$). There were no significant mean differences in religious coping scores based on sex.

DISCUSSION

This study identified significant demographic, clinical and religious correlates of various dimensions of HRQoL and differences in mean HRQoL scores between groups (based on gender and religious factors) among PLWH in the Southeastern U.S. The findings highlight the role that religious coping and religiosity in the HRQoL of PLWH in this “bible belt” region of the U.S. Similar to previous findings, including a national study of PLWHA,^{4,8,11,17} many PLWH in our sample identified as religious and frequently engaged in private religious practice (prayer) and their frequency of religious attendance varied.

One of our main findings was that religious coping significantly predicted mental HRQoL and general health beyond demographic and clinical covariates. These findings are consistent with previous studies.^{2,8,20,21} These associations were also without mediation by social support satisfaction. More specifically, frequent religious attendance (weekly or more) and self-identification as a ‘moderately’ or ‘very’ religious person was associated with better mental HRQoL and negative forms of

Variable	Sex			Prayer		Religious Attendance			Religiousness			
	p	Female M (n)	Male M (n)	p	< Daily M (n)	≥ Daily M (n)	p	< Weekly M (n)	Weekly M (n)	p	Not at all/ Slightly M (n)	Very/ Moderate M (n)
Mental HRQoL	.041	48.5 (125)	51.2 (163)	.015	47.8 (97)	51.2 (191)	.000	47.4 (165)	53.4 (124)	.004	46.9 (75)	51.1 (213)
Physical HRQoL	.002	47.8 (127)	51.8 (163)	.169	48.8 (98)	50.6 (192)	.210	49.3 (166)	51.0 (124)	.159	48.5 (76)	50.6 (213)
Physical functioning	.004	53.2 (127)	62.8 (163)	.569	57.3 (98)	59.3 (191)	.678	59.3 (166)	57.9 (124)	.399	56.4 (76)	59.7 (213)
General health	.950	53.4 (127)	53.6 (163)	.061	50.2 (98)	55.2 (192)	.129	51.9 (166)	55.7 (124)	.000	48.9 (76)	55.2 (213)
Physical role limits	.002	39.1 (125)	54.8 (163)	.231	43.8 (97)	50.1 (191)	.254	45.5 (165)	51.1 (124)	.802	46.7 (75)	48.1 (213)
Emotional role limits	.056	46.9 (125)	57.0 (163)	.059	45.7 (97)	56.1 (191)	.002	45.4 (165)	61.8 (124)	.089	44.9 (75)	55.0 (213)
Vitality (energy/fatigue)	.133	50.8 (125)	54.7 (163)	.062	49.7 (97)	54.8 (191)	.001	49.5 (165)	57.9 (124)	.001	46.3 (75)	55.5 (213)
Emotional well-being	.250	60.5 (125)	63.8 (163)	.002	56.5 (97)	65.5 (191)	.000	56.8 (165)	69.8 (124)	.006	56.0 (75)	64.7 (213)
Social functioning	.055	63.3 (125)	70.0 (163)	.148	63.5 (97)	68.8 (191)	.000	60.3 (165)	76.0 (124)	.017	60.0 (75)	69.4 (213)
Pain	.012	55.4 (125)	64.3 (163)	.443	58.5 (97)	61.4 (191)	.096	57.8 (165)	63.8 (124)	.097	55.6 (75)	62.3 (213)

Table 4: Differences in Mean Health-Related Quality of Life Outcomes by Sex and Religious Factors

religious coping (*i.e.* thinking that the devil made it happen or that things are the way they are because God does not care about them) was associated with poorer mental HRQoL. Better medication adherence, income and social support satisfaction was also associated with better mental HRQoL. Better physical HRQoL was associated with higher income, younger age, less depressive symptoms and better social support satisfaction and could not be significantly explained by religious coping or religious factors. More positive forms of religious coping (*i.e.* working together with God), less depressive symptoms and greater satisfaction with social support was associated with better general health.

Similar to other studies among PLWH,^{2,5,8,19-22} this study identified associations between HRQoL and religious factors. Previous studies primarily identified associations between religious faith, religious affiliation²² or spiritual well-being⁵ and QoL. Similar to our findings, three of these studies^{2,20,21} identified that religious coping was associated with better HRQoL. Tsevat et al.² and Trevino et al.²⁰ also showed this finding over time. According to Tsevat et al.,^{5,19} the concept of “the will to live” may help to explain the beneficial role of spirituality/religion and religious coping in QoL outcomes among PLWH. Their model purports that religious attendance, prayer, and self-rated religiousness contribute to meaning, peace and use of religious coping, which contribute to healthier lifestyle and beliefs, self-perception, and social support, thereby leading to improved QoL perceptions and “will to live”.

We found that, on average, Blacks and participants with greater than high school level education reported using more positive forms of religious coping. These differences are consistent with previous reports^{11,27,36,45,49,50} and are especially important to consider in HIV case management and care. However, unlike these previous studies, our study did not identify any significant gender differences in the use of religious coping.

The differences in mean HRQoL composite and subscale scores between males and females were similar to previous findings⁷¹ and highlight the disparities that exist in HRQoL between males and females. As expected, females had significantly poorer mental and physical HRQoL, and physical functioning than males. The finding that females report significantly less bodily pain was unexpected since most studies indicate that, in general, women report more pain and/or have lower pain tolerance than men.^{72,73} Ruau et al.⁷² also found that women with HIV report higher pain scores than HIV-infected men. In spite of previous findings, our finding may be due to participants' responses to questions about pain in the context of HRQoL, which may depend on various factors including pain intensity, frequency and duration required to significantly impact their perception of the role of bodily pain in affecting their HRQoL. Similarly, in our sample, females reported significantly lower role limitations due to physical problems, on average, which was unexpected, especially since they also had poorer average scores in physical health dimensions, including energy, overall. These findings may reflect the notion of the resiliency of females, who often push and persevere through physical and other challenges in attempt to fulfil the multiple roles and responsibilities that many females have (*i.e.* mother/caregiver, wife/partner, homemaker

etc.). Therefore, the poorer physical health of females in our sample may not have been severe enough to limit their roles.

Our findings also identified differences in HRQoL scores based on less studied religious factors. Among PLWH in our sample, those who: (1) prayed at least daily had better mental HRQoL and emotional well-being, (2) attended religious services at least weekly had significantly better mental HRQoL, emotional well-being, social functioning and more energy/less fatigue, and (3) were more religious had significantly better mental HRQoL, general health, energy, emotional well-being and social functioning- than their counterparts.

Limitations

The cross-sectional design used in this study limits the ability to make causal inferences about the associations observed. Findings may also only be generalizable to PLWH with similar demographic and religious characteristics of those included in our sample. Despite these limitations, the findings from this study provide additional important insight regarding the demographic, clinical, religious and social factors that relate to the HRQoL of PLWHA.

Conclusions

These findings confirm the importance role that religious coping, religious practices and personal religiosity play in the general health, and HRQoL of PLWH. They also highlight the role of social support and clinical factors, including medication adherence and depressive symptoms in affecting their HRQoL. Therefore, it is imperative that clinicians routinely assess all of these factors and make the appropriate referrals, as necessary. Substantially more research is needed to validate and clarify the current literature on the relationship between religious coping (both positive and negative) or other religious factors and HRQoL dimensions and to better understand the mechanisms of action. Longitudinal studies are needed to identify causal relationships and changes over time. Findings from this study and future studies could be used to inform the development of interventions to help support and improve HRQoL that take into account the religious interests and coping practices of PLWH.

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Research

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A Study of Psychological Impact of Diagnosis of HIV in Children and Adolescents in Indian Population

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ABSTRACT

Objectives: To identify psychosocial impact in children and adolescents infected with HIV with a view to improve counselling and minimize impact of HIV and improve their quality of life.

Material and Methods: This was a cross-sectional study, conducted at a tertiary care hospital among 100 consecutively enrolled HIV infected children between 10 and 18 years of age. A detailed interview on a pretested questionnaire was conducted, which include child's personal history, knowledge of HIV, psychological concern, behavioral problems on an observation scale. Misconceptions and ignorance about the HIV/AIDS were clarified to the respondents, using this session as an educational tool also.

Result: Mean age of study population was 13.8 years with male: female ratio of 0.8:1. Only 65% respondents knew about their HIV status and only 14% had knowledge about mode of spread and prevention. 33 children complained of frequent sicknesses, 23 had feeling of anger, 19 isolation tendencies, 15 were fearful, 12 lost their confidence and 14 children were unable to concentrate on study. 29 children had a feeling of stigma towards HIV, 10 felt discriminated by classmates and community. History of sexual exploitation was given by 6 and bedwetting by 3 children. Thirteen children looked unhappy, 5 felt guilty, 3 were nervous and 1 stared blankly. Majority of respondents (91%) wanted to be a grown up and fight the disease bravely.

Conclusion: 65% respondents knew about their HIV status and 14% had knowledge about HIV. The disclosure of HIV was told to only 65% adolescents and most of them by the doctors. There was a significant psychological impact in form of anger, isolation tendencies, fearfulness, loss of confidence, and suicidal tendencies. We need to provide appropriate counseling, education and creative ways to decrease the psychological impact of HIV/AIDS with a view to improve their quality of life.

KEYWORDS: HIV disclosure; Psycho-social impact; Adolescent counselling.

INTRODUCTION

Children are an ever-growing part of the HIV/AIDS pandemic. As per WHO and UNAIDS 2011 epidemiological update, globally at the end of 2010, an estimated 34 million people were living with HIV.¹ In India, as per National AIDS Control Organization (NACO), an estimated 2.39 million Indians were infected with HIV in 2009, of which, 4.4% were children.²

With the universal availability of Highly Active Antiretroviral Therapy (HAART), HIV is increasingly been recognized as a chronic manageable disease, rather than terminal illness. This transition has led to various psychological, social and behavioural maladjustments, especially in children. Stigma and discrimination, often associated with HIV can lead to exclusion and isolation, deprives children of education, feeling of discrimination by friends, classmates or community and thus affects quality of life. Various psycho-social implications on children include anger, fear, anxiety, depression, grief, guilt and shame, lack of interest in surrounding, loss of confidence, complaining that no one loves, feeling worthless or inferior to others suicidal tendencies, lower cognitive abilities and other behavioural problems.^{3,4} This study was conducted to evaluate psychosocial impact and behavioural changes in children infected with HIV with a view to counsel them appropriately and minimize adverse impact of HIV and improve their quality of life.

MATERIAL AND METHODS

This was a cross-sectional study, conducted at pediatric HIV centre of a tertiary care hospital, among 100 consecutively enrolled HIV infected children between 10 and 18 years of age. The ethical clearance was obtained from the institutional ethical committee. The instrument used was a structured interview schedule in the form of a pretested questionnaire. It was read out to the respondents in the language, they understand and responses were recorded. Prior to beginning the study, a pilot study was carried out to validate the questionnaire. The interview was preceded by an informed consent, obtained from the participants or their attendants. The data were compiled and analyzed. Miscon-

ceptions and ignorance about the HIV/AIDS were clarified to the respondents at the end of the interview, using this session as an educational tool also.

RESULTS

Mean age in the study population was 13.8 years with male: female ratio of 0.8:1. The commonest mode of transmission was vertical from parent-to-child seen in 92% children. 16 children did not attend school, reasons being frequent illnesses of self or family members. Forty seven children were orphans and staying with NGOs and 61 children were on HAART.

a) Respondents' knowledge about HIV: Only 65% children knew their HIV status, of which 36 (55%) children were disclosed by the doctors, 13 (20%) by their parents, 10 by others and 6 of them learned it by themselves. 26 children (40%), who knew their HIV status, felt sad after they were disclosed about the disease. Only 14 children knew about the HIV disease, however details about the nature of the disease and how it spreads was not known to them. 20 children knew the duration of therapy and only 12% knew how to prevent this disease. The knowledge about HIV among the respondents is shown in figure 1.

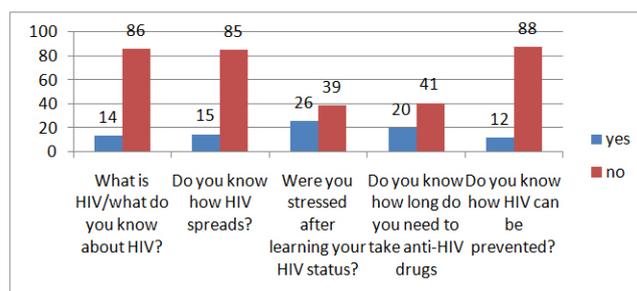


Figure 1: Distribution of respondents' knowledge about HIV.

b) Psychological concern among respondents: Thirty three children often complained of frequent sicknesses, 23 had feeling of anger, 15 were fearful and 14 were unable to concentrate on studies due to self or family sicknesses. Five of the respondents were having suicidal tendencies. (Figure 2)

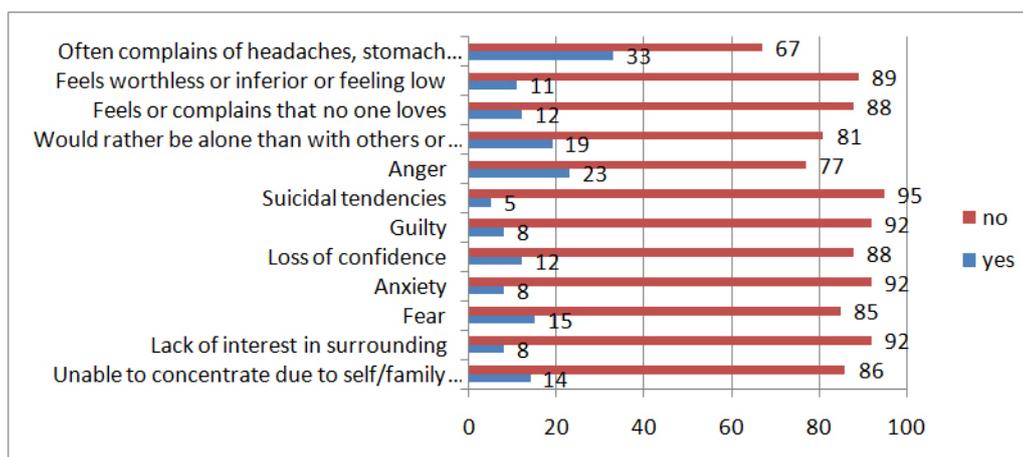


Figure 2: Showing the respondents' psychological concern.

c) Social acceptance of respondents: 29 children have a feeling of stigma towards HIV and the response is shown in table 1.

d) Behavioural problems among respondents: Behavioural problems were not very common in our study. History of involving in sexual activities were given by 6 children, bedwetting by 3 and alcohol and drug consumption in one each.

e) Psychosocial assessment: Most of the respondents had good interaction with the researcher. They were well dressed up and personal hygiene was good. Only 8 children were shy to talk to the researcher, 13 looked unhappy, 5 felt guilty, 3 nervous and 1 stared blankly and the details are shown in table 2.

Self-perception, values and risk factors: Majority of respondents (91%) wanted to be a grown up and fight with the disease bravely and also look after other persons suffering from the disease as shown in table 3.

DISCUSSION

HIV/AIDS is not only threatening the physical health and survival of millions of children, it also destroying their families and depriving them of parental love, care and protection. It has a great negative psychological impact on those infected with the disease in a number of ways. Because of the strong stigma associated with this disease, “stigmatized persons lose their social status, feel discounted and discredited, spoiled and tainted” which affect their social lives, their employment, emotional well-being, and self-perception. These children involve in commercial sex, trafficking, violence, arms conflict, sexual abuse, alcohol and drug consumption, stealing, smoking etc, all of which may be precipitated by economic need, peer pressure, exploitation and lack of supervision. Some studies of street children show that vulnerable children do little to protect themselves from HIV infection because, the pressures for basic survival such as finding food far outweighs the future orientation required to

S. No	Respondents' social acceptance	Yes	No	Total
1	Do you feel HIV as stigma?	29	71	100
2	Do you feel discriminated by family members?	5	95	100
3	Do you feel discriminated by friends during play?	0	100	100
4	Do you feel discriminated by classmates?	2	98	100
5	Do you feel avoided by community/ others?	3	97	100
6	Do you get along with other kids?	97	3	100
7	Do you share readily with other children?	90	10	100
8	How was your interaction with other children in clinic?	89	11	100

Table 1: Showing the respondents' social acceptance.

S. No	Statement	Present	Absent	Total
1	Interaction with examiner	100	0	100
2	Too shy or timid	8	92	100
3	Unhappy or sad, tearful/ cries a lot	13	87	100
4	Nervous, high strung or tense	3	97	100
5	Feels too guilty	5	95	100
6	Poorly coordinated or clumsy	1	99	100
7	Self-conscious	1	99	100
8	Stares blankly	1	99	100
9	Clothes and dressing up	99	1	100
10	Personal cleanliness or hygiene	100	0	100

Table 2: Showing respondents' psycho-social assessment.

S. No	Statement	(a)	(b)	(c)	(d)	(e)	Total
1	I want to become a grown up	4	5	0	47	44	100
2	I can complete tasks	0	2	0	65	33	100
3	I have hope for my future	2	1	2	64	31	100
4	I can influence my future	2	1	2	65	30	100
5	I take care of other people	1	6	2	62	29	100
6	I share feelings with others	13	14	1	65	7	100
7	I am angry with my situation	15	74	0	10	1	100
8	I feel lost because i do not have parents	8	51	0	15	1	100
9	I am afraid that i will be removed from my house/ school/society	18	73	0	7	2	100
10	I want to become doctor	21	26	17	14	22	100

The Scale used for the assessment was as strongly disagree-no as a quick response – (a), Disagree-no as delayed response – (b), Neutral-no response/don't know – (c), Agree- yes as delayed response – (d) and strongly agree-yes as a quick response – (e).

Table 3: showing the assessment of self-perception, values and risk factors.

avoid infection.^{5,6} Being shunned from society can lead to low self esteem, isolation, self-loathing and self deprecation. Children whose families are affected by HIV/AIDS experience severe emotional and psychological distress.² With proper support from their health care providers and community, the challenges of living with childhood HIV/AIDS will be easier to surmount.⁷ These psychological challenges comprises of three general areas: emotional, cognitive and behavioural. Emotionally, the family must accept the child's diagnosis.⁸ Doing so includes grieving the loss of the idea of their once-healthy child, as well as guilt, sadness, and anger. If the child acquired HIV through mother-to-child transmission, the mother may feel enormous guilt and may be blamed by other family members for the child's infection. The cognitive challenge is to educate the child's family about HIV/AIDS.^{9,10}

Disclosure of HIV infection status to children and adolescents should take into consideration their age, psychosocial maturity and complexity of family dynamics.^{11,12} As some family members have been reluctant to discuss the nature of the illness with their infected child, and reasons include concerns about the impact that disclosure¹³ may have on a child's emotional health and fear by the parents that the knowledge will negatively affect a child's will to live, a sense of guilt about having transmitted infection to the child, anger from the child related to knowledge of perinatal transmission, and fear of inadvertent disclosure by the child.¹⁴ Children also may inadvertently learn the nature of their illness in a manner that is not supportive. Studies suggest that children who knew their HIV status have higher self-esteem than children who are unaware of their status.⁶

The disclosure of HIV status in our study was poor and only 65% of the children know their HIV status and the knowledge about the nature of disease was rather much poorer. Studies from the United States in 1999 show that between 25% and 90%

of HIV-infected school-age children have not been told about their infection.¹⁵

In our study the psychological concern was observed in 33 children in form of frequent sicknesses, 19 felt isolated, 15 were fearful and 23% of the children showed feeling of anger, while in similar studies among AIDS orphan just over half of the children (55.5%) say that they are angry about their situation.¹⁶ In our study 9% were afraid of being removed from house/school/society, while in a similar study 45.8% of children are afraid that they will be removed from their home. Behavioural problems in form of substance use, alcohol, and sexual exploitation were common in these children; however in our study these problems were rare.¹¹

Most of the respondents had good interaction with the researcher. They were well dressed up and personal hygiene was good. Regarding self-perception, values and risk factors, majority of respondents (91%) in our study wanted to be a grown up and fight with the disease bravely and also look after other persons suffering from the disease. In a similar study 76.2% children say they take care of themselves, two-thirds (62.8%) say that they take care of others.^{16,17} Results from the present investigation should be interpreted in the context of some possible limitations, due to geographical area of urban population and consequently to the hospital setting.

CONCLUSION

In our study, the disclosure of HIV was known to only 65% adolescents and most of them were disclosed by the doctors. Knowledge about the nature of the disease was not known to most of them. There was a significant psychological impact in form of frequent sicknesses, anger, isolation, fearfulness, loss of confidence, and suicidal tendencies. We need to provide appro-

ropriate counseling, education and creative ways to decrease the psychological impact of HIV/AIDS. Education and support are the most effective tools that help children and adolescents infected with HIV to survive into psychologically healthy adulthood. They can also extend this education to others and help reduce the stigma within their larger communities. Through these changes and the support of family, friends, communities, and health care professionals, these affected children will grow in to tomorrow's happy and healthy adults.

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