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Study of quality of life and depression in people living with HIV/AIDS in India

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Abstract

The aim of this study was to assess the quality of life (QOL) and the severity of depression in people living with HIV/AIDS (PLWHA) and investigate its correlates. This was a cross-sectional study on 700 PLWHA in India. World Health Organization QOL HIV (WHOQOL HIV-BREF) and Patient Health Questionnaire-9 (PHQ-9) were used to assess QOL and depression in PLWHA, respectively. The study population was divided into five groups on the basis of Cluster of Differentiation 4 (CD4) count as follows: Group A [< 50 cells/μL], Group B [50-199 cells/μL], Group C [200-349 cells/μL], Group D [350-499 cells/μL], and Group E [>500 cells/μL]. The lowest mean scores were noted under Group A [< 50 cells/μL] in physical and psychological domains and the highest mean scores were noted under Group E [> 500 cells/μL] in physical and environment domains. PHQ9 scores negatively correlated with QOL domains and the correlation was statistically significant (p < 0.001) with the highest negative correlation was found in relation to the psychological domain (r = –0.739). The PHQ9 score in those who do not have opportunistic illnesses (7.23 ± 6.14) was lower in comparison to those who had opportunistic illnesses (9.81 ± 6.40) and the difference was statistically significant (p < 0.001). We observed that there was almost a chronological increase in the individual QOL domain score and a decrease in the PHQ9 score with an increase in CD4 count. Our result supports the implementation of routine screening for depression in antiretroviral therapy centers and multidisciplinary interventions to improve outcomes among depressed PLWHA.

Key words

HIV/AIDS. Quality of life. Depression. WHOQOL HIV-BREF. Patient Health Questionnaire-9.

Introduction

HIV causes progressive deterioration of the immune status of an individual leading to AIDS. The individuals and families affected by HIV not only bear the heavy financial burden but also have to face stigma and social isolation attached to the disease. The number of children from HIV households who have to absent themselves from school due to their parents' illness is around 4 times higher as compared to non-HIV households[1]. Feeling stigmatized due to living with HIV has been shown to be related to poor quality of life (QOL)

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in different cultures. Since the beginning of the HIV epidemic, experiencing the stigma related to HIV has been shown to be a barrier to treatment and prevention[2,3].

QOL is used as an important outcome indicator for healthcare decision-making and intervention effects evaluation[4]. Health-related QOL (HRQOL) in people living with HIV/AIDS depends on sociodemographic characteristics such as age, sex, education, occupation, and income status. In addition, patient CD4 counts, viral load, clinical stage, and patient adherence to treatment are significant predictors of different dimensions of HRQOL[5].

Depression is the most commonly observed mental health disorder among HIV-infected patients, affecting up to 22% of PLWHA[6]. Depressive symptoms are particularly concerning as they can lead to poor treatment adherence, in turn causing low CD4 cell count and increased viral load[7]. Various studies have shown that viral load suppression was associated with satisfactory QOL. One of the studies from South Carolina had observed that viral load suppression was significantly associated with health, psychological health, social relations, and environmental health and negatively associated with spirituality. Among various domains, psychological health was the highest followed by environmental health and spiritual domain were lowest[8]. Another study was done to evaluate QOL in PLWHA had shown that QOL for the whole domains of the questionnaire was 12.19 ± 2.44 with domain of spirituality, religion, and personal beliefs (SRPB) had the highest mean score and level of independence had the lowest mean score, females had better aspect of QOL except for SRPB domain. Furthermore, a significant association was observed between education and the independence, environment, and spirituality domains of QOL[9]. However, Indian study had shown equivocal results and only few studies are present which showed 28.2%-71.25% PLWHA had good QOL. In terms of domains, one study had the highest score in physical and lowest in environmental domains, whereas another study had the highest score in environment domain and lowest in social relationship[10,11]. There is a huge variability of results and also scarcity of data regarding QOL in developing countries like India on qualitative identification of QOL determinants, as well as the health and social support needs and constraints of PLWHA in the context of National AIDS Control Programme (NACP). This deficit hinders a proper understanding of the scope of known quantitative determinants of QOL and responsiveness of the existing program. Due to lack of studies on this field currently in India, there is a need of a larger study to assess various factors, including the biological markers of disease activity affecting the QOL in PLWHA and regarding the prevalence of depression in these people.

Methods

Study setting, sample, design, and measures

This was a cross-sectional study carried out at the Department of Medicine, PGIMS, Rohtak, India. Patients attending the nodal antiretroviral therapy (ART) center or admitted in wards of PGIMS, Rohtak, were enrolled in this study after obtaining written informed consent. The study subjects were recruited between November 2017 and October 2018. In view of the reported prevalence of HIV infection in India by National AIDS Control Organization (NACO) as 0.26%, a sample size of 384 was estimated. For this study, we had a total sample size of 700 PLWHA. HIV seropositive subjects confirmed by enzyme-linked immunosorbent assay or Western blot technique aged more than 18 years were enrolled in the study. All subjects aged less than 18 years and more than 65 years, pregnant and lactating mothers, subjects with an altered sensorium or cognitive impairment severely affecting communication were excluded from the study. Patients having established chronic kidney and liver disease before the diagnosis of HIV and presence of non-HIV/AIDS-related malignancy were also not included in this study.

After obtaining written informed consent, a detailed clinical history and biochemical investigation, including CD4 count, was taken. After that, each participant was evaluated with a semi-structured questionnaire, which was consisted of three parts. The first part consists of basic sociodemographic details and clinical history of the participant and other factors relating to his disease that may possibly affect the QOL or cause psychological stress. We also assessed for possible routes of acquisition of HIV by enquiring about sexual habits, and intravenous drug abuse history, the clinical status of the patient by CD4 count (measured using flow cytometer), adherence to treatment, opportunistic infections, and other systemic complications.

The second part of this questionnaire had World Health Organization (WHOQOL-HIV BREF), a self-administered questionnaire specific for HIV/AIDS patients and takes only 8-10 min to complete. Of the several

QOL measurement tools available, the HIV-specific shorter version of WHOQOL-HIV BREF questionnaire was selected, which was field-tested in six cross-culturally different centers across the world, including two centers in India (Bengaluru and New Delhi)[12-14]. It has six domains, thirty-one items representing the thirty facets (including one General facet; containing two items asking about an individual's overall perception of the QOL and overall perception of his or her health). Six domains were – (1) *Physical domain* {pain and discomfort, energy and fatigue, sleep and rest, and symptoms of people living With HIV/AIDS (PLWHA)}, (2) *Psychological domain* {positive feelings, thinking, learning, memory, and concentration, self-esteem, bodily image and appearance, and negative feelings}, (3) *Level of Independence* {mobility, activities of daily living, dependence on medication or treatments, and work capacity}, (4) *Social Relationships* {personal relationships, social support, sexual activity, and social inclusion}, (5) *Environment* {physical safety and security, home environment, financial resources, health, and social care: accessibility and quality, opportunities for acquiring new information and skills, participation in and opportunities for recreation/leisure activities, physical environment (pollution/noise/traffic/climate), and transport}, and (6) {SRPB, forgiveness and blame, concerns about the future, death, and dying}. Individual items are rated on a 5-point Likert scale where 1 indicates low, negative perceptions and 5 indicate high, positive perceptions. Domain and facet scores are scaled in a positive direction where a higher score denotes higher QOL. The mean score of items within each domain was used to calculate the domain score. Mean scores are then multiplied by 4 to make domain scores comparable with the scores used in the WHOQOL-HIV (long form) so that scores range between 4 and 20.

The third part of the questionnaire consisted of Patient Health Questionnaire-9 (PHQ-9) to screen for depression and measure its severity. This was also a self-administered questionnaire and takes only 5 min to complete[15]. Severity was calculated by assigning scores of 0, 1, 2, and 3 to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively. PHQ-9 total score for the nine items ranges from 0 to 27. A score of 0-4 indicates none to minimal, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe depression.

The study population was divided into five groups on the basis of CD4 count for further comparison as follows: Group A [< 50 cells/μL], Group B [50-199 cells/μL], Group C [200-349 cells/μL], Group D [350-499 cells/μL], and Group E [> 500 cells/μL]. CD4 count was chosen as the reference standard since it was done in almost all PLWHA irrespective of patient attributes and viral load measurement was not routinely available in India during our study period. Similarly, the study group was also subdivided based on the presence or absence of opportunistic illness. Finally, all these sociodemographic factors were correlated with the QOL and depression in people living with HIV. Since WHOQOL-HIV BREF and PHQ-9 are widely used and validated tools for assessing these variables, no pretesting was done.

Data analysis

Data were recorded and entered carefully in the master chart prepared using Microsoft Excel 2016. For all descriptive and statistical analysis, Statistical Package for the Social Sciences (SPSS) Version 25 was used. The distribution of data was analyzed to assess for parametric versus non-parametric analysis. The values of all domains were expressed in mean and standard deviation for each group separately. All categorical variables were expressed in number out of total and their respective percentages. For all tests, a $p < 0.05$ was considered as statistically significant and confidence level was kept at 95%.

Ethical consideration

The study was approved by the institutional ethics committee and also by the NACO, India. Study participation was voluntary and anonymous. Information about the study and consent was provided in the questionnaire.

Results

There were a total of 700 cases included in the study. Table 1 shows the basic sociodemographic characteristics of the study population. The mean age of the study population was 35.12 ± 10.54 years. Four hundred eighty-one patients were on 1st line ART and Tenofovir-Lamivudine-Efavirenz was the most common regimen.

Table 2 shows the various clinical characteristics of the study population. The mean total domain score of the study population was 85.22 ± 13.56. The overall mean height (cm) was 164.14 ± 9.99, weight (kg) was 54.95 ± 11.07, and body mass index (kg/m^2) was 20.37

Table 1. Basic sociodemographic characteristics of the study population

Variables	Frequencies (percentage)
Age in years (Mean ± SD)	35.12 ± 10.54
Gender	
Male	438 (62.57%)
Female	253 (36.14%)
Transgender	9 (1.29%)
Residence	
Rural	478 (68.28%)
Urban	222 (31.71%)
Religion	
Hindu	670 (95.71%)
Muslim	16 (2.29%)
Christian	9 (1.28%)
Sikh	5 (0.72%)
Education	
Illiterate	135 (19.28%)
Primary	220 (31.43%)
Secondary	247 (35.29%)
College and above	98 (14%)
Occupation	
Unemployed	69 (9.86%)
Unskilled worker/laborer	140 (20%)
Semi-skilled worker	124 (17.71%)
Skilled worker	76 (10.86%)
Agricultural cultivator	84 (12%)
Housewife	199 (28.43%)
Govt. employee	8 (1.14%)
Income (in rupees/month)	
< 2000	131 (18.71%)
2000-5000	242 (34.57%)
5001-20,000	279 (39.86%)
> 20,000	48 (6.86%)
Marital status	
Married	461 (65.85%)
Unmarried	116 (16.57%)
Widow	72 (10.29%)
Widower	23 (3.29%)
Divorces	14 (2%)
Live in relation	14 (2%)
Spouse status	
Not known	284 (40.57%)
Positive	263 (37.57%)
Negative	153 (21.86%)
Risk factor	
Heterosexual	567 (81%)
Men sex with men	33 (4.71%)
Injection drug abuser	13 (1.86%)
Blood transfusion	26 (3.72%)
Commercial sex worker	4 (0.57%)
Trucker	46 (6.57%)
Healthcare worker	11 (1.57%)
Treatment status	
No antiretroviral therapy	164 (23.43%)
1st line antiretroviral therapy	487 (69.57%)
2nd line antiretroviral therapy	49 (7%)

(Continues)

Table 1. Basic sociodemographic characteristics of the study population *(Continued)*

± 3.53. The rest of the blood parameters were within normal limit and the difference was not statistically significant except for mean hemoglobin, which was less in females (11.20 ± 1.92 g/dL) as compared to males (12.91 ± 2.18 g/dL). On physical domain, most of the patient had moderate to high amount of physical distress. On psychological, social, and environmental scale most of the patients fall into dissatisfied or neither satisfied nor dissatisfied category.

Table 3 shows the comparative mean domain values of patients with different CD4 groups. As the CD4 count increases, the mean domain score of QOL also increases and was found to be statistically significant ($p < 0.001$). On the other hand, PHQ9 scores decrease as the CD4 count increases and were also found to be statistically significant ($p < 0.001$).

Table 4 shows the correlation between individual QOL domains. Each QOL domain score was positively correlated with other QOL domain scores and was found to be statistically significant ($p < 0.001$) (Fig. 1).

Table 5 shows the comparison of mean total domain score and PHQ9 score with opportunistic illnesses. The total domain score in those who do not have opportunistic illnesses (86.79 ± 12.65) was higher than those who had opportunistic illnesses (77.08 ± 15.22) and the difference was statistically significant ($p < 0.001$). Table 6 illustrates the prevalence of opportunistic infection among different depression grades. The PHQ9 score in those who do not have opportunistic illnesses (7.23 ± 6.14) was lower than those who had opportunistic illnesses (9.81 ± 6.40) and the difference was statistically significant ($p < 0.001$) (Fig. 2).

Discussion

HIV is a chronic debilitating disease with a shift in the natural history of disease from a predominantly mortal endpoint to chronic stable disease stage. The

Table 2. Clinical characteristics of the study population

Clinical characteristics	Mean ± SD
Height (cm)	164.14 ± 9.99
Weight (kg)	54.95 ± 11.07
Body mass index (kg/m^2)	20.37 ± 3.53
CD4 count (cells/μL)	418.23 ± 252.58
Time since antiretroviral therapy (months)	29.75 ± 36.565
Total domain score	85.22 ± 13.56
Patient Health Questionnaire-9 score	7.65 ± 6.25
Physical domain	14.64 ± 3.05
Psychological domain	14.24 ± 2.78
Level of independence domain	13.86 ± 2.64
Social relationship domain	13.68 ± 2.40
Environment domain	14.43 ± 2.46
SRPB domain	14.36 ± 2.76

success achieved by highly active ART (HAART) has now transformed the perception about HIV infection from being a "virtual death sentence" to a "chronic manageable illness." QOL has become an important outcome variable. The present study involving 700 patients assessed various factors influencing QOL and depression in PLWHA.

In our study, there were 438 (62.57%) males, 253 (36.14%) females, and 9 (1.28%) transgender. Males were higher in number compared to females probably because the majority of women remain unaware of their HIV status, women have limited access to healthcare because of various social, cultural, and economic reasons, rejection by their own families, routine of the household is likely to be disrupted by women's absent at home when both husband and wife are sick, more importance could be given to see that the man gets well first, in case of a widow, whether staying by herself or with the in-laws, there may be nobody who is prepared to take her to the doctor. Gender inequalities are a key driver of women's vulnerabilities to HIV[16]. Majority of the subjects were in the age group of 20-39 years (66%).

Table 3. Relationship between the various quality of life domains and CD4 groups

CD4 Groups [cells/μL]	Quality of life Domains*(Mean ± SD)						Patient Health Questionnaire-9‡	p value
	Physical	Psychological	Level of Independence	Social Relationship	Environmental	SRPB		
Group A [< 50]	9.86 ± 2.81	9.90 ± 2.68	10.05 ± 2.39	10.76 ± 2.50	11.14 ± 2.11	11.19 ± 2.29	15.33 ± 6.41	< 0.001
Group B [50-199]	12.28 ± 2.98	12.44 ± 2.56	12.07 ± 2.37	12.48 ± 2.24	12.80 ± 2.40	12.53 ± 2.63	11.18 ± 5.21	
Group C [200-349]	14.31 ± 2.46	14.11 ± 2.28	13.43 ± 2.10	13.08 ± 2.21	14.16 ± 2.13	14.33 ± 2.41	7.15 ± 5.80	
Group D [350-499]	15.25 ± 2.52	14.68 ± 2.36	14.27 ± 2.26	13.80 ± 1.96	14.70 ± 2.00	14.66 ± 2.49	6.98 ± 6.18	
Group E [≥ 500]	16.12 ± 2.44	15.40 ± 2.55	15.13 ± 2.37	14.85 ± 2.21	15.58 ± 2.20	15.48 ± 2.49	5.70 ± 5.75	

*Higher domain scores correspond to better quality of life on a scale of 4-20.
‡Higher scores correspond to higher levels of depression on a scale of 0-27.

Table 4. Correlation between various WHOQOL-HIV BREF domains

QOL domains	Physical	Psychological	Level of independence	Social relationships	Environment	SRPB	p value
Physical	1	0.734	0.764	0.534	0.694	0.688	< 0.001
Psychological	0.734	1	0.706	0.548	0.729	0.661	
Level of independence	0.764	0.706	1	0.567	0.699	0.647	
Social relationships	0.534	0.548	0.567	1	0.614	0.444	
Environment	0.694	0.729	0.699	0.614	1	0.645	
SRPB	0.688	0.661	0.647	0.444	0.645	1	

Table 5. Mean total domain scores and Patient Health Questionnaire-9 scores with opportunistic illness

Opportunistic illnesses	Mean ± SD		p value
	Absent (n-587)	Present (n-113)	
Total domain score	86.79 ± 12.65	77.08 ± 15.22	< 0.001
Patient Health Questionnaire-9 score	7.23 ± 6.14	9.81 ± 6.40	< 0.001

Table 6. Prevalence of opportunistic infections among different depression grades

Patient Health Questionnaire-9 score	Oppotunistic infections		Total
	No	Yes	
0-4 (none to minimal)	255	31	286
5-9 (mild)	121	20	141
10-14 (moderate)	117	32	149
15-19 (moderately severe)	82	22	104
20-27 (severe)	12	8	20
Total	587	113	700

Our study found that of the 700 PLWHA, 478 were residing in rural areas, whereas 222 were from urban localities. This difference might be due to a lack of awareness about the modes of transmission in people from rural background. It could also be due to long waiting queues and probable fear of recognition by a neighborhood on ART center visits leading urban people toward private clinics.

The mean total domain score of our study population was 85.22 ± 13.56 and the mean PHQ9 score was 7.65 ± 6.25. Statistically significant differences were not found among gender groups. The social domain was the worst affected followed by the level of independence domain.

Our study demonstrated that PLWHA who have received ART for a longer duration had a significant difference in physical, psychological, and level of independence domain scores. We found that there were no statistically significant differences in the domain scores with respect to the route of transmission. This means that how a person gets HIV infection has no bearing on QOL. Similarly, the marital status of an individual has no effect on QOL domain scores which is in contradiction to some of the previous studies showing better QOL in the married group. In a study done by Arjun *et al*., married PLWHA showed better QOL domain scores compared to widowers[17]. The probable reason could be that the physical, emotional, and psychological support of a spouse is more effective when compared to the support received from the rest of the family members. There were no statistically significant differences in QOL domains when compared with the type of residence, be it rural or urban. No statistically significant difference was observed in the QOL domain when compared with religious groups, potentiating the

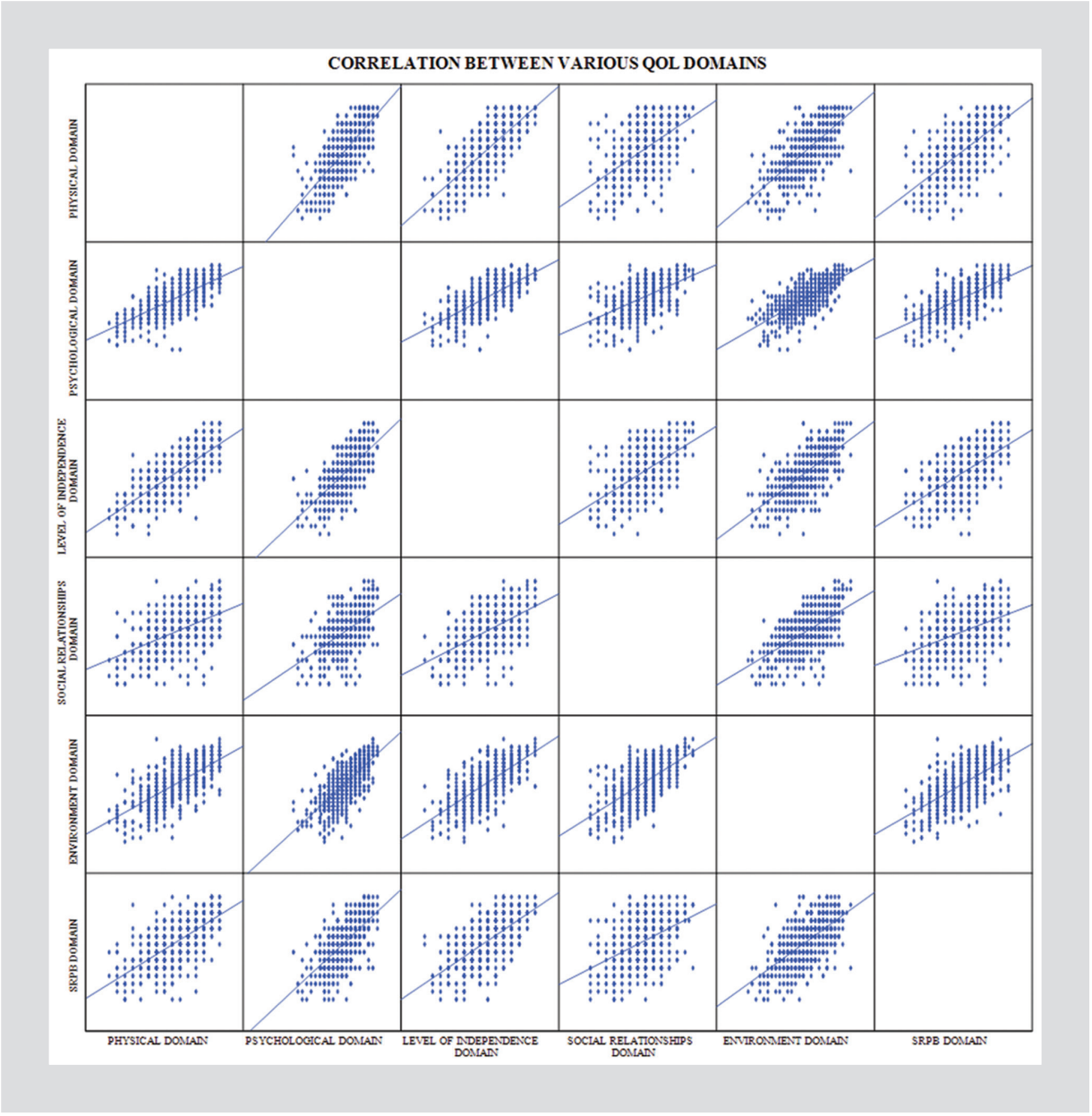

Figure 1. *Matrix scatter plot showing the correlation between various WHOQOL HIV-BREF.*

fact from previous studies that religion had no net effect on overall QOL. However, whether or not spiritual interventions can improve the QOL is still a subject of debate. Systemic reviews to date had not advised blanket encouragement or discouragement of religious beliefs[18]. Healthcare workers should be aware of patients' spirituality and religious involvement that might have a role in shaping the QOL.

We found statistically significant differences in spouse HIV status with lower scores in spouse HIV positive group (p = 0.014). The reason could be a quarrel between the partners and worries about their child's future. Statistically significant differences were also observed in income groups with lower scores in low-income group (p = 0.011), further supporting the fact that financial burden badly affects each QOL domain and had a negative effect overall QOL in PLWHA. We found statistically significant differences in education groups with lower scores in lower education groups (p = 0.021). This can be explained by the coping strategies adopted by literate people and correct knowledge on the disease, mode of transmission, and

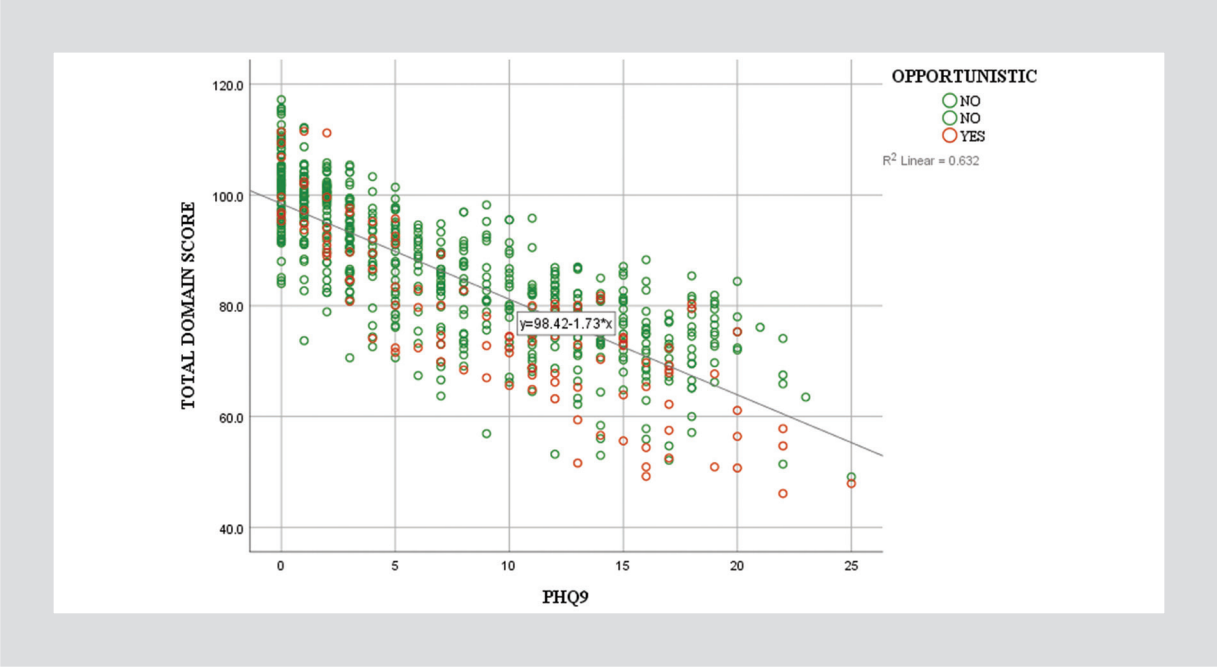

Figure 2. *Scatter plot showing the correlation between total quality of life domain scores and Patient Health Questionnaire-9 scores.*

good adherence to ART in achieving a healthy life free from illness. We also found a statistically significant difference in occupation groups with the lowest scores in government employees (p = 0.026), probably due to fear of losing government jobs and accompanying financial burden.

Our study found that the physical domain scores are positively correlated with psychological, level of independence, social, environment, and spiritual well-being scale (SRPB) domain scores and are statistically significant. This suggests that physical domain was influenced by psychological, level of independence, social, environment, and SRPB factors. Each domain was affected by every other domain in our study subjects and improving one QOL domain would have a significant positive impact on the rest of the QOL domains and a positive feedback circuit was created automatically. PLWHA had poor social functioning which includes a patient's interaction with other people at home, work, and society. The social stigma associated with the disease makes it even harder for patients to socialize in society. Patients are more often isolated; therefore, they feel lonely, bored, confined, or abandoned. Patients are worried, frustrated, and/or disappointed when it comes to accepting the diagnosis of HIV; the economic burden of the disease, loss of a job, social stigma, and physical appearance is also cause for psychological problems[19].

In our study, we have found that CD4 count had a positive linear relationship with individual domain scores. There was almost a chronological increase in the mean QOL score with an increase in CD4 cell count category in all the domains. The lowest mean scores were noted under CD4 Group A [< 50 cells/μL] in physical and psychological domains. On the other hand, the highest mean scores were noted under CD4 Group E [≥ 500 cells/μL] under the physical and environment domains. The QOL score tends to increase with increases in the CD4 cell count category which is consistent with another study in India showing a positive correlation between CD4 and QOL[20]. The differences between consecutive categories are statistically significant (p < 0.001). The improvements in clinical variables will translate to improve QOL. Hence, early initiation of ART along with good control of opportunistic infections can result in better QOL.

In a cross-sectional study conducted at Finland by Nobre et al., on 453 PLWHA, it was found that factors such as male gender, being married or living in a partnered relationship, being employed, having fewer financial concerns, and not having depression, and other medical co-morbidities were positively and consistently associated with higher scores in the different domains of the QOL. HIV-related clinical variables were not associated with QoL, contradicting previous

evidence of a significant association between good clinical parameters and increased QoL. Almost 95% of participants were receiving combination ART (cART) and 63% had a CD4+ T-cell count > 500 cells/mm^3. They concluded that in a stable patient population treated with modern cART, the significance of these HIV-related clinical variables may disappear[21].

In a study of QOL among PLWHA conducted by P S Chandra on 82 patients, it was observed that significant associations were seen between low CD4 counts and the psychological and social relationships domain. However, there were no significant differences between the CD4 subgroups for the domains related to physical health, level of independence, environment, and spirituality domains. In addition, as part of the inclusion criteria, they excluded subjects with harmful alcohol use and clinical depression. These might have independent influences on immunological and QOL parameters and would have acted as confounding factors[22].

In our study, the most common opportunistic illness was pulmonary tuberculosis (TB) which was detected using Cartridge-based Nucleic Acid Amplification Test in 76 patients followed by candidiasis in 30 patients. Ten patients had extrapulmonary TB, 4 had Cytomegalovirus retinitis, 3 had cryptococcal meningitis, 2 had *Mycobacterium avium* complex infection, and 1 patient had cerebral toxoplasmosis. We found that the total domain score in those who do not have opportunistic illnesses was higher than those who had opportunistic illnesses and the difference was statistically significant ($p < 0.001$). About 16.1% of the participants had opportunistic infections, with lower QOL scores in all the domains compared to participants with the absence of opportunistic infection. This was comparable to a study conducted by Arjun et al., where PLWHA with opportunistic illnesses had lower domain scores compared to those who did not have opportunistic illnesses[17].

The total mean PHQ9 score of the study population was 7.65 ± 6.25. There were no statistically significant differences between gender groups ($p = 0.618$). Twenty (2.85%) PLWHA were having severe depression at the time of study as screened by the PHQ9 questionnaire. Two hundred and eighty-six (40.85%) PLWHA belonged to "No-Minimal depression" category. The mean PHQ9 scores who were "NOT ON ART" were higher (10.73 ± 5.42) than those who were "ON ART" (1st line-6.67 ± 6.13 and 2nd line-7.10 ± 6.74) and were statistically significant ($p < 0.001$). PHQ9 scores negatively correlated with ART receival status with $p < 0.001$, meaning those who were on ART had a lower chance of depression compared to those who did not receive ART which is consistent with a previous study showing higher depression among those who did not receive ART[23].

We have found that CD4 count had a negative linear relationship with PHQ9 scores. On face value, there was almost a chronological decrease in the PHQ9 score with an increase in CD4 cell count category. The highest PHQ mean scores were noted under CD4 Group A [< 50 cells/μL]. On the other hand, the lowest PHQ9 mean scores were noted under CD4 Group E [≥ 500 cells/μL]. The PHQ9 score tends to increase with increases in the CD4 cell count category. The differences between consecutive categories were statistically significant ($p < 0.001$), implicating that depression associated with HIV was also likely to improve when the clinical parameters got better. This was supported by a study conducted by Taniguchi et al. in which they found that the decline of CD4 cell count was independently associated with an increase in depression[24,25].

PHQ9 scores negatively correlated with WHOQOL HIV-BREF domains and the correlation was statistically significant ($p < 0.001$), with the highest negative correlation, was found in relation to the psychological domain ($r = -0.739$), and lowest negative correlation was found in relation to social relationships domain. This finding is supported by a study done in Thailand showing a negative correlation between PHQ9 and QOL[26]. Hence, depression also affects QOL domains very significantly.

A study conducted in Uganda by Mwesiga et al. on 345 HIV-positive patients found that patients of depression with pain co-morbidity (DPC) had a poorer QOL in all domains compared to the total population. They concluded by stating that screening as well as early and appropriate management of DPC in PLWHA may help to improve the QOL. Simple and self-rated instruments such as PHQ9 and Mini International Neuropsychiatric Interview used in this study could easily be implemented into routine clinical practice to get patients with DPC into care that is appropriate for their situation[27].

The PHQ9 score in those who do not have opportunistic illnesses (7.23 ± 6.14) was lower in comparison to those who had opportunistic illnesses (9.81 ± 6.40) and the difference was statistically significant ($p < 0.001$). It means those who had opportunistic illnesses tend to have higher categories of depression and had suicidal tendencies compared to those who do not have opportunistic illnesses which is consistent with previous study[23,25].

Some limitations must be considered in interpreting the results of our study. The cross-sectional nature of

the study prevents us from making any speculations regarding the consistency of this relationship over time.

Conclusion

In our study of evaluation of the QOL in PLWHA, it was observed that all the six domains (physical, psychological, level of independence, social relationships, environment, and SRPB) of QOL were affected. The domain scores between males and females were similar. The physical domain score was better than environment domain score, SRPB domain score, psychological domain score, level of independence domain score, and social relationships domain score. The social relationships domain was the worst affected followed by the level of independence domain. The social stigma associated with the disease makes it even harder for patients to socialize in society. There was almost a chronological increase in the individual QOL domain score and a decrease in the PHQ9 score with an increase in CD4 cell count. QOL is an important health indicator and is directly related to clinical improvements. Depression and QOL are inversely related to each other.

With an increased life expectancy of individuals living with HIV, QOL has become a focus of treatment. Our result supports the implementation of routine screening for depression in ART centers and multidisciplinary interventions to improve outcomes among depressed PLWHA. This calls for the integration and training of mental health services into HIV/AIDS care and future efforts by policymakers and HIV caregivers to address this treatment gap to advance the care of PLWHA.

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