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Health-related quality of life among people living with HIV in the era of universal test and treat: Results from a cross-sectional study in KwaZulu-Natal, South Africa

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Abstract

Background: The World Health Organization's (WHO) key population-based strategy for ending the human immunodeficiency virus (HIV) epidemic is universal HIV test and treat (UTT) along with pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP). Despite the successful scale-up of the UTT strategy in sub-Saharan Africa, the quality of life (QoL) of people living with HIV (PLHIV) remains sub-optimal. Poor quality of life in PLHIV may threaten the UNAIDS 95-95-95 programme targets. Monitoring QoL of PLHIV has become a key focus of HIV research among other outcomes so as to understand [health-related quality of life \(HRQoL\)](#) profiles and identify interventions to improve programme performance. This study aimed to describe HRQoL profiles and identify their predictors in PLHIV in KwaZulu Natal, South Africa.

Methods: We conducted a secondary data analysis of a cross-sectional survey conducted between May and June 2022 [among](#) PLHIV (n=105) accessing HIV [services at an](#) outpatient clinic in KwaZulu-Natal, South Africa. Socio-demographic, HRQoL (EQ-5D-5L index scores), clinical data, depressive symptoms (CES-D-10) and viral load data were collected from all participants. We examined predictors of HRQoL using generalised linear models controlling for age and sex.

Results: The mean age of the participants was 45 years (SD= 13). [The proportion of participants with disabilities and comorbidities was 3% and 18%, respectively.](#) [Depressive symptoms were present in 49% of the participants.](#) Participant's [mean EQ-5D-5L index score was 0.87 \(SD= 0.21\) and ranged from 0.11 to 1.0.](#) [The mean general health state \(EQ-VAS\) was 74.7 \(SD= 18.8\) and ranged from 6 to 100.](#) Factors that reduced HRQoL were disability ($\beta=-0.607$, $p\leq 0.001$), comorbidities ($\beta = -0.23$, $p\leq 0.05$), presence of depressive symptoms ($\beta = -0.10$, $p\leq 0.05$) and old age ($\beta = -0.04$, $p\leq 0.05$). [Factors that increased HRQoL were a good perceived health state \(\$\beta = 0.147\$, \$p\leq 0.001\$ \) and availability of social support \(\$\beta = 0.098\$, \$p\leq 0.05\$ \).](#)

Conclusion: A combination of old age (60 years and above), any disability and comorbidities had a considerable effect on HRQoL among PLHIV. Our findings support the recommendation for an additional fourth UNAIDS target that should

focus on ensuring that 95% of PLHIV have the highest possible HRQoL. Psychosocial support interventions are recommended to improve the HRQoL of PLHIV.

Background

The World Health Organization (WHO) [defines quality of life \(QoL\)](#) as an “individual’s perception 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”

¹. The all-encompassing concept takes into consideration an individual’s overall biopsychosocial health, and the role of salient features in the environment ².

How well one functions in life relative to one’s health or disease status or the quality of life that impacts well-being, are some of the ways in which health-related quality of life (HRQoL) has been defined ³. Understanding the HRQoL for persons living with human immunodeficiency virus (PLHIV) is important given the chronic nature of HIV infection, and the multifaceted impacts of HIV on physical, psychological, and social well being.

Current interventions include universal test and treat (UTT), pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP) as outlined in the strategies by the WHO to address HIV. UTT affords persons diagnosed as HIV positive to promptly start antiretroviral therapy (ART) regardless of CD4 count and WHO clinical stage⁴. [Evidence has been documented of UTT correlating with improved QoL in PLHIV](#) ^{5,6,7,8}.

The HRQoL of PLHIV has been considered the fourth target to be achieved when examining the UNAIDS 95-95-95 targets aimed at monitoring the effectiveness of UTT policy recommendations for PLHIV ⁹. Conflicting evidence exists regarding HRQoL outcomes for PLHIV depending on the timing of initiation of ART and study setting ^{10,11,12}. Evaluating HRQoL provides insights into the challenges posed by the HIV epidemic, such as medication adherence, symptom management, psychological distress, and social stigma. The HRQoL of PLHIV could provide a comprehensive perspective that empowers healthcare providers to devise personalised interventions that address the diverse needs of persons infected and affected by HIV.

PLHIV often have lower QoL compared to the general population due to the longevity of the infection and chronic disease aspects ¹³. HRQoL in people living with HIV has been shown to be predicted by old age, presence of comorbidities, unavailability of

food, limited social support and psychological factors ^{11,14,15,16,17}. In 2017, a meta-analysis of [the prevalence of depression in PLHIV in sub-Saharan Africa \(SSA\)](#) found that the prevalence of depression ranged from 9% to 32% ¹⁸ and its correlates were low socio-economic status, female sex, and old [age](#). In Ethiopia, for example a study on the relationship between food insecurity, poor mental health and QoL in PLHIV found that food insecurity and poor mental health correlated well with low QoL¹⁹

[A study in Zambia found that scale up of UTT reduced HIV incidence and HIV-related mortality in PLHIV](#) ²⁰. We report here from South Africa, where the KwaZulu-Natal province has the highest prevalence of HIV infections in the country ²¹. Linkage to care and retention among PLHIV is low in areas with high HIV prevalence ²². However, since the introduction of UTT, survival of PLHIV has improved, and optimising the QoL in PLHIV has become the focus of HIV research among other outcomes⁵. Routine measurement of HRQoL in KwaZulu-Natal would serve as a vital tool in the holistic care of PLHIV. It would allow for capturing the intricate interplay between physical health, psychological well-being, and social aspects, and how to provide and tailor interventions, which foster better coping mechanisms and promote a higher quality of life. Integrating HRQoL assessments into clinical practice and research has the potential not only to enhance patient-centred care but also [to](#) inform policy decisions aimed at addressing the unique challenges faced by PLHIV.

The aim of this study was to describe HRQoL profiles and identify their predictors in PLHIV in KwaZulu Natal, South Africa.

Methods

Design and Study Setting

This was a cross-sectional [analytical study using secondary data collected as part of a larger study aimed at evaluating memory scale among PLHIV at a hospital in KwaZulu-Natal](#). The data was collected among 105 PLHIV accessing HIV services at an outpatient clinic in [KwaZulu-Natal](#), South Africa between May and June 2022.

Sample characteristics and sampling technique

Participants aged 18 years and above were purposively sampled during regular clinic days. Participants were included in the study if they were HIV positive with CD4 count results available. Eligible participants [who accepted to take part in the survey](#) were then asked to complete EQ-5D-5L and CESD-10 questionnaires. Participants were asked to [voluntarily](#) sign [written](#) consent form [prior to data collection](#).

Data Collection

Data were collected using trained field staff, who administered a four-part questionnaire which included the following:

- **Demographic details questionnaire:** The demographic details questionnaire collected data related to age, sex, educational level, HIV viral load suppression status, disability, social support, any comorbidity, weight, body mass index, and WHO clinical stage.
- **Health Related Quality of Life:** HRQoL was measured using the EuroQol (EQ-5D-5L) Index. The EQ-5D-5L index score is a brief, multi-attribute, generic health status measure consisting of 5 questions with Likert response options²³. The EQ-5D-5L has strong psychometric properties regarding reliability, validity and responsiveness^{24,25}. The descriptive system consists of 5 dimensions of health (mobility, self-care, usual activities, pain or discomfort, and anxiety or depression). These dimensions have 5 levels of severity in each dimension measured on a Likert scale (no problems, slight problems, moderate problems, severe problems, and unable to perform or extreme problems).
- **General health status:** General health status was measured using the EQ-VAS, which is a vertical visual analogue scale that takes values between 100 (best imaginable health) and 0 (worst imaginable health), on which participants provide a global assessment of their self-perceived health status²⁶. A cut-off point of ≥ 73 was used to categorise participants with a good health state.
- **Depressive symptoms:** The Centre for Epidemiological Studies on Depression scale (CESD-10) is the 10-item unweighted summed score measuring depression symptoms²⁷. Examples of the items in the scale include: I was bothered by things that don't usually bother me, I had trouble

keeping my mind on what I was doing, I felt depressed, I felt everything I did was an effort, I felt hopeful about the future, I felt fearful, my sleep was restless, I was happy, I felt lonely, and I could not "get going". Participants who scored ≥ 12 were considered to have probable depressive symptoms while participants with a score of ≥ 16 were considered to have depressive symptoms²⁸. Details of the computation and measurements have been explained somewhere²⁷.

Derivation of EQ-5D-5L Index Scores

The EQ-5D-5L index scores were derived by asking participants to indicate their health state in the box next to the appropriate statement about severity of the problems in each of the five dimensions. Responses from each dimension resulted in a five-digit number that expressed the levels of severity on each dimension. These five digits were combined into a single number that described the participant's health state. The last process in the derivation of the index score was to convert the five digit number into a single measure of health state ranging from 0 (poor health state) to 1 (good health state)²⁹. The Ugandan value sets were developed using both additive and multiplicative models.³⁰ Appendix 1 shows values sets of the levels of severity by their five dimensions. For example, if a participant has no problem on mobility the score is zero (0), moderate problems on self-care the score is 0.110, slight problems on usual activities the score is 0.060, moderate problems on pain/discomfort the score is 0.138 and no problem on anxiety the score is 0. The utility score for this participant will be $1 - (0 + 0.110 + 0.060 + 0.138 + 0) = 0.692$. We subtract the total scores from 1 because the highest score an individual can achieve when he/she has no problem is 1.

Data Analysis

All data were coded and cleaned. Descriptive and inferential statistical analyses were conducted in STATA release 18.0³¹. For descriptive statistics, all quantitative variables were summarised using means and standard deviation while categorical variables were summarised using frequencies and percentages. For inferential statistics, the EQ-5D-5L index scores were calculated based on the 2021 Uganda value datasets, due to the unavailability of recent utility data for South Africa.

Differences in index scores by socio-demographic characteristics were determined using the Mann-Whitney test because the EQ-5D-5L index values were not normally distributed. [We used](#) generalised linear models with gamma distribution and identity link function to examine predictors of the HRQoL utility index because of the non-normality of the EQ-5D-5L index scores. At the multivariable level, adjustments for age and sex due to sample size limitation. Results of the model were presented in the form of beta coefficients along with standard errors and p-values.

Results

Table 1 shows [the](#) distribution of selected participant's characteristics. The sample consisted of 105 PLHIV, who had a mean age of 45.2 years (SD= 13.3), and whose ages ranged from 18 to 70 years with an equal balance of participants self-identifying as male and female. [Twenty percent](#) (n= 18) of the participants had tertiary education. The proportion of participants who indicated that they were married was 54.4% (54). 73.3% (n=77) of the participants were residing in formal houses while 21.0% (n=22) and 5.7% (n=6) were residing in informal houses (made of wood) and traditional houses (made of mud) respectively. More than half of the participants (n= 55; 54.5%) were in the first WHO clinical stage, followed by 25.7% (n= 26), 15.8% (n= 16) and 3.8% (n= 4) respectively in the second to fourth clinical stages [respectively](#). Approximately 52.5% (n= 55) of the participants were [not](#) virally suppressed [while 47.4% \(n=50\) were virally suppressed](#). Nearly 18% (n= 19) of the participants had [a](#) comorbidity and 2.8% (n=3) reported having some form of disability.

Appendix [2](#) shows distribution of participant's social support systems. More than 62% (n= 65) of the participants indicated that they [required](#) support from a significant other and a further 58% (n= 61) indicated that family [members](#) were available to provide support. Approximately 60% (n= 63) of participants indicated that emotional support was available.

Table 2 shows [the](#) distribution of selected study outcomes. Probable depressive symptoms (CESD-10 \geq [12](#)) were present in 78% (n= 83) of the participants while significant depressive symptoms (CESD-10 \geq 16) were present in approximately

49% (n= 51) of the participants. The distribution of EQ-5D-5L dimensions is presented in Table 3. Anxiety and depression were reported by 37.4% (n=39) of the participants while pain/discomfort was reported by 34.2% (n=36). The [results further indicate](#) that 25.7% (n= 27) had some mobility problems and 22.9% (n= 24) reported problems with performing their daily activities.

Table 4 shows the comparison of EQ-5D-5L index scores by selected variables and their corresponding p-values. The variables were selected for comparison based on identified correlates of HRQoL in literature. The mean index score of the EQ-5D-5L Index was 0.87 (SD=0 .21) with scores ranging from 0.11 to 1. When evaluating the general health status of participants, a mean score of 74.7 (SD= 18.8) was obtained using the EQ-VAS, and scores ranged from 6 to 100. When examining significant differences in EQ-5D-5L index mean scores and the baseline characteristics (sex, any tertiary qualification and viral load suppression status), significant differences were seen for participants with a disability, comorbidity, general health status, depressive symptoms and having a good social support system (see Table 4). Participants with any disability had a significantly lower mean index score compared to those without any disabilities (0.4945 versus 0.8814, $p < 0.001$). Similarly, participants with any comorbidity had slightly lower index scores (0.6731 versus 0.8682, $p = 0.05$) compared to those without any comorbidity. Participants in a good health state (EQ-VAS ≥ 73) had a higher mean index score compared to those in a poor health state (0.9339 versus 0.7759, $p < 0.001$). Participants [without](#) depressive symptoms had a slightly [higher](#) mean index score compared to their counterparts with depressive symptoms (0.[9191](#) versus 0.[8188](#), $p = 0.0014$). Participants with [a](#) good social support system had a slightly higher mean index score compared to those with limited social support (0.8911 versus 0.7963, $p = 0.05$).

Results presented in Table 5 show predictors of EQ-5D-5L index scores. They suggest that the factors that predicted the HRQoL index at both univariate and multivariate levels were old age, any disability, good health state, any depressive symptoms and any comorbidity predicted. Factors that reduced HRQoL were any disability ($\beta = -0.607$, $p \leq 0.001$), any comorbidities ($\beta = -0.23$, $p \leq 0.05$), presence of depressive symptoms ($\beta = -0.10$, $p \leq 0.05$) and old age ($\beta = -0.04$, $p \leq 0.05$). Factors

that increased HRQoL were good perceived health state ($\beta = 0.147$, $p \leq 0.001$) and availability of social support ($\beta = 0.098$, $p \leq 0.05$).

Discussion

People living with HIV (PLHIV) often experience difficulties in maintaining their health-related quality of life (HRQoL) because of physical and emotional factors related to HIV and treatment. These factors can impact PLHIV's overall health, well-being and daily functioning. However, with advancements in universal test and treat, access to treatment and social support, PLHIV can lead and achieve lives that are of a high health-related quality of life. Considering these factors, the current study aimed to describe HRQoL profiles and identify their predictors in PLHIV in KwaZulu-Natal, South Africa. The findings in the current study suggest that PLHIV had high HRQoL scores which could be equated to having a good health state. Some of the problem dimensions reported by participants in order of severity that shaped HRQoL were anxiety/depression, pain/discomfort, mobility, activity, and self-care.

Furthermore, the factors that were found to reduce the HRQoL index scores were old age (over 60 years of age), having a disability, the presence of depressive symptoms and the presence of any comorbidity. On the contrary, the availability of social support and high-perceived health state increased HRQoL index scores among PLHIV.

HRQoL is a multidimensional concept, that includes an individual's physical health, psychological well-being, level of independence and presence of social relationships, and the interaction with the environment that they find themselves in^{32,33}. HRQoL is not only the perceived health status of an individual but also considers the milieu of aspects of life³³. For PLHIV, HRQoL is shaped by many determinants in their lives¹¹. Some of these determinants include psychiatric comorbidity, social support and socio-economic status, which is similar to persons living with other diseases¹¹.

PLHIV in the current study were found to have high HRQoL, which could be attributed to the age range of participants in the study as well as not having advanced stages of HIV, availability of regular ART and mechanisms such as UTT as seen previously³⁴. Resilience among PLHIV has also been thought of as a factor

related to high HRQoL³⁵. However, when examining some of the problem dimensions that impact the quality of life, it was reported by participants that anxiety/depression, discomfort, and mobility impacted QoL among PLHIV, which is comparable to findings from previously conducted studies^{35,36,37}.

Among PLHIV HRQoL scores were reduced by old age, depression symptoms, disability and comorbidity, in the current study. Reduced HRQoL scores in the presence of old age among PLHIV have previously been reported in American³⁸, Brazilian³⁹, French⁴⁰ and Pakistani studies⁹. The reason why old age is associated with reduced HRQoL scores could be due to increased social isolation among persons 60 years and older, which is even higher among PLHIV⁴¹. In addition to age, depressive symptoms have also been reported to reduce HRQoL among PLHIV⁴², as seen in the current study.

Depression and anxiety are strongly associated with physical, and socio-economic problems as well as low adherence to ART in related studies^{43,44,45}. A review of the prevalence and factors associated with anxiety and depression in SSA found that depression and anxiety were present in up to 32% of PLHIV¹⁸. The results of our study found a higher prevalence of depressive symptoms among participants (48.6%) compared to findings from extant SSA regional systematic reviews. Even though the prevalence of depressive symptoms is usually greater among PLHIV, than the general population, this could be explained by the small sample size and lack of national representativeness of the sample in the current study.

In addition to depressive symptoms, the presence of disability was also found to reduce the HRQoL among PLHIV in the current study. Disability has been previously associated with diminished quality of life for PLHIV⁴⁶. Understanding the presence of disability in reducing HRQoL among PLHIV assists in determining HIV-associated disability and the need for early interventions which may reduce the presence and severity of disability among PLHIV.⁴⁶ Functional limitations also pose a threat for long-term disability which impacts HRQoL for PLHIV⁴⁷. Comorbidities and conditions associated with HIV, include functional limitations which impact HRQoL, particularly mobility problems⁴⁸. Evidence of mobility problems among PLHIV in SSA suggests that close to 25% of PLHIV experience mobility problems that could be prevented by

early initiation of treatment ⁴⁹. The prevalence of mobility problems related to functional limitations is consistent with the findings in the current study where approximately 25% of participants had mobility problems. The presence of comorbidities has been associated with lower HRQoL for PLHIV. When comorbidities are absent or mild their effect on HRQoL has not been reported to be as detrimental as when comorbidities are severe ⁴⁸.

On the contrary, the presence of a good perceived health state and the availability of social support was found to be associated with increased HRQoL for PLHIV in the current study. The higher the perceived social support experienced by PLHIV the greater the experience of HRQoL. Evidence from a recent review suggests that when PLHIV were taking ART and had good perceived social support, they were four times more likely to report higher HRQoL than those who did not ⁵⁰. These findings were consistent with studies in Ethiopia ⁵⁰, Ghana⁵¹ and in China ⁵².

HRQoL for PLHIV is shaped by various determinants. The results in the current study suggest determinants that both reduce and increase HRQoL, using these findings, the following recommendations could be considered:

- Age: Healthcare services that are tailored to the aging population of PLHIV are needed to address the determinants that add to their reduction in HRQoL.
- Depression: It is recommended that screening for depression happens as part of the UTT recommendations, particularly for persons who might start ART later.
- Comorbidity: Even though comorbidities reduce the HRQoL for PLHIV, mental health comorbidities particularly place a strain on HRQoL. It is recommended that interventions focussed on mental health comorbidities are made available for PLHIV to optimise their HRQoL.
- Social support: Psychosocial support should be provided to PLHIV as part of their treatment intervention to optimise HRQoL.
- To effectively monitor the effectiveness of UTT on HRQoL, studies that compare HRQoL before the implementation of UTT policy recommendations are required. A study on differences in HRQoL profiles between PLHIV and those with other conditions found no significant differences between

participants who had been on ART for over five years and those who were HIV-negative but with other conditions⁵³.

Since many countries in the region are moving towards achieving the UNAIDS 95-95-95 targets⁵¹, we recommend that the fourth 95% target should explicitly focus on ensuring that 95% of PLHIV are supported to achieve the highest possible QoL, and to close the gap in HRQoL inequalities that exist. To achieve this, it is recommended that interventions that may improve HRQoL in PLHIV such as strengthening social support systems, proper and prompt management of comorbidities and strengthening coping mechanisms through psychosocial support are made available.

One of the strengths of the current study is that it provides current, up-to-date HRQoL profiles in PLHIV in South Africa for the first time and uses the most recent utility value sets from a SSA country. [Our study therefore adds value to the importance of HRQoL research for PLHIV in SSA as one way of monitoring the progress of HIV interventions.](#) Some of the limitations in the current study include our attempt to describe HRQoL, where it is known that the cut-off point for both the HRQoL index and the perceived health state scores are arbitrary in nature. Furthermore, the use of EQ-5D-5L scores based on Uganda value sets developed in 2021 due to the absence of a South African equivalent. The Uganda value sets, however, were preferred because their values are recent and have the same geographical region as South Africa. We recognise that Uganda is the least developed country on the ODAC list, compared with South Africa which is classed as an upper middle-income country. This creates substantial divergence in quality of life. Another limitation is the sample size of our study, we only sampled 105 participants because the study was part of the pilot study for a larger anticipated study. This led to adjusting for only age and sex at the multivariate level of analysis. [This study did not include data on retention and adherence among our study participants which could have given more insight into their effect on HRQoL. The last limitation was the use of purposive sampling at the expense of probability sampling methods to select study participants. This may have led to sampling a roughly equal number of male and female participants when there are more females living with HIV compared to males.](#)

Conclusions

For PLHIV, HRQoL is shaped by many determinants in their lives. In the current study, a combination of old age, any disability, the presence of depressive symptoms and comorbidities led to diminished HRQoL in PLHIV. While a perceived good health state and social support were found to improve HRQoL for PLHIV. It is therefore recommended that a fourth UNAIDS target is considered that accounts for making sure that 95% of PLHIV have the highest possible HRQoL.

Declarations

Ethics Approval

[This study was approved by the South African Medical Research Council \(SAMRC\) Health Research Committee. Its ethical approval reference number is: EC006-4/2022](#)

Consent for Publication

Not Applicable

Availability of Data and Materials

The data for this study may be accessed on request from the corresponding author.

Competing Interests

The authors declare no competing interests.

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This study was not funded.

Authors Contributions

Study Design: Reuben Christopher Moyo, Lovemore N. Sigwadhi, Stanley Carries, Zibuyisile Mkhwanazi, Arvin Bhana , Davide Bruno, Marie-Claire Van Hout, and Darshini Govindasamy

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Table 1: Distribution of Participants characteristics (N=105)

Variable	Frequency	Column Percentage
Age		
18 to 59	89	84.8
60 to 70	16	15.2
Mean age (SD)	45.2 (13.2)	-
Range (years)	18 – 70	-
Sex		
Male	53	50.5
Female	52	49.5
Virally Suppressed		
Yes	50	47.6
No	55	52.4
Any Tertiary Education		
Yes	21	20.00
No	84	80.00
Married/In Union		
Yes	54	51.4
No	51	48.6
Any Comorbidity		
Yes	19	18.1
No	86	81.9
Any Disability		
Yes	3	2.9
No	102	97.1
Dwelling Type		
Formal House (Made of brick)	77	73.3
Traditional House (Mud House)	6	5.7
Informal House (Made of Wood)	22	21.0
WHO Clinical Staging		
Stage 1	55	54.5
Stage 2	26	25.7
Stage 3	16	15.2
Stage 4	4	3.8
Missing	4	3.8

Table 2: Distribution of selected outcomes

General Health State (0 -100)	74.78 (18.68)	
< 73	43	40.95
>= 73	62	69.05
Probable of depressive symptoms (CESD-10\geq12)		
Yes	83	78.10
No	22	29.90
Severe Signs of Depression (CESD-10 \geq16)		
Yes	51	48.60
No	54	51.40
HRQOL index score (Mean, SD)	0.87 (0 .21)	
Availability of Social Support		
Yes	23	21.9
No	82	78.1

Table 3: Distribution of EQ5D5L dimensions

HRQoL Dimension	No Problem (Row %)	Some Problems (Row %)	Total (Row %)
Mobility	78 (74.29)	27 (25.71)	105 (100)
Activity	81 (77.14)	24 (22.86)	105 (100)
Self- Care	85 (81.90)	20 (18.10)	105 (100)
Pain/Discomfort	69 (65.71)	36 (34.29)	105 (100)
Anxiety/ Depression	66 (62.86)	39 (37.14)	105 (100)

Table 4: Comparison of EQ-5D-5L Index scores by selected variables

Variable	EQ-5D-5L Index Value	P-Value
Sex		0.1249
Male	0.8896	
Female	0.8502	
Virally Suppresses		0.5662
Yes	0.8712	
No	0.8696	
Any Disability		<0.001
Yes	0.4945	
No	0.8814	
Any Comorbidity		0.051
Yes	0.6731	
No	0.8682	
Any Tertiary Qualification		0.3358
Yes	0.8803	
No	0.8304	
WHO Stage		0.2313
1&2	0.8823	
3&4	0.8301	
Any Depressive Symptoms		0.014
<u>No</u>	0.9191	
<u>Yes</u>	0.8188	
Perceived Health State (EQ-VAS)		<0.001
≥73	0.9339	
<73	0.7759	
Availability of Social Support		0.05
Yes	0.8911	
No	0.7962	

Mean index score = 0.87, SD=0 .21

Table 5: Univariate and multivariate generalised linear models of predictors of EQ-5D-5L index score

	Model 1 (Univariate)	Model 2 (Multivariate)
Predictor	Coefficient (SE)	Coefficient (SE)
Age \geq 60	-0.047 (0.057) *	-0.040 (-0.058) *
Female	0.039 (0.041)	0.015 (0.042)
Virally Suppressed	0.001 (0.041)	-0.002 (0.042)
Any Disability	-0.387 (0.119) ***	- 0.607 (0.032). ***
Weight	-0.004 (0.001)	0.002 (0.001)
Body Mass Index	-0.002 (0.001)	0.0005 (0.001)
WHO stage 3 & 4	-0.052 (0.049)	-0.024 (0.059)
EQ-VAS \geq 73	0.160 (0.039) ***	0.147 (0.042) ***
Any Comorbidity	-0.210 (0.053) *	-0.231 (0.059) *
Any Depressive Symptoms	- 0.103 (0.0409) *	-0.101 (0.043) *
Any tertiary Qualification	-0.0499 (0.050)	-0.036 (0.053)
Availability of social support	0.095 (0.047) *	0.098 (0.046) *

Key: *= $p \leq 0.05$, ** = $p \leq 0.005$ and *** = $p \leq 0.001$

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Appendix 1: Ugandan EQ-5D-5L Value sets

		Mobility	Self-care	Usual-Problems	Pain/Discomfort	Anxiety/Depression
Level 1	No problem	0	0	0	0	0
Level 2	Slight Problems	0.073	0.068	0.060	0.082	0.050
Level 3	Moderate Problems	0.146	0.110	0.081	0.138	0.127
Level 4	Severe problems	0.245	0.240	0.243	0.580	0.235
Level 5	Unable/Extreme problems	0.376	0.354	0.306	0.798	0.285

Appendix 2: Distribution of Participants Social Support

ITEM	Very Strongly Agree	Strongly Agree	Mildly Agree	Neural	Mildly Disagree	Strongly Disagree	Very Strongly Disagree
There is a special person who is around when I am in need	49 (46.67%)	17 1(6.91%)	6 (5.71%)	5 (4.76%)	7 (6.67%)	12 (11.43%)	9 (8.57)
There is a special person with whom I can share joys and sorrows	45 (42.86%)	17 (16.19%)	10 (9.52%)	3 (2.86%)	13 (12.38%)	9 (8.57%)	8 (7.62%)
My family really tries to help me	33 (31.43%)	16 (15.24%)	11 (10.48%)	10 (9.52%)	10 (9.52%)	6 (5.71%)	19 (18.10%)
I get the emotional help and support I need from my family	34 (32.38%)	16 (15.24%)	14 (13.33%)	9 (8.57%)	8 (7.62%)	8 (8.62%)	16 (15.24%)
I have a special person who is a real source of comfort to me	44 (41.90%)	23 (21.90%)	13 (12.38%)	8 (7.62%)	7 (6.67%)	3 (2.86%)	7 (6.67%)
My friends really try to help me	17 (16.19%)	14 (13.33%)	12 (11.43%)	8 (7.62%)	11 (10.48%)	18 (17.14%)	25 23.81%)
I can count on my friends when things go wrong	15 (14.29%)	17 (16.19%)	10 (9.52%)	12 (11.43%)	9 (8.57%)	16 (15.24%)	26 (24/76%)
I can talk about my problems with my family	31 (29.52%)	23 (21.90%)	8 (4.62%)	5 (4.76%)	11 (10.48%)	17 (16.19%)	10 (9.52%)
I have friends with whom I can share my joys and sorrows	14 (13.33%)	22 (20.95%)	17 (16.19%)	7 (6.67%)	14 (13.33%)	10 (9.52%)	21 (20.0%)
There is a special person in my life who cares about my feelings	44 (41.90%)	26 (24.76%)	9 (8.57%)	8 (7.62%)	10 (9.52%)	4 (3.81%)	4 (3.81%)
My family is willing to help me make decisions	33 (31.43%)	14 (13.33%)	17 (16.19%)	7 (6.67%)	7 (6.67%)	13 (12.38%)	14 (13.33%)
I can talk about my problems with my friends	16 (15.24%)	13 (12.38%)	9 (8.57%)	7 (6.67%)	19 (18.10%)	15 (14.29%)	26 (24.76%)