

# Psychometric assessment of translated Urdu version of WHOQOL-HIV BREF among patients living with HIV

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## Research

**Keywords:** Cross-cultural, HRQoL, Pakistan, Reliability, Translation, Validity

**Posted Date:** June 15th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-34790/v1>

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**Version of Record:** A version of this preprint was published on February 8th, 2021. See the published version at <https://doi.org/10.1186/s12955-021-01693-0>.

# Abstract

## Objective

The Low Middle Income Countries (LMIC) like Pakistan are facing an escalation in the number of HIV cases, approximately more than 180,000 people are currently living with HIV/AIDS (PLWHA). Currently, no HIV specific Health Related Quality of Life (HRQoL) tool is validated in Pakistan; therefore, the current analysis was aimed at translating and examining the psychometric properties of the Urdu version of WHOQOL HIV BREF among HIV patients of Pakistan.

## Methods

The standard forward-backwards translation technique was used for Urdu translation of the instrument. Based on the principle of 5 subjects minimally for each item, a sample of 182 patients were recruited by employing a universal random sampling technique. Data were analysed to measure reliability, internal consistency, known-group, multivariable linear regression and construct validity.

## Results

High internal consistency 0.93 (Cronbach alpha) was found for all WHOQOL HIV Bref facets. The test-retest reliability analysis demonstrated a statistically significant Interclass Correlation Coefficient (ICC) ranged from 0.88 – 0.98 ( $p < 0.001$ ). In known group validity, lower CD-4 lymphocytes count was significantly related to poor scores for all six domains ( $p < 0.001$ ). Similarly, symptomatic subjects had significantly lower scores compared to asymptomatic subjects on the physical, psychological, social relationship and independence domains ( $p < 0.05$ ). Results also revealed a statistically significant positive correlation of all six domains with CD4 count ( $p < 0.001$ ), exhibiting patients with higher CD-4 lymphocytes count will have higher mean scores of all six domains. Factor analysis revealed 5 domains, including Physical health, Psychological health, Social relationship, Environmental, and Spiritual health. When all domains were assessed together via Multivariable linear regression analysis; only physical, psychological health and environment health domains were found significantly associated with higher CD-4 lymphocytes count (Beta = 0.121,  $p < 0.001$ , Beta = 0.103,  $p = 0.002$ , and Beta = 0.032,  $p = 0.032$ ).

## Conclusion

Findings suggested that the Urdu version of WHOQOL HIV Bref is a psychometrically valid tool for measuring HRQoL.

## Introduction

As per the Joint, United Nations Programme on HIV/AIDS (UNAIDS) estimates, more than 37.9 million living people are infected with HIV worldwide (1). Since the beginning of the HIV epidemic, approximately 32 million individuals died of AIDS (1). Despite the fall in peak of new HIV cases all over the world the low-middle-income countries (LMIC) like Pakistan are facing an escalation in the number of HIV cases,

approximately more than 180,000 people are currently living with HIV / AIDS (PLWHA). (2, 3). The number of new cases of HIV has risen from 14,000 a year since 2010, to 22,000 in 2018 (1). Furthermore, HIV/AIDS-associated mortalities have alarmingly escalated to 6400 deaths in 2018 compared to 1,400 deaths in 2010 (4). As of May 2020, data suggested only 39,529 (22%) people out of 0.180 million patients were registered with the National AIDS Control Program of Pakistan (NACP) (5). However, only 22,947 (58%) people are receiving antiretroviral drugs, of which 7,047 (30.7%) are People Who Inject Drugs (PWID) and 16,582 (42%) failed to follow-up for the medication (no shows for 6 months) (4, 5). Regular use of effective combination Anti-Retroviral Therapy (ART) has been reported to increase the life span of People Living With HIV/AIDS (PLWHA) (6, 7).

Since the emergence of ART, there has been a lot of improvements in the safety and efficacy of ART (8, 9). With the use of antiretroviral combinations, AIDS went from acute deadly infection to a manageable chronic disease (8). As HIV is an incurable disease; thus, to keep viral load suppressed, HIV patients need to take ART throughout their lives (10). Nevertheless, HIV infection and its associated complications still have a significant impact on Health-Related Quality of Life (HRQoL), even among individuals whose viral count suppressed by ART (11). Studies have suggested that, in addition to the underlying infection, immunological status, aging, treatment adherence, social conditions, relationship problems, comorbidities, and social stigma in people with HIV can affect HRQoL of HIV patients (12, 13).

Precise evaluation of HRQoL with valid measures has become crucial for improving PLWHA quality of life (14, 15). Furthermore, the HRQoL assessment plays a significant role in evaluating the outcome of the studied intervention (16). Several instruments, both generic and disease-specific, are used for measuring HRQoL in PLWHA (17). Generic questionnaires like the frequently utilized EQ-5D, WHOQOL, HUI, M-QOL, SF-12, and SF-36 have the advantage of allowing comparison of HRQoL across different disease population. However, HIV-specific instruments such as WHOQOL-HIV Bref, HIV-QL-31, MOS-HIV, ACTG-21, AIDS-HAQ, MQOL-HIV, FAHI, PROQOL-HIV, and HIV-SQUAD, evidenced greater sensitivity than generic ones (17, 18).

Originally, generic WHOQOL-100 item scale was developed by World Health Organization (WHO) to assess individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (19). Then, an abbreviated 26-item WHOQOL Bref has been developed. Later, a 100-item HIV-specific questionnaire (WHOQOL-HIV) was developed and most recently a brief version was developed. The WHOQOL HIV Bref is considered as the most sensitive and reliable particular tool for assessing the HRQoL of patients living with HIV (PLWH) (14, 20). It contains both generic measures and HIV specific facets. WHOQOL-HIV Bref includes two general questions and 29 items, encompassing six aspects as psychological, physical, environmental, level of independence, spiritual and social health (16). In Pakistan, a validated version of the generic WHOQOL instrument is available (21). However WHOQOL HIV bref is not validated in local settings of Pakistan. To be successful in a specific country, Such an instrument must be translated and validated in the local language to position the individual HRQoL within their local context in terms of culture and values. (22). This instrument has not been translated into Urdu, although it has been translated into many

other languages (18, 22-32). Hence, the current study aimed to assess the psychometric properties and cultural adaptability of the Urdu version of WHOQOL-HIV Bref in PLWHA in Pakistan.

## **Methods**

### **Ethical Considerations**

The study protocol was approved by the National AIDS Control Program of Pakistan (NACP) and Research Ethics Committee (REC) of ART center of Pakistan Institute of Medical Sciences (PIMS) (Approval No; 1827). Written informed consent from patients was taken after providing them with the written information as well as a verbal explanation of the study. Participants were told that study participation was voluntary and can be terminated at any time. All the information collected in this research will be confidential and only available to the research team that manages the data; Upon completion of the analysis, the contact details of the participants will be removed. All the study procedures were handled following the Helsinki Declaration ethical principles (33).

### **Study Design and Study Setting**

For data collection, we adopted a cross-sectional study design. The study was carried out at the ART center at PIMS hospital, which is a 947-bed hospital located in Islamabad Capital Territory (ICT), Pakistan. PIMS hospital is a teaching and referral center catering to the needs of more than 1.5 million population. ART center PIMS is the biggest center of HIV care in Pakistan having more than 4000 registered PLWH who are getting free of charge HIV treatment. Almost 15 to 20 PLWH visit the ART center daily for their medical needs. This center was selected because of the geographic location, and it is the biggest referral center where patients from different ethnic groups and regions of Pakistan receive their ART.

### **Sample Size**

For psychometric evaluation of questionnaires or instruments, a minimum of 5 subjects should be selected for each question (34). Therefore, 155 PLWH was recruited in the current study for the validation of the 31-item instrument in the present study. Considering a dropout rate of 20% (such high rate was considered due to stigma among PLWH), 190 subjects were approached. Participants who did not fill the questionnaire and patients with missing information (viral load, CD4 T cell count) were excluded; therefore, 182 (95.8%) subjects were included in the final analysis.

### **Participants**

Subjects aged more than 18 years, diagnosed with HIV (more than six months), have a new CD-4 T cells count and viral load tests (not more than four weeks older from the date of interview) were included in the study. Furthermore, participants who follow up ART regularly and able to communicate in Urdu language were also included. Moreover, terminally ill patients, visually impaired, subjects with hearing impairment, multiple comorbid, cognitively impaired and patients unable to complete the interviews were excluded.

## Questionnaire

The questionnaire consisted of three parts, including sociodemographic information, HIV related characteristics, and the WHOQOL HIV Bref. The sociodemographic part consisted of gender, age, education, marital status, and work status. HIV related components included HIV since diagnosed, viral load, CD-4 lymphocytes count, HIV serostatus, total time on ART and mode of HIV transmission. HIV serostatus was divided into three stages Asymptomatic, symptomatic and AIDS converted similarly CD-4 T lymphocytes count were also divided into three groups.

The WHOQOL HIV Bref instrument consisted of a total of 31 questions, including two general questions and 29 specific questions explaining six areas of quality of life. The first domain; physical wellbeing, consisting of four questions, i.e. 3, 4, 14, 21; the second domain; psychological health, consisting of five questions 6, 11, 15, 24, 31; the third domain is the degree of freedom, consisting of four questions 5, 20, 22, 23; the fourth domain is social relations, consisting of four questions 17, 25, 26, 27; the fifth domain is environmental health, consisting of eight questions 12, 13, 16, 18, 19, 28, 29, 30; Sixth domain is spiritual wellness comprised of 4 questions 7, 8, 9, 10 (16).

Respondents were asked to rate 31 statements of quality of life instrument describing specific behaviors related to HIV care during the past two weeks. Five-point Likert scale is used to develop the ratings ranging from 1, Very poor/Not at all/Very dissatisfied/Never to 5, Very good/Extremely/Completely/Very satisfied/Always. Out of the 31 items, 7 are negative statements, for which responses were reversely coded to ensure higher scores representing better quality of life. Each item in a facet contributes equally to the domain score, however, since each aspect comprised of a different number of questions, therefore, to calculate each domain score, the average score of the facet was multiplied by four. The total facet score ranged from 4 as the lowest score to 20 represents the most effective score (35). WHOQOL HIV Bref user manual also provides the sociodemographic and current health characteristics of the participants like age, gender, marital status and HIV transmission route (36).

## WHOQOL HIV Bref Instrument Translation

WHO was contacted regarding permission to conduct cross-cultural validation of WHOQOL HIV Bref in the Urdu language (the national language of Pakistan); the English version of the WHOQOL HIV Bref instrument was translated to Urdu by standardized forward-backwards translation procedure (Figure 1) explained in 5 steps by Beaton's guidelines (37). Expert committee (Comprised of health professionals, language professionals, methodologists and translators) was responsible for the consolidation of original questionnaire and all versions of translation (T1, T2, T12, BT1, BT2). The original English version was independently forward translated into Urdu by a bilingual physician (T1) and a non-medical linguist (T2). Later, the authors reconciled the two translations in order to produce a single version of the forward translation (T12). Later the Urdu version (T12) was sent to native expert bilingual physician (BT1) and an independent bilingual linguist (BT2) for backward translation. Translators were asked to report any sort of difficulty during translation. After that authors compared the forward backwards translations and amended the questionnaire to produce preliminary translated Urdu version. Upon ensuring consistency in

the translated version and the original English version, the preliminary version of Urdu was pre-tested for cognitive debriefing on 30 conveniently chosen PLWHAs at the PIMS hospital. Data were analyzed and Cronbach's alpha for each domain was shown to be between 0.78 and 0.92. Relevant changes to a few items have been made Based on the feedback of the respondents to submit the final version of WHOQOL HIV Bref in Urdu. Expert committee ensured the semantic, idiomatic, experiential and conceptual equivalence of translated version to the original questionnaire.

### **Data collection procedure**

A simple random sampling technique was used to collect data from PLWHA. Data were collected from July to Sep 2019. In PIMS ART center, PLWHA regularly visits for ART follow up (All medicines provided to patients were free of cost from the Government of Pakistan) in a separate counseling room. After describing the objectives of the study and nature of research study participants were interviewed face-to-face. They were asked to fill the questionnaire for the collection of sociodemographic information, HIV characteristics and quality of life data. Eligible patients participated in the study after written consent under the guidance of a trained investigator. The completed questionnaires were checked by the study investigator and scoring were performed. Furthermore, incomplete questionnaires were excluded from the study. 54 participants were asked to complete the WHOQOL HIV Bref questionnaire again after the gap of two weeks for test retest reliability analysis.

### **Statistical Analysis**

Statistical analysis was performed using Statistical Package for Social Sciences version 24® (SPSS v24, SPSS Inc., Chicago, IL, USA). Categorical parameters were calculated as frequencies and percentages, while numerical variables were reported as means and standard deviations. The reliability of the WHOQOL HIV Bref was measured by Cronbach's  $\alpha$  coefficient. Cronbach's  $\alpha > 0.70$  indicates a good consistency (38). For test-retest analysis, an Independent Correlation Coefficient (ICC) was used with an ICC  $> 0.70$ ; demonstrating high test-retest reliability (39).

Known group analysis was used to assess how well the Urdu version of the WHOQOL HIV Bref instrument differentiates between patients living with HIV concerning their HIV stages and CD-4 T cell count. One-way Analysis of Variance (ANOVA) was performed to assess known-group validity. Post hoc tests were conducted to look at critical contrasts in domain scores among the three CD-4 T-cell count /mm<sup>3</sup> (good CD-4 T cell count ( $\geq 500$ ), medium CD-4 T cell count (200-499) and poor CD-4 T cell count ( $\leq 200$ ). It was hypothesized that HIV-symptomatic members and PLWHA with lower CD4 T Cell counts would have lower HRQoL scores mostly. Convergent validity was determined by measuring average variance extract (AVE), and composite reliability (CR) for all facets with minimal acceptable value of 0.5 and value  $> 0.7$  indicates excellent validity (40). Statistical examinations of all HRQoL items were conducted by utilizing inverted item scores, and a  $p$ -value of  $< .05$  (two-tailed test) was considered as a basis of measurable centrality for all analyses (41). The independent associations between the domains and CD-4 T-cell count were assessed using multivariable linear regression (42). The construct validity was evaluated by Exploratory Factor Analysis (EFA) by considering Kaiser-Meyer Olkin and Bartlett's test of sphericity. The EFA validity

was tried by extracting components via principal component analysis, taken after Varimax rotation with Kaisers' normalization (43).

## Results

### Patient Characteristics

Sociodemographic and health-related data of participants is given in **Table 1**. Of the total 182 patients, most respondents were males (n = 134, 73.6%), more than half (n = 104, 57.1%) fall in the age category of 25-50 years, and almost half of individuals (n = 90, 49.5%) were married or in a relationship. The majority of participants were illiterate (56%) but were able to understand and converse in the Urdu language. No PLWH had AIDS and 81% were asymptomatic. The majority of participants (53%) infected with HIV through intravenous drug use, while (16.5%) having sex with a male partner is the reason why they got the infection.

### WHOQOL HIV Bref Scale

The WHOQOL HIV-Bref domain scores were calculated following the user's manual of the WHOQOL-HIV instrument (36). Questions showing the lowest scores were activities of daily living, sleep and rest, participation in leisure activities, meaningful life and social inclusion. Across the domains, physical health and psychological health showed the highest score; social relationships showed average scores while the level of independence showed the least count. The majority of items have skewness and kurtosis coefficients within the range of - 1.00 to 1.00. Only five items have a coefficient higher than 1.00, but still within the acceptable range of - 2.00 to 2.00 (44). An item with the highest kurtosis (5.3) was the one measuring friends' social support accompanied by negative feelings (4.5). **(Table 2)**

### Reliability Test

Reliability analysis revealed excellent reliability of the translated Urdu version of the scale with Cronbach's alpha value 0.934. All the six subscales exhibited remarkable internal consistencies ranging from Cronbach's alpha value of 0.931 for the physical health domain to 0.934 for the social relationship domain. **(Table 3)**

### Test Re-Test Analysis

The test-retest reliability analysis was performed on 54 PLWH after two weeks gap. ICC value > 0.70 ( $p < .001$ ) was considered significant (45). Findings revealed statistically significant ( $p < .001$ ) ICC value for all six domains with highest ICC value of .99 (95% CI: .986 - .995) for psychological domain, and lowest ICC value of .872 (95% CI: .850 - .890) for environment domain. **(Table 3)**

### Known group validity

Results revealed remarkable differences in the domain's mean scores stratified by CD4 T cell level. The results indicate patients with higher CD4 T cell count had higher mean scores of physical health, level of independence, psychological health, social relationship, environment health and spiritual health ( $p < 0.001$ ) compared to patients with CD4 T cell level 200-499 and less than 200. Post hoc- analysis also demonstrated a statistically significant variation in mean scores for all six domains except spirituality domain; mean count did not vary substantially among patients with CD4 T-cell count less than 200 and patients with CD4 T-cell count tally 200-499 (**Table 4**).

Five out of the six domain scores discriminated significantly among disease stages (asymptomatic and symptomatic). Asymptomatic patients had higher scores across all subdomains except for spirituality compared to symptomatic patients (**Table 5**).

### **Convergent validity**

Results revealed that based on the Composite reliability (CR) value, all facets show good convergent validity as CR value is higher than 0.7 except for the social relationship domain .664 (.458 - .755). Other parameters Average Variance Extracted (AVE) also demonstrates that all the facets exhibit acceptable convergent validity (**Table 6**).

### **Multivariable linear regression analysis**

To assess the association between WHOQOL HIV Bref domains and CD-4 count; linear regression test was applied (**Table 7**). Results showed when all domains were valued together; only physical, psychological and environment health domains were significantly associated with higher CD4 T-cell count (Beta= .121,  $p < .001$ , Beta= .103,  $p = .002$ , and Beta = .032,  $p = .032$ ).

### **Factor Validity**

Twenty-nine items of the WHOQOL HIV Bref instrument were analyzed for factor analysis. Kaiser-Meyer Olkin and Bartlett's test of sphericity results were significantly acceptable. The analysis was acceptable as factor analysis of six domains with Eigen value above one represented 62.1% of the variance. First domain attributed to 34.5% of the variance. Furthermore, all six domains contain three or more items except for the fifth and sixth domains which include 2 and 1 items respectively. As recommended by Bryant et al. every domain should contain a minimum of three items; therefore, the model was modified to five domains (46). Factor analysis of 5 domains accounted for 61% of the total variance. All unique areas were divided into a few aspects; however, similar regions were gathered, and stacked onto comparable components. For example, all items of the level of independence and physical health loaded into factor 1. All factors with details are given in **Table 8**.

## **Discussion**

The current study focused on the appraisal of reliability and validity of the Urdu version of the WHOQOL HIV Bref instrument. Findings demonstrate that WHOQOL HIV Bref is a highly reliable and validated tool in

the Urdu language. This is the first study that systematically translated and validated the 31-item instrument in Pakistan. Conceptually our study highlighted the high reliability of the original instrument developed by WHO. The none response rate in our study was less (2.6%) displayed good acceptability by PLWHA. Overall, Cronbach's alpha value is greater than 0.93 which indicates excellent internal consistency (47). Individual domains and each question's internal consistency was more than 0.9, which is highly acceptable, and these findings are in line with the Iranian, Brazilian and Chinese studies (18, 24, 31). The skewness and kurtosis value of almost all the items fall within the acceptable range (-1.00 to 1.00) which are consistent with the findings of the study conducted among Taiwanese and older Portuguese patients infected with HIV (26, 27).

Reliability coefficients (ICC values) of the Urdu version of the WHOQOL HIV Bref instrument ranging from 0.872 to 0.992; these findings are consistent with psychometric evaluation studies conducted in China and Malaysia (18, 22, 29). The time interval was 12 to 16 days between the first and second ratings as proposed by Anne Anastasi and Susana Urbina (48). The two weeks gap was selected to minimize the memory effect if the period is too short and that genuine differences in scores are not likely to have occurred if the period is too long (48).

Known group comparison shows the Urdu version of WHOQOL HIV Bref is a flexible tool for measuring the HIV care-related quality of life, as the questionnaire significantly differentiates between patients with different levels of CD4 T cells; the higher the CD4 T cell levels, the better quality of life. These results are comparable to the findings of a study conducted in Chinese PLWH (18). Of note, the difference in social relationship and spirituality facets (larger standard deviation) among PLWH with different HIV stages, indicates that though AIDS is a non-mortal disease at present, the level of affected emotional distress remains the same even at entirely different stage of HIV. This replicates the reality that, despite HIV/AIDS is presently a treatable syndrome, however, does not represent a loss of life sentence. The participants have difficulties in coping with disease and managing related emotional distress regardless of their medical stage.

The social relationship factor may additionally face similar problems, therefore, an interventional studies that are directed to improve emotional and social well-being are required to clarify this aspect. Along with other difficulties limited financial resources; a social aspect predominately affects PLWHA care and this is of particular importance in developing countries. Our study also demonstrated that asymptomatic patients showed better health-related outcomes compared to symptomatic patients. Previous studies by Tesfye et al., Zhu et al., and Saddki et al. have found Asymptomatic PLWHA have better HRQol than symptomatic subjects do and WHOQOL-HIV Bref has an excellent discriminative ability regarding HIV stages (18, 29, 30).

Factor analysis (FA) of WHOQOL-HIV Bref showed a five-factor model structure which is in line with the Portuguese and Malaysian HIV patients (27, 29). This is found to be maximum about imbricate constructs between the factors due to the difference in perceptions and interpretations grounded in the Pakistani Muslim culture. In addition to the Exploratory Factor Analysis (EFA), Canavarro et al. performed

a WHOQOL-HIV Bref (CFA) jointly and found that each of the five-factor model and the original six-domain model worked reasonably well. (27). Furthermore, multiple regression analyses from Peltzer et al. explained that only four domains (spirituality, psychological, surroundings, and level of independence) majorly predicted overall HRQoL (49). Different studies also suggested that the model could be improved by changing some questions in a construct (27, 30).

## Limitations

This research has limitations that should be noted. Pakistan is a country filled with immense diversity and ethnicities. There are more than 1,80,000 patients of HIV but only 22,947 people are receiving the ARV free of cost from the government established ART centers. Thus, the results of this study do not apply to those who are not receiving therapy. Most of the investigation populace included were intravenous drug users who were in a lamentable environment or incapable of sticking to the treatment rules.

Moreover, all study patients were outpatients and who might already be in a good physical state and none of the study participants had AIDS. Therefore, a discriminative property of instrument was tested between the symptomatic and asymptomatic groups only. For this reason, it is recommended that longitudinal studies should be conducted to further differentiate between different clinical stages of HIV infection.

## Conclusion

Present study findings indicates that the Urdu version of the WHOQOL HIV Bref is a reliable and valid tool among HIV patients in Pakistan. ART centers of Pakistan could utilize this instrument to assess the HRQoL of HIV patients and can develop specifically tailored interventions to enhance the adherence of ARVs.

## Declarations

### Supplementary Materials

Data sets used in this study can be requested from corresponding author upon reasonable request.

### Author Contributions

A.A conceptualize the idea, A.A, F.K.H, N.A, M.M.U collected the data, M.S, A.A, F.K.H analysed the data, M.S, A.A generated the tables, A.A., M.S written the first draft of manuscript subsequently edited by F.K.H, A.B, A.B and J.D. All authors approved the final version of manuscript.

### Acknowledgement:

We acknowledge Pakistan's National AIDS Control Program, PIMS Hospital Antiretroviral Therapy Centre, Hassan Mansoor Malik (HIV Case Manager) and Musarat Jabeen (Health Counselor) for helping us conduct a smooth study. We are very grateful to Azhar Hussain Tahir, Hafeez Ahmed, Ali Safder and

Maria Tanveer for helping with the translations. We also recognize the voluntary participation of HIV patients in the study.

### **Declaration of Funding:**

We received no funding for this project.

### **Conflict of Interest:**

We declare no conflict of interest.

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## Tables

**Table 1: Sociodemographic and Clinical characteristics of the participants (n = 182)**

<b>Parameters</b>	<b>n (%)</b>
<b>Gender</b>	
Male	134 (73.6)
Female	42 (23.1)
Transgender	6 (3.3)
<b>Age (Years)</b>	
<25 years	30 (16.5)
25-50 years	104 (57.1)
>50 years	48 (26.4)
<b>Marital Status</b>	
Single	54 (29.7)
Married / In Relationship	90 (49.5)
Divorced / Separated	14 (7.7)
Widowed	24 (13.2)
<b>Level of Education</b>	
Illiterate	102 (56)
Primary	50 (27.5)
Secondary	12 (6.6)
Tertiary	18 (9.9)
<b>Employment Status</b>	
Employed	102 (56)
Unemployed	80 (44)
<b>Since HIV Diagnosed</b>	
<1 year	44 (24.2)
1-5 years	80 (44.0)
6-10 years	28 (15.4)
>10 years	30 (16.5)
<b>HIV Serostatus</b>	
Asymptomatic	148 (81.3)
Symptomatic	34 (18.7)
AIDS Converted	0 (0)
<b>CD - 4 T cells Count</b>	
<200	32 (17.6)
200-500	62 (34.1)
>500	88 (48.4)
<b>Viral Load</b>	
Detectable	64 (35.2)
Not Detectable	118 (64.8)
<b>Time on ART (Months)</b>	
<12	42 (23.1)
12-48	14 (7.7)
>48	126 (69.2)
<b>How you got infected with HIV</b>	
No Idea	20 (11.0)
Blood Products	20 (11.0)
Injecting Drugs	96 (52.7)
Sex with Women	16 (8.8)
Sex with Man	30 (16.5)

**Table 2: Mean, SD, Skewness, and Kurtosis of WHOQOL-HIV Bref items**

	Mean	Std. Deviation	Skewness	Kurtosis	Cronbach's Alpha if Item Deleted
<b>Overall QoL</b>					
How would you rate your QoL?	3.61	.85	-.584	-.321	0.931
How satisfied are you with your health?	3.67	.84	-.550	-.218	0.931
<b>Physical Health</b>	15.63				
Pain and discomfort	4.14	1.02	-.913	-.409	0.930
Bothered by HIV symptoms	4.04	.95	-.946	.441	0.930
Energy and fatigue	3.49	.90	-1.055	.803	0.931
Sleep and rest	3.95	.81	-.543	-.052	0.932
<b>Psychological Health</b>	15.33				
Positive feelings	2.95	.74	-.094	.146	0.932
Concentration ability	2.49	.90	.016	-.778	0.933
Bodily image and appearance	3.41	.80	-.999	.390	0.931
Self-satisfaction	2.77	.85	.219	-1.085	0.931
Negative feelings	1.21	.48	2.293	4.588	0.934
<b>Level of Independence</b>	8.04				
Dependence on medical treatment	4.09	.93	-.749	-.378	0.930
Mobility	4.33	.98	-1.400	1.074	0.930
Activities of daily living	3.56	.61	-.804	.031	0.931
Work capacity	3.35	.76	-.693	-.149	0.931
<b>Social Relationships</b>	12.34				
Social acceptance (Inclusion)	1.99	.83	.598	-.119	0.935
Personal relationships	2.11	.58	-.017	-.123	0.931
Sexual satisfaction	1.98	.53	-.021	.546	0.932
Social support from friends	1.97	.62	1.141	5.398	0.934
<b>Environmental Health</b>	9.02				
Physical safety and security	3.45	.73	-.766	-.482	0.931
Physical environment	3.52	.70	-.734	-.145	0.931
Financial resources	2.60	.87	-.026	-.709	0.931
Information for daily living	3.21	.73	-.351	.781	0.934
Participation in leisure activities	3.00	.82	.118	-.081	0.934
Home environment	2.51	.65	-.780	-.124	0.931
Accessibility of health services	3.19	.72	-.651	.288	0.932
Transport	3.21	.80	-.526	.388	0.931
<b>Spirituality</b>	10.27				
Meaningful life	2.88	.74	-.297	-.116	0.933
Forgiveness and blame	2.15	.92	.781	.262	0.933
Concerns about the future	2.02	.59	.314	.924	0.934
Worry about death	1.97	.79	1.000	1.876	0.935

**Table 3: Reliability test; Internal consistency and Test-retest reliability**

Parameters	Cronbach's alpha (n = 182)	ICC (95% CI) (n = 54)
Overall	.934	
Physical	.931	0.975 (0.957-0.986)
Psychological	.934	0.992 (0.986-0.995)
Independence	.932	0.892 (0.870-0.941)
Social Relationships	.934	0.901 (0.880-0.932)
Environment	.932	0.872 (0.850-0.890)

**Table 4: Known-group validity for subcategories of patients by CD-4 T Cell count/mm<sup>3</sup> (n=182)**

Categories	CD4 count 200	Sign <sup>a</sup>	CD4 count 200-499	Sign <sup>b</sup>	CD4 count 500	Sign <sup>c</sup>	ANOVA P
	n = 32		n = 62		n = 88		n = 182
Physical	10.62±3.01	<0.001	15.83±2.11	<0.001	17.31±1.40	<0.001	<0.001
Psychological	7.7±2.11	<0.001	10.09±1.24	<0.001	11.32±1.36	<0.001	<0.001
Independence	11.43±2.27	<0.001	15.48±1.82	0.002	16.63±1.84	<0.001	<0.001
Social relationships	7.18±1.57	0.031	8.06±1.19	0.545	8.34±1.67	0.001	<0.001
Environment	10.53±2.11	<0.001	12.50±1.74	0.353	12.89±1.38	<0.001	<0.001
Spirituality	8.06±2.57	0.469	8.61±2.05	0.010	9.65±1.81	0.001	<0.001

Data are M ± SD. Tests were One-way ANOVA and Scheffé Test for post-hoc group comparisons. ANOVA, Analysis of Variance.

<sup>a</sup> regards comparison between the first and second group

<sup>b</sup> regards the comparison between the second and third group

<sup>c</sup> regards the comparison between the third and first group

**Table 5: Comparison of Urdu version of WHOQOL-HIV Bref domain scores between participants with asymptomatic and symptomatic HIV status**

Domain	Asymptomatic n = 148 Mean and SD	Symptomatic n = 34 Mean and SD	Mean difference (95% CI)	P = Value
Physical	16.71 (1.95)	10.94 (2.98)	5.77 (4.95-6.59)	<0.001
Psychological	16.19 (1.85)	11.58 (2.51)	4.60 (3.68-5.52)	<0.001
Independence	8.26 (1.50)	7.11 (1.47)	1.14 (0.57-1.70)	<0.001
Social relationships	12.83 (1.58)	10.24 (1.48)	2.60 (2.01-3.18)	<0.001
Environment	9.26 (2.07)	8.00 (2.17)	1.26 (0.47-2.04)	<0.001
Spirituality	10.8541 (1.49931)	7.7176 (1.76)	3.13 (2.55-3.72)	.002

All significant with  $p < 0.05$

**Table 6: Convergent validity of six domains of WHOQOL-HIV Bref scale**

Domains	Composite reliability (CR)	Average variance extracted (AVE)
Environmental Health	0.825 (0.782-0.855) ***	0.586 (0.332-0.636) ***
Level of Independence	0.881 (0.852-0.905) ***	0.649 (0.592-0.705) ***
Physical Health	0.909 (0.878-0.930) ***	0.716 (0.649-0.770) ***
Psychological Health	0.772 (0.720-0.811) ***	0.534 (0.385-0.685) ***
Social Relationship	0.664 (0.458-0.755) ***	0.583 (0.300-0.672) ***
Spirituality	0.759 (0.597-0.819) ***	0.548 (0.320-0.532) ***

All significant with \*\*\*  $P < 0.001$

**Table 7: Linear Associations of the WHOQOL HIV Bref with CD-4 T cells**

Predictors	Beta (95% CI)	P-Value
Physical Health	0.121 (0.072-0.170)	< 0.001
Psychological Health	0.103 (0.037-0.168)	.002
Level of Independence	0.030 (-0.023-0.83)	.260
Social Relationships	0.036 (-0.018-0.090)	.190
Environment Health	-0.063 (-0.120- -0.006)	.032
Spiritual Health	0.002 (-0.120-0.041)	.908

Dependent Variable CD-4 T cell count, All significant with  $p < 0.05$

**Table 8: Exploratory Factor Analysis by Varimax rotation with Kaiser's normalization**

Items	Original Domain	Related factor loading				
		F <sup>a</sup> . 1	F. 2	F. 3	F. 4	F. 5
<b>Physical Health</b>						
Bothered by HIV symptoms	Phy <sup>b</sup>	.926				
Pain and discomfort	Phy	.885				
Sleep and rest	Phy	.827				
Energy and fatigue	Phy	.617			.309	
Dependence on medical treatment	Independent <sup>c</sup>	.832				
Activities of daily living	Independent	.618				
Work capacity	Independent	.593				
Mobility	Independent	.804				
Bodily image and appearance	Psycho <sup>d</sup>	.816				
Physical safety and security	Environm <sup>e</sup>	.635				
<b>Environmental Domain</b>						
Home environment	Environm		.603			
Accessibility of health services	Environm		.763			
Transport	Environm		.646		.483	
Physical environment	Environm		.569			
<b>Spirituality Domain</b>						
Concerns about the future	Spiritual <sup>f</sup>			.856		
Worry about death	Spiritual			.809		
Forgiveness and blame	Spiritual			.710		
Concentration ability	Psycho			.318		
Meaningful life	Spiritual			.343		
<b>Social Domain</b>						
Social support from friends	Social <sup>g</sup>				.665	
Positive feelings	Psycho	.555			.325	
Financial resources	Environm				.681	
Information for daily living	Environm				.665	
Sexual satisfaction	Social	.420	.430		-.355	
Social acceptance (Inclusion)	Social				.452	
<b>Psychological Health</b>						
Personal relationships	Social		.349			.804
Self-satisfaction	Psycho	.445				.554
Negative feelings	Psycho					.768
Participation in leisure activities	Environm					.606

Note: <sup>a</sup> F = Factor loading; <sup>b</sup> Phy = Physical domain, <sup>c</sup> Independent = Level of independence domain, <sup>d</sup> Psycho = Psychological domain, <sup>e</sup> Environm = Environment domain, <sup>f</sup> Spiritual = Spiritual domain, <sup>g</sup> Social = Social domain,

Kaiser Kaiser-Meyer Olkin result 0.87 and Bartlett's test of sphericity result  $P < 0.0001$

## Figures

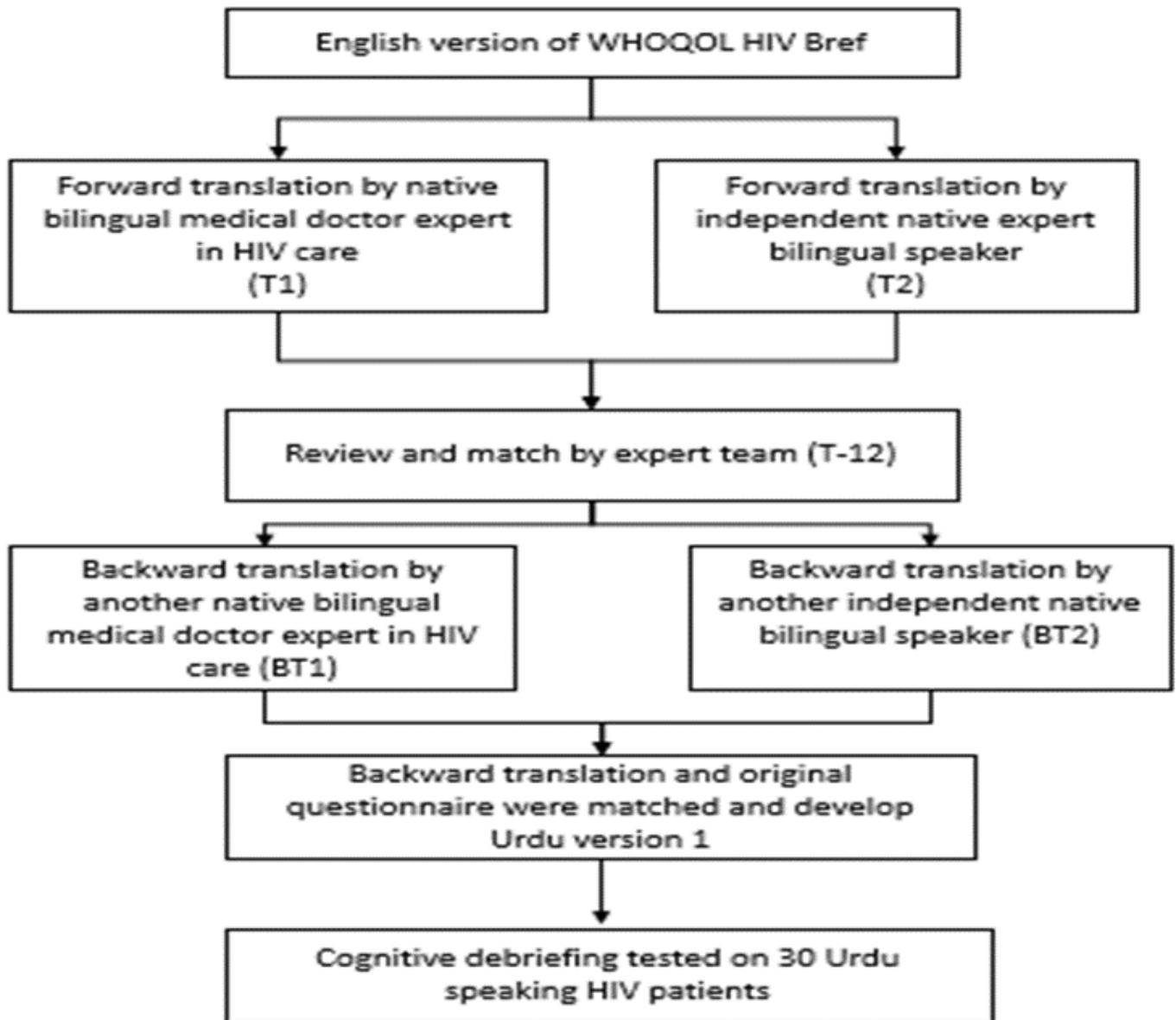


Figure 1

Translation procedure