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The WHOQOL BREF questionnaire in Luganda: Validation with a sample including people living with HIV in Uganda

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2013

UEA
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Working Paper 46

DEV Reports and Policy Papers

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Abstract

Quality of life (QOL) is an important outcome measure, known to be affected by many variables including health conditions such as HIV, poverty and other environmental and cultural factors. There are a lack of QOL measures that have been validated for use in Uganda. Validated measures are required to understand the impact of HIV on people's QOL, to assess the impact of HIV interventions, and to compare QOL of those with and without such conditions. QOL can be reliably and validly assessed using the WHOQOL-BREF. There is no validated version of the WHOQOL-BREF for Uganda. This paper describes the psychometric properties of the Luganda WHOQOL-BREF when used with a mixed sample of people living with HIV and community controls. Standardised methods were used to translate the WHOQOL-BREF into Luganda. 423 participants recruited from Wakiso district of Uganda completed the measure and provided basic socio-demographic information. 263 of these participants were people living with HIV taking antiretroviral therapy (ART), recruited from HIV clinics. Analysis was performed to assess validity and internal consistency, including confirmatory factor analysis and exploratory factor analysis. The original WHOQOL-BREF structure yielded acceptable internal consistency for Physical Health, Psychological and Environment domains. Confirmatory factor analysis revealed an adequate fit of data with the WHOQOL-BREF four domain model. Exploratory factor analysis revealed a similar four factor solution, with 8 of the 26 items showing factor loadings different to the WHOQOL-BREF structure. The WHOQOL-BREF is suitable to assess QOL in Luganda speaking Ugandans with and without HIV. An alternative structure reflected a local conceptualisation of QOL.

Keywords: Quality of life; HIV; Psychometrics; WHOQOL-BREF; Uganda

1. Introduction

1.1 Overview and need to assess quality of life

The assessment of quality of life (QOL) allows an understanding of the impact of ill-health, poverty, demographic difference and interventions on people's wellbeing. The World Health Organisation (WHO) defines quality of life 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 (WHOQOL Group 1994). QOL is affected by many factors, including for example poverty, social inequality, physical health and disability, and demographic variables such as age and gender when studied in relation to culture, ethnicity and wealth (Camfield and Skevington 2008). In relation to development, it has been argued that improving QOL is a goal of development and that aid can affect QOL when combined with social change (Kosack 2003).

Measuring QOL then is of relevance to countries with developing economies, such as Uganda. QOL is also influenced by health. Of particular note for developing countries, particularly those in sub-Saharan Africa, is the HIV epidemic. Estimates of HIV prevalence in Uganda suggest 7.3% of adults aged 15-49 are living with HIV. This compares to a regional prevalence in 2011 of 4.9% of adults in sub-Saharan Africa overall and 0.6% in North America (UNAIDS 2012b, 2012a).

The impact of HIV and anti-retroviral treatment (ART) on QOL may be particularly complex in resource-limited settings such as Uganda. Here people living with HIV (PLWH) face challenges of poverty, unemployment, costs of accessing treatment and insecure ART supplies (Russell et al. 2007). However, increased access to ART has prolonged lives, improved health, improved quality of life and enabled people to work again and rebuild relationships (Nyanzi-Wakholi et al. 2011; Russell and Seeley 2010).

Some studies with PLWH in resource-limited settings have shown that those on ART report higher QOL than those who are not on ART (for example Louwagie et al. 2007; Nannungi et al. 2013). There is a lack of research comparing QOL of PLWH on ART to other people living in the same community not taking ART and without a HIV diagnosis. Such a comparison would provide evidence regarding the impact of

HIV intervention programmes providing counselling and ART in resource-limited settings and how PLWH on ART adjust to their condition by comparing their QOL to a general population level. WHO have developed HIV specific QOL measures (WHOQOL HIV Group 2004; Pedroso et al. 2011), but these have different items to the non-disease specific versions. Therefore, to facilitate comparisons between those with and without HIV, the generic WHOQOL measures can be used (Fang et al. 2002). Accurate measurement of QOL and comparisons between PLWH and people without HIV is required. This necessitates QOL measures with adequate psychometric properties.

1.2 Reviewing the literature for current QOL measures available in Uganda

Translated measures which are culturally appropriate and have adequate psychometric properties are required globally. It is imperative that there are measures of adequate quality for use in Uganda to provide vital information on needs and outcomes. A review of the literature was conducted to investigate the current availability of validated quality of life instruments in Uganda. Searching PsycInfo and Medline in February 2013 for "quality of life" and Uganda returned a total of 98 results. 21 of these papers used quality of life measures. Nine studies used various specific health-related quality of life (Chua et al. 2011; Masumo et al. 2012; Robinson et al. 2005; Astrøm and Mtaya 2009; Nuwagaba-Biribonwoha et al. 2006; Masquillier et al. 2012; Selman et al. 2011, 2012; Eva Namisango et al. 2007). General measures of wellbeing were used in two studies, with one single item measure (Ventegodt et al. 2004) and a four-item measure (Muhwezi et al. 2007). The "SF-8" (Ware et al. 2001)has been used to explore the physical and mental health of populations affected by conflict in Uganda (Roberts et al. 2008). Eight studies used the "MOS-HIV" measure (A. C. Tsai et al. 2013; Babikako et al. 2010; Mast et al. 2004; A. L. Stangl et al. 2007; Anne L. Stangl et al. 2012; Eve Namisango et al. 2012; Bajunirwe et al. 2009; Alibhai et al. 2010). One study has used a Luganda version of the WHOQOL-BREF in Uganda and this was with PLWH (W. Muhwezi et al. 2010). Although providing support for WHOQOL-BREF's validity, this paper did not formally explore psychometric properties.

The MOS-HIV measure is the most commonly used QOL measure in Uganda. The MOS-HIV or "Medical Outcomes Study HIV" measure was developed to assess functional status and wellbeing for PLWH (Wu et al. 1997). It provides excellent

information regarding the health-related quality of life of PLWH and has good reliability and validity in relation to health status and outcomes (Brown and Ruth no date). However, MOS-HIV does have ceiling effects, focuses more on functioning than satisfaction and concentrates more on health rather than broader quality of life elements such as social relationships (Shahriar et al. 2003; O'Brien et al. 2010). Measures such as the WHOQOL-BREF then can complement the use of the MOS-HIV to explore a more global quality of life (Huang et al. 2006), to reduce difficulties with ceiling effects and to facilitate comparisons between quality of life of people with HIV and those without.

1.3 The WHOQOL-BREF

The WHOQOL-BREF was developed cross-culturally, embedding applicability to other cultures in its original structure and content (Skevington et al. 2004a). The measure is based on a broad, clear definition of quality of life covering not only health but also psychological and broader socio-cultural factors (Skevington et al. 2004a; Sakthong et al. 2007; Shan et al. 2011). The measure has been used to assess QOL of PLWH, correlates very strongly with the longer WHOQOL-100 measure and has been shown to have generally good psychometric properties in several translated versions, providing a reliable, rapid and broad measure of QOL (Brown and Ruth no date). The measure can be used with people with and without HIV.

The WHOQOL-BREF has been used in sub-Saharan Africa. A search for all names of sub-Saharan African nations and the term "WHOQOL-BREF" on MedLine, CINAHL and PsycInfo, located 28 papers, 24 of which were relevant for use of WHOQOL-BREF in sub-Saharan Africa (February 2013). These papers shown the use WHOQOL-BREF versions in Nigeria (e.g. Adewuya and Makanjuola 2009; Makanjuola et al. 2007) a nation where the measure was originally developed, Ethiopia (e.g. Araya et al. 2007), Tanzania (e.g. Howitt et al. 2011), Uganda (W. W. Muhwezi et al. 2010), Rwanda (Mutimura et al. 2008) and Sudan (e.g. J. U. Ohaeri et al. 2007). In summary, there are few translations of WHOQOL-BREF into the languages of Africa and several translate without exploring the factor structure (e.g. Akinpelu et al. 2006). The psychometric properties of the WHOQOL-BREF used in Uganda (translated into Luganda) were not investigated in the only published study using the measure (W. W. Muhwezi et al. 2010). Yet psychometric properties are vital to provide good quality measures and collect accurate data.

The WHOQOL-BREF has good properties across its various translations (Skevington et al. 2004b). The only specific exploration of the factor structure of additional translations is the work exploring the Sudanese version (J. U. Ohaeri et al. 2007; Ohaeri et al. 2004). Although factor loading for the social relationship items are low (between 0.57 and 0.61), with internal consistency low (Cronbach's alpha 0.45), the four model factor was supported. The studies also argue that exploring the domains using factor analysis can provide important information about the way in which QOL is characterised in the particular culture.

1.4 Summary an aim of present study

Measurement of QOL in Uganda requires the availability of measures with good psychometric properties. Measures of QOL that are more general are lacking for use in Uganda, where the majority of measures are condition specific. Broader measures of QOL such as the WHOQOL-BREF are needed to allow understanding of differences between those with and without health conditions, general QOL levels in relation to other variable such as poverty and to be able to measure the impact of interventions. As such, this paper aims to explore the properties of a Luganda version of the WHOQOL-BREF in a sample with both PLWH and people without HIV.

2. Methods

This paper reports data from a study that examined PLWHs' self-management strategies and adjustment to living on ART in Wakiso District, Uganda. Ethical approval was obtained from the Ugandan Virus Research Institute and the Uganda National Council of Science and Technology.

2.1 Participants

423 participants provided data: 263 participants with HIV and taking ART, and 160 forming a "control" group (HIV status not known, not currently on ART) . The 263 PLWH were recruited from ART-providing health facilities (included if on ART for at least one year) and the control participants from the general population. Data were collected in 2011.

2.2 Measures

The WHOQOL-BREF has 24 items covering four domains (1: physical health, 2: psychological health, 3: social relationships, 4: environment) and two global items of overall QOL and overall health. The measure was translated into Luganda using the WHOQOL methodology (Szabo et al. 1997). Briefly, the measure was translated into Luganda and this version was independently translated back into English by a second translator. Discrepancies were discussed amongst the research team and the process repeated. Consensus was achieved regarding the amended Luganda version as back-translated into English. The version was sent to WHOQOL for approval. The measure uses the suggested time-frame of "within the last two weeks" (WHOQOL Group 1996).

2.3 Procedure

Participants completed the interviewer-administered WHOQOL-BREF as part of a longer interview for a larger study. First participants were asked for demographic information, including marital status, gender, age, religion and size of household. Participants with HIV then provided information about their access to treatment (data not used in this paper), beliefs about illness and psychological adjustment to HIV prior to completing the WHOQOL-BREF. Participants in the control group provided demographic information only prior to completing the WHOQOL-BREF.

2.4 Statistical analysis

Data analyses were carried out using SPSS (PASW Statistics v18) and AMOS v17.0 for confirmatory factor analysis. Confirmatory factor analysis was completed to explore the fit of the original four-factor model of the WHOQOL-BREF measure. Evaluation of the model was based on guidance for good fit, specifically: ratio of X^2 to df 2-5 (J. Ohaeri et al. 2007); CFI cut-off for good fit 0.95 (Hooper et al. 2008); PCFI above 0.70 indicates good fit with higher values indicating closer fit (Szabó 2010); and RMSEA of 0.05 is close fit, 0.05 to 0.08 adequate fit (Schermelleh-Engel et al. 2003).

Exploratory factor analysis was also completed to investigate whether an alternative factor structure to the four-factor WHOQOL-BREF model was a better fit for the data. Exploratory factor analysis with varimax rotation was conducted. This commenced with seeking eigen values above one before specifying the number of factors as the initial seven factor solution was not conceptually meaningful. The number of factors was iteratively reduced by one until a solution that produced a parsimonious result, with conceptual meaning and with the most number of items without secondary loadings (secondary loading considered is above 0.5 (Tabachnick and Fidell 2007)).

3. Results

3.1 Demographic characteristics of the sample

423 participants provided data. 263 were known to have HIV and were taking antiretroviral medication. 160 formed a "control" group, whose HIV status was not known to be positive. 36% were male, mean age was 40 (s.d. 12.1).

Table 1 provides data on the demographics comparing people with HIV and the control group. Comparisons of marital status ($\chi^2(2)=5.24$ p=0.07), gender ($\chi^2(1)=3.16$ p=0.076), a food insecurity indicator ($\chi^2(1)=2.63$ p=0.11), religion ($\chi^2(1)=0.21$ p=0.65), education level ($\chi^2(2)=1.23$ p=0.54), and age (t(239)=0.016 p=0.99) revealed no significant differences between HIV and control groups. Total household size was significantly different (t(283)=2.309, p=0.022, mean difference 0.72, 95% CI 0.10-1.33), being larger in the control group. The differences between the groups then were HIV status/medication use and household size.

Table 1: Demographic details of the HIV and Control groups

Variable	HIV (n=263)	CONTROL (n=160)
Mean Age in years (s.d.)	39.8 (9.76)	39.8 (15.22)
Mean number of people living in household (s.d.)	4.6 (2.68)	5.3 (3.33)
	Frequency (%)	Frequency (%)
Number female	177 (67.3)	94 (58.8)
Education level		
None	32 (12.2)	17 (10.6)
Primary	144 (54.8)	93 (58.1)
Junior	3 (1.1)	4 (2.5)
Senior school	62 (27.3)	40 (25.0)
Further education	12 (4.6)	6 (3.8)
Religion		
Christian	226 (85.9)	140 (87.5)
Muslim	37 (14.1)	20 (12.5)
Marital status		
Single	60 (22.8)	27 (16.9)
Married	155 (58.9)	112 (70.0)
Other	48 (18.3)	21 (13.1)
Self-rating food security		
Has enough meals	229 (87.1)	130 (81.3)
Does not	34 (12.9)	30 (18.7)

3.2 Reliability

Internal consistency was measured by Cronbach alpha, shown in Table 2. Domain 1 Physical and domain 4 Environment have acceptable reliability, (greater than 0.7 (Nunnaly 1978)), domain 2 Psychological approaches this, however domain 3 Social relationships has poorer reliability.

Table 2: Domain means, internal consistency and correlation with overall quality of life

Domain	Mean (s.d.)	Alpha	Correlation with Overall Quality of Life (item G1)
1 Physical	13.9 (2.63)	0.752	0.494*
2 Psychological	16.0 (2.26)	0.674	0.516*
3 Social relationships	14.4 (2.92)	0.440	0.241*
4 Environment	13.5 (2.48)	0.719	0.446*

* significant at p=0.0000

3.3 Validity

Item-to-domain correlations matrix (available on request) showed all items correlated highest with their corresponding domains. Domain scores correlated significantly (all p=0.00000) with the overall rating of QOL (item G1) (see Table 2).

Item to overall rating of QOL correlations ranged from 0.413. (p=0.00000) for "do you enjoy life" to 0.140, (p=0.004) for "how satisfied are you with personal relationships". Only the item "do you need treatment to function" showed no significant correlation (0.016, p=0.736), illustrating this item's poorer functioning with PLWH, who were all taking medication. Using only data from the control group, who were not known to have HIV or be on ART, the item correlated at 0.202 (p=0.011) with overall QOL rating.

Discriminant validity was examined using control group data. WHOQOL domain scores were compared by gender and are given in Table 3. Gender differences were observed on domain 2 Psychological (t(158)=-4.087, p=0.00007), domain 3 social relationships (t(158)=-2.116, p=0.03593) and domain 4 Environment (t(158)=-2.225, p=0.02551), but not for domain 1 Physical health (t(158)=-1.625, p=0.106). This mirrors previous observations of similar differences using WHOQOL-BREF (e.g. W. Muhwezi et al. 2010; Min et al. 2002).

Table 3 WHOQOL domain scores by gender

Domain	Female - Mean (s.d.)	Male – Mean (s.d.)
WHOQOL 1 Physical	13.9 (2.61)	14.0 (2.67)
WHOQOL 2 Psychological	15.7 (2.27)	16.5 (2.13)**
WHOQOL 3 Social resources	14.3 (2.92)	14.6 (2.93)*
WHOQOL 4 Environment	13.4 (2.47)	13.8 (2.48)*

* significant at p<0.05
** significant at p<0.01

As the impact of and adjustment to HIV renders it difficult to predict relationships between QOL scores and HIV status, only the item regarding needing medical treatment to function in daily life was compared between the two groups. As expected the PLWH group reported significantly higher need for treatment (mean 4.4, s.d. 0.82) than the control group (mean 3.8, s.d. 1.27, difference analysed with Mann-Whitney owing to unequal sample sizes, Z=-5.178, p=0.0000).

Confirmatory factor analysis was conducted to investigate the WHOQOL-BREF four domain structure. The result is provided in Figure 1, with achieved indications of fit. Fit was acceptable, but did not reach the levels of "good".

Figure 1 shows that the relationship between the need for medication item and the physical health domain was low. The social relationships domain has the poorest relationship with quality of life.

Exploratory factor analysis was conducted, allowing the questionnaire items to create factors that best fit the data collected. Results are presented in Table 4. A four factor solution was derived and shows similarities to the original WHOQOL overall, however seven items were different, as can be seen.
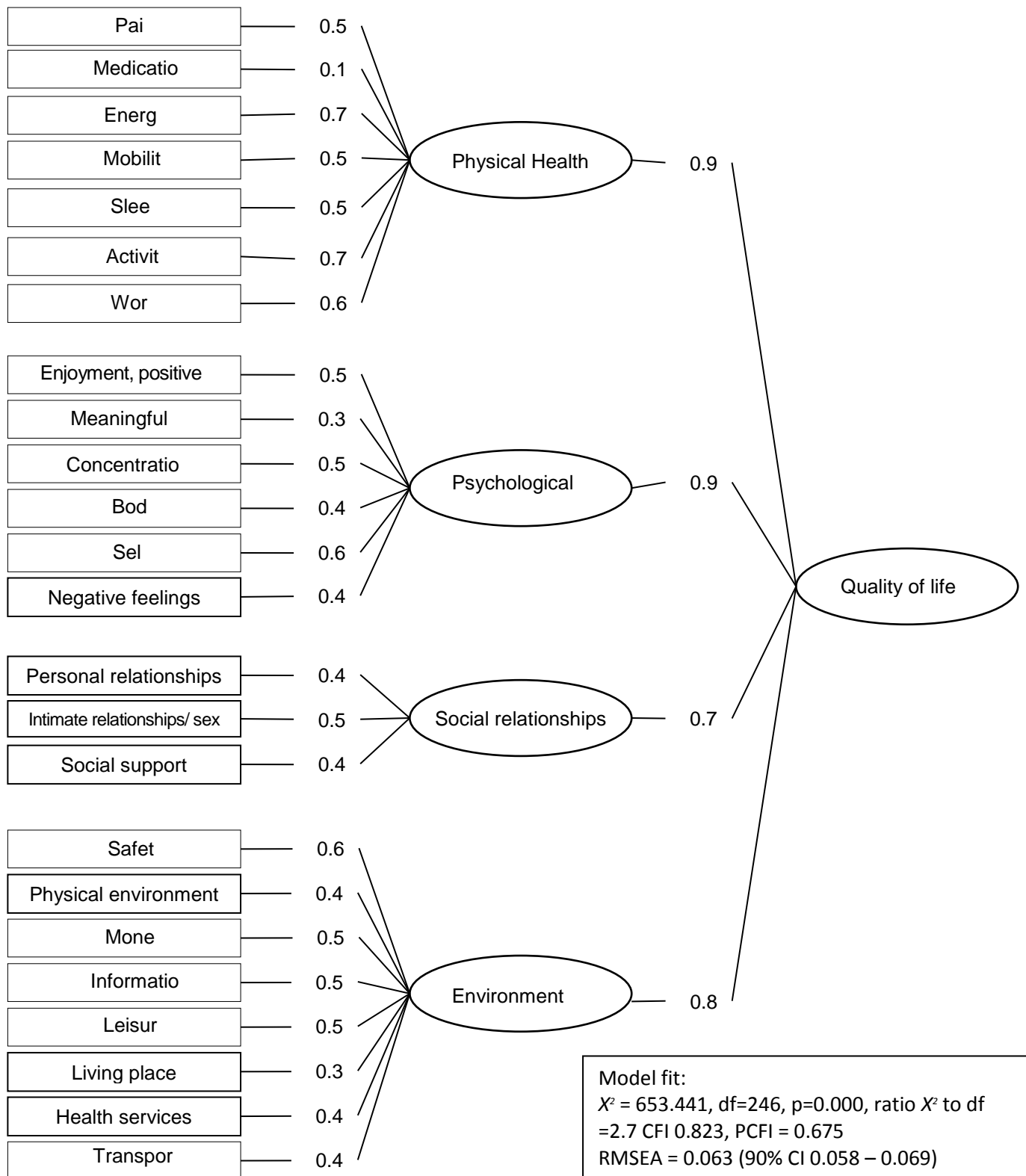
Figure 1: Four model confirmatory factor analysis

Model fit:
X^2 = 653.441, df=246, p=0.000, ratio X^2 to df =2.7 CFI 0.823, PCFI = 0.675
RMSEA = 0.063 (90% CI 0.058 – 0.069)

Table 4 Exploratory Factor Analysis (secondary factor loadings greater than 0.3 are highlighted)

* marks items loading onto different factors to the original WHOQOL-BREF, with original domain number given

Item #	Item	Factor 1 Physical (similar to D1 Physical Health)	Factor 2 Psychological (similar to D2 Psychological)	Factor 3 Resources (similar to D4 Environment)	Factor 4 Living Situation (somewhat similar to D3 Social relationships)
3	Pain	0.72	0.11	-0.05	0.05
10	Energy	0.66	0.17	0.27	0.12
18	Work capacity	0.56	0.02	**0.33**	0.16
17	Daily activity performance	0.56	0.08	**0.39**	0.11
19	Self*D2	0.45	0.14	0.27	**0.32**
26	Negative feelings*D2	0.45	0.14	0.15	0.16
16	Sleep	0.40	0.16	**0.36**	0.23
11	Bodily appearance*D2	0.40	0.28	0.05	0.24
4	Need medication* D1	**0.44**	-0.47	-0.30	0.23
7	Concentrate	**0.36**	0.60	0.13	0.00
5	Enjoy life	0.18	0.70	-0.01	0.20
6	Meaningful life	0.09	0.73	0.03	0.03
15	Mobility* D1	**0.42**	0.01	0.55	-0.09
14	Leisure activities	0.27	0.12	0.62	0.00
12	Money	0.22	0.07	0.32	**0.34**
25	Transport	0.16	-0.12	0.61	0.07
13	Necessary information	0.15	0.18	0.62	-0.02
8	Safe	0.12	**0.35**	0.46	0.26
24	Health services access	0.06	0.09	0.57	0.23
22	Social support *D3	-0.08	-0.05	0.58	**0.34**
9	Physical environment *D4	0.09	**0.39**	0.07	0.51
21	Sex / intimate relations	0.19	0.10	0.00	0.58
23	Living place*D4	0.15	0.03	0.15	0.56
20	Personal relationships	0.06	-0.05	0.10	0.70

4. Discussion

The WHOQOL-BREF translated into Luganda showed evidence of construct and discriminant validity, an acceptable fit to the four domain structure and generally acceptable internal consistency. These properties were achieved with a sample including people with and without HIV.

The internal consistency of the domains was good (above 0.7) for two domains, acceptable (approaching 0.7) for one domain and low for "social relationships". It is important to note that in the original WHOQOL-BREF paper reporting psychometric properties, 17 of the 24 nations' data had a least one domain with alpha below 0.70, with the social relationship domain most commonly marginal (Skevington et al. 2004b). These properties were accepted by WHOQOL.

Measure validity was supported by correlations between general QOL, domain and item scores. Discriminant validity was evidenced with expected differences in relation to gender and HIV status. Confirmatory factor analysis revealed that although the model did not have good fit (based on the criteria presented), it was acceptable and similar to those reported in the development of the WHOQOL-BREF e.g. CFI=0.863, RMSEA 0.07 (Skevington et al. 2004b) and subsequent validations in other languages (for example Jaracz et al. 2006).

Results from exploratory factor analysis revealed a structure similar to the WHOQOL-BREF in that there were four factors which are broadly similar in conceptualisation. The first factor is composed of largely physical items. The second factor relates to psychological variables. These are both different in content but similar to the WHOQOL domains 1 and 2. The third factor is around the environment and resources (similar to Environment domain) and the fourth factor is around living situation (similar to social relationship domain). These factors can be interpreted in relation to both the cultural setting and the inclusion of participants living with HIV and taking anti-retroviral medication.

The "physical" factor included negative feelings, bodily appearance and self-esteem items, perhaps reflecting the cultural expression/experience of negative feelings as somatic (Okello and Neema 2007). This also reflects the important impact of HIV on (perceived) bodily appearance and self-esteem, and the association between physical

appearance and self-esteem found in Uganda (Russell and Seeley 2010). This links these items to physical health. Conversely, the medication item loaded onto the "psychological" factor, perhaps reflecting the psychological impact of ART (Okello et al. 2012).

The resources and living situation factors differ from the WHOQOL domains in several ways. First, considering the resources factor, ability to move around loaded onto "resources" factor (rather than on the physical WHOQOL domain), possibly due high transport costs relative to household budgets in this setting and the need for resources to support mobility. Friends' support loaded on the "resources" factor (rather than the WHOQOL social relationship domain). This could be due to widespread poverty and the importance of material, instrumental or practical support provided by friends (A. Tsai et al. 2012) in this setting. Second, considering the "living situation" factor, this includes sex and personal relationship items from the WHOQOL-BREF "social relationships", in addition to healthy physical environment and satisfaction with home/living place conditions. These items cover relationships and the place where they occur. The context of relationships and the relationships themselves seem intertwined.

This study has several limitations. First, the sensitivity of the measurement to change in QOL over time has not been investigated. Second, owing to the complex and currently poorly understood relationship of HIV to QOL in Uganda, it was not possible to generate well evidenced hypotheses to assess discriminant validity based on HIV status. Further work will be required to establish test-retest reliability and further investigation of validity should be undertaken, using the WHOQOL-BREF with different healthy and illness populations, e.g. older adults, people with other chronic health or mental health conditions. Third, with larger sample sizes it would be interesting to compare the factor structure between those with HIV and those without to explore in more depth whether the measure's properties are equivalent across groups.

In conclusion, the results show that the Luganda version of the WHOQOL-BREF had acceptable validity and reliability. Results for domain 3 should be interpreted cautiously. Exploratory analysis revealed a factor solution similar to the WHOQOL-BREF domains, however demonstrated potential cultural and HIV related differences particularly in relation to the association between body image and

negative feelings with other physical items. The measure is suitable to assess QOL in Luganda speaking Ugandans with and without HIV. The development of this version of the measure can facilitate comparisons not only between those with and without HIV, but also cross-cultural comparisons between data from the Luganda version of the measure and scores obtained from other language versions of the WHOQOL-BREF, in order to explore the impact of variables such as poverty, HIV and health interventions on quality of life.

REFERENCES

Adewuya, A. O., & Makanjuola, R. O. A. (2009). Subjective quality of life of Nigerian schizophrenia patients: sociodemographic and clinical correlates. *Acta Psychiatrica Scandinavica, 120*(2), 160-164, doi:10.1111/j.1600-0447.2009.01395.x.

Akinpelu, A. O., Maruf, F. A., & Adegoke, B. O. (2006). Validation of a Yoruba translation of the World Health Organization's quality of life scale--short form among stroke survivors in Southwest Nigeria. *Afr J Med Med Sci, 35*(4), 417-424.

Alibhai, A., Martin, L. J., Kipp, W., Konde-Lule, J., Saunders, L. D., Rubaale, T., et al. (2010). Quality of life of HIV patients in a rural area of western Uganda: impact of a community-based antiretroviral treatment program. *Current HIV Research, 8*(5), 370-378.

Araya, M., Chotai, J., Komproe, I. H., & de Jong, J. T. V. M. (2007). Effect of trauma on quality of life as mediated by mental distress and moderated by coping and social support among postconflict displaced Ethiopians. *Quality Of Life Research: An International Journal Of Quality Of Life Aspects Of Treatment, Care And Rehabilitation, 16*(6), 915-927.

Astrøm, A. N., & Mtaya, M. (2009). Factorial structure and cross-cultural invariance of the Oral Impacts on Daily Performances. *European Journal Of Oral Sciences, 117*(3), 293-299, doi:10.1111/j.1600-0722.2009.00621.x.

Babikako, H. M., Neuhauser, D., Katamba, A., & Mupere, E. (2010). Feasibility, reliability and validity of health-related quality of life questionnaire among adult pulmonary tuberculosis patients in urban Uganda: cross-sectional study. *Health and Quality of Life Outcomes, 8*, 93-93, doi:10.1186/1477-7525-8-93.

Bajunirwe, F., Tisch, D. J., King, C. H., Arts, E. J., Debanne, S. M., & Sethi, A. K. (2009). Quality of life and social support among patients receiving antiretroviral therapy in Western Uganda. *AIDS Care, 21*(3), 271-279, doi:10.1080/09540120802241863.

Brown, L., & Ruth, L. (no date). A review of approaches and instruments for assessing health–related quality of life. *The HIV/AIDS Survey Library*. Tulane University: accessed online February 2013 at http://www.popcouncil.org/Horizons/ORToolkit/AIDSQuest/appendix_f_part1_2.html.

Camfield, L., & Skevington, S. M. (2008). On Subjective Well-being and Quality of Life. *Journal of Health Psychology, 13*(6), 764-775, doi:10.1177/1359105308093860.

Chua, S. L., Maurer, T., & Chren, M.-M. (2011). Adaptation of a Runyankore version of Skindex-16 for oral administration in Mbarara, Uganda. *International Journal Of Dermatology, 50*(10), 1249-1254, doi:10.1111/j.1365-4632.2011.04894.x.

Fang, C. T., Hsiung, P. C., Yu, C. F., Chen, M. Y., & Wang, J. D. (2002). Validation of the World Health Organization quality of life instrument in patients with HIV infection. *Quality of Life Research, 11*(8), 753-762, doi:10.1023/a:1020870402019.

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods, 6*(1), 53 - 60.

Howitt, S. C., Jones, M. P., Jusabani, A., Gray, W. K., Aris, E., Mugusi, F., et al. (2011). A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. *Journal Of Neurology, 258*(8), 1422-1430, doi:10.1007/s00415-011-5948-6.

Huang, I. C., Wu, A., & Frangakis, C. (2006). Do the SF-36 and WHOQOL-BREF Measure the Same Constructs? Evidence from the Taiwan Population*. *Quality of Life Research, 15*(1), 15-24, doi:10.1007/s11136-005-8486-9.

Jaracz, K., Kalfoss, M., Górna, K., & Bączyk, G. (2006). Quality of life in Polish respondents: psychometric properties of the Polish WHOQOL – Bref. *Scandinavian Journal of Caring Sciences, 20*(3), 251-260, doi:10.1111/j.1471-6712.2006.00401.x.

Kosack, S. (2003). Effective Aid: How Democracy Allows Development Aid to Improve the Quality of Life. *World Development, 31*(1), 1-22, doi:http://dx.doi.org/10.1016/S0305-750X(02)00177-8.

Louwagie, G., Bachmann, M., Meyer, K., Booysen, F., Fairall, L., & Heunis, C. (2007). Highly active antiretroviral treatment and health related quality of life in South African adults with human immunodeficiency virus infection: A cross-sectional analytical study. *BMC Public Health, 7*(1), 244.

Makanjuola, A. B., Adeponle, B. A., & Obembe, O. A. (2007). A comparison of quality-of-life in schizophrenia and affective disorder patients in a Nigerian tertiary hospital. *Transcultural Psychiatry, 44*(1), 65-78.

Masquillier, C., Wouters, E., Loos, J., & Nöstlinger, C. (2012). Measuring health-related quality of life of HIV-positive adolescents in resource-constrained settings. *PLoS ONE, 7*(7), e40628-e40628, doi:10.1371/journal.pone.0040628.

Mast, T. C., Kigozi, G., Wabwire-Mangen, F., Black, R., Sewankambo, N., Serwadda, D., et al. (2004). Measuring quality of life among HIV-infected women using a culturally adapted questionnaire in Rakai district, Uganda. [Research Support, U.S. Gov't, P.H.S.]. *AIDS Care, 16*(1), 81-94.

Masumo, R., Bardsen, A., Mashoto, K., & Astrøm, A. N. (2012). Child- and family impacts of infants' oral conditions in Tanzania and Uganda- a cross sectional study. *BMC Research Notes, 5*, 538-538, doi:10.1186/1756-0500-5-538.

Min, S. K., Kim, K. I., Lee, C. I., Jung, Y. C., Suh, S. Y., & Kim, D. K. (2002). Development of the Korean versions of WHO Quality of Life scale and WHOQOL-BREF. *Qual Life Res, 11*(6), 593-600.

Muhwezi, W., Okello, E., & Turiho, A. (2010). Gender-based profiling of Quality of Life (QOL) of primary health care (PHC) attendees in central Uganda: A cross-sectional analysis. *African Health Sciences, 10*(4), 374 - 385.

Muhwezi, W. W., Agren, H., & Musisi, S. (2007). Detection of major depression in Ugandan primary health care settings using simple questions from a

subjective well-being (SWB) subscale. *Social Psychiatry and Psychiatric Epidemiology, 42*(1), 61-69.

Muhwezi, W. W., Okello, E. S., & Turiho, A. K. (2010). Gender-based profiling of Quality of Life (QOL) of primary health care (PHC) attendees in central Uganda: a cross sectional analysis. *African Health Sciences, 10*(4), 374-385.

Mutimura, E., Stewart, A., Crowther, N. J., Yarasheski, K. E., & Cade, W. T. (2008). The effects of exercise training on quality of life in HAART-treated HIV-positive Rwandan subjects with body fat redistribution. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation, 17*(3), 377-385, doi:10.1007/s11136-008-9319-4.

Namisango, E., Harding, R., Atuhaire, L., Ddungu, H., Katabira, E., Muwanika, F. R., et al. (2012). Pain among ambulatory HIV/AIDS patients: multicenter study of prevalence, intensity, associated factors, and effect. *The Journal Of Pain: Official Journal Of The American Pain Society, 13*(7), 704-713, doi:10.1016/j.jpain.2012.04.007.

Namisango, E., Katabira, E., Karamagi, C., & Baguma, P. (2007). Validation of the Missoula-Vitas Quality-of-Life Index among patients with advanced AIDS in urban Kampala, Uganda. *Journal of pain and symptom management, 33*(2), 189-202.

Nannungi, A., Wagner, G., & Ghosh-Dastidar, B. (2013). The Impact of ART on the Economic Outcomes of People Living with HIV/AIDS. *AIDS Research and Treatment, 2013*, 7, doi:10.1155/2013/362972.

Nunnaly, J. (1978). *Psychometric theory*. New York: McGraw-Hill.

Nuwagaba-Biribonwoha, H., Mayon-White, R. T., Okong, P., Carpenter, L. M., & Jenkinson, C. (2006). The impact of HIV on maternal quality of life in Uganda. *AIDS Care, 18*(6), 614-620.

Nyanzi-Wakholi, B., Medina Lara, A., Munderi, P., Gilks, C., & on behalf of the, D. T. T. (2011). The charms and challenges of antiretroviral therapy in Uganda: the DART experience. *AIDS Care, 24*(2), 137-142, doi:10.1080/09540121.2011.596518.

O'Brien, K. K., Bayoumi, A. M., Strike, C., Young, N. L., King, K., & Davis, A. M. (2010). How do existing HIV-specific instruments measure up? Evaluating the ability of instruments to describe disability experienced by adults living with HIV. *Health Qual Life Outcomes, 8*, 88, doi:10.1186/1477-7525-8-88.

Ohaeri, J., Awadella, A., & El-Abassi, A. (2007). Confirmatory factor analytical study of the WHOQOL-Bref: Experience with Sudanese general population and psychiatric samples. *BMC Medical Research Methodology, 7*, 37, doi:10.1186/1471-2288-7-37.

Ohaeri, J. U., Awadalla, A. W., El-Abassi, A.-H. M., & Jacob, A. (2007). Confirmatory factor analytical study of the WHOQOL-Bref: experience with Sudanese general population and psychiatric samples. *BMC Medical Research Methodology, 7*, 37-37.

Ohaeri, J. U., Olusina, A. K., & Al-Abassi, A.-H. M. (2004). Factor analytical study of the short version of the World Health Organization Quality of Life Instrument. *Psychopathology, 37*(5), 242-248.

Okello, E. S., & Neema, S. (2007). Explanatory Models and Help-Seeking Behavior: Pathways to Psychiatric Care Among Patients Admitted for Depression in Mulago Hospital, Kampala, Uganda. *Qualitative Health Research, 17*(1), 14-25, doi:10.1177/1049732306296433.

Okello, E. S., Ngo, V. K., Ryan, G., Musisi, S., Akena, D., Nakasuija, N., et al. (2012). Qualitative study of the influence of antidepressants on the psychological health of patients on antiretroviral therapy in Uganda. *African Journal of AIDS Research, 11*(1), 37 - 44.

Pedroso, B., Gutierrez, G. L., Duarte, E., Pilatti, L., & Picinin, C. (2011). Quality of life assessment in people living with HIV/AIDS: clarifying the WHOQOL-HIV and WHOQOL-HIV-bref instruments. In V. Venketaraman (Ed.), *Global view of HIV infection* (pp. 163-176). Rijeka: Intech.

Roberts, B., Browne, J., Ocaka, K. F., Oyok, T., & Sondorp, E. (2008). The reliability and validity of the SF-8 with a conflict-affected population in northern Uganda. *Health and Quality of Life Outcomes, 6*, 108-108, doi:10.1186/1477-7525-6-108.

Robinson, P. G., Nalweyiso, N., Busingye, J., & Whitworth, J. (2005). Subjective impacts of dental caries and fluorosis in rural Ugandan children. *Community Dental Health, 22*(4), 231-236.

Russell, S., & Seeley, J. (2010). The transition to living with HIV as a chronic condition in rural Uganda: Working to create order and control when on antiretroviral therapy. *Social Science & Medicine, 70*(3), 375-382, doi:10.1016/j.socscimed.2009.10.039.

Russell, S., Seeley, J., Ezati, E., Wamai, N., Were, W., & Bunnell, R. (2007). Coming back from the dead: living with HIV as a chronic condition in rural Africa. *Health Policy Plan, 22*(5), 344-347, doi:10.1093/heapol/czm023.

Sakthong, P., Schommer, J. C., Gross, C. R., Sakulbumrungsil, R., & Prasithsirikul, W. (2007). Psychometric properties of WHOQOL-BREF-THAI in patients with HIV/AIDS. *J Med Assoc Thai, 90*(11), 2449-2460.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structurtual equation models: test of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8*(2), 23 - 74.

Selman, L., Siegert, R. J., Higginson, I. J., Agupio, G., Dinat, N., Downing, J., et al. (2011). The MVQOLI successfully captured quality of life in African palliative care: a factor analysis. *Journal of Clinical Epidemiology, 64*(8), 913-924, doi:10.1016/j.jclinepi.2010.12.013.

Selman, L., Siegert, R. J., Higginson, I. J., Agupio, G., Dinat, N., Downing, J., et al. (2012). The "Spirit 8" successfully captured spiritual well-being in African

palliative care: factor and Rasch analysis. *Journal of Clinical Epidemiology, 65*(4), 434-443, doi:10.1016/j.jclinepi.2011.09.014.

Shahriar, J., Delate, T., Hays, R., & Coons, S. (2003). Commentary on using the SF-36 or MOS-HIV in studies of persons with HIV disease. *Health and Quality of Life Outcomes, 1*(1), 25.

Shan, D., Ge, Z., Ming, S., Wang, L., Sante, M., He, W., et al. (2011). Quality of Life and Related Factors among HIV-Positive Spouses from Serodiscordant Couples under Antiretroviral Therapy in Henan Province, China. *PLoS ONE, 6*(6), e21839, doi:10.1371/journal.pone.0021839.

Skevington, S. M., Lotfy, M., & O'Connell, K. A. (2004a). The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. *Qual Life Res, 13*(2), 299-310.

Skevington, S. M., Lotfy, M., O'Connell, K. A., & Group, W. (2004b). The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. *Quality of life Research, 13*(2), 299-310.

Stangl, A. L., Bunnell, R., Wamai, N., Masaba, H., & Mermin, J. (2012). Measuring quality of life in rural Uganda: Reliability and validity of summary scores from the Medical Outcomes Study HIV Health Survey (MOS-HIV). *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation, 21*(9), 1655-1663, doi:10.1007/s11136-011-0075-5.

Stangl, A. L., Wamai, N., Mermin, J., Awor, A. C., & Bunnell, R. E. (2007). Trends and predictors of quality of life among HIV-infected adults taking highly active antiretroviral therapy in rural Uganda. *AIDS Care, 19*(5), 626-636.

Szabó, M. (2010). The short version of the Depression Anxiety Stress Scales (DASS-21): Factor structure in a young adolescent sample. *Journal of Adolescence, 33*(1), 1-8, doi:10.1016/j.adolescence.2009.05.014.

Szabo, S., Orley, J., Saxena, S., & on behalf of the WHOQOL Group (1997). An approach to response scale development for cross-cultural questionnaires. . *European Psychologist, 2*, 3270–3276.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston, MA: Pearson Education Inc.

Tsai, A., Bangsberg, D., Frongillo, E., Hunt, P., Muzoora, C., Martin, J., et al. (2012). Food insecurity, depression and the modifying role of social support among people living with HIV/AIDS in rural Uganda. *Social Science & Medicine, 74*(12), 2012-2019, doi:10.1016/j.socscimed.2012.02.033.

Tsai, A. C., Weiser, S. D., Steward, W. T., Mukiibi, N. F. B., Kawuma, A., Kembabazi, A., et al. (2013). Evidence for the Reliability and Validity of the Internalized AIDS-Related Stigma Scale in Rural Uganda. *Aids and Behavior, 17*(1), 427-433, doi:10.1007/s10461-012-0281-3.

UNAIDS (2012a). Core Slides: Global Summary of the AIDS Epidemic. UNAIDS.

UNAIDS (2012b). Report on the global AIDS epidemic. UNAIDS.

Ventegodt, S., Flensborg-Madsen, T., Andersen, N. J., Morad, M., & Merrick, J. (2004). Clinical holistic medicine: a pilot study on HIV and quality of life and a suggested cure for HIV and AIDS. *Thescientificworldjournal, 4*, 264-272.

Ware, J., Kosinski, M., Dewey, J., & Gandek, B. (2001). How to Score and Interpret Single-Item Health Status Measures: A Manual for Users of the SF-8 Health Survey. Boston: QualyMetric.

WHOQOL Group (1994). Development of the WHOQOL: Rationale and current status. *International Journal of Mental Health, 23*, 24-56.

WHOQOL Group (1996). Introduction, administration, scoring and generic version of the assessment-field trial version. Geneva: Programme on Mental Health, World Health Organization.

WHOQOL HIV Group (2004). WHOQOL-HIV for quality of life assessment among people living with HIV and AIDS: results from the field test. *AIDS Care, 16*(7), 882-889, doi:10.1080/09540120412331290194.

Wu, A. W., Revicki, D. A., Jacobson, D., & Malitz, F. E. (1997). Evidence for reliability, validity and usefulness of the Medical Outcomes Study HIV Health Survey (MOS-HIV). *Qual Life Res, 6*(6), 481-493.