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Quality of life among South African patients receiving antiretroviral therapy in the Western Cape Province

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Abstract

Compared to patients not receiving treatment, antiretroviral therapy (ART) users may experience a lower viral load, an increased CD4 count, slower disease progression, fewer opportunistic infections, and more rapid recovery time from HIV-related illnesses. As such, health related quality of life (HR-QOL) is likely to be considerably greater for ART users than patients not receiving treatment. The dearth of QOL research in sub-Saharan Africa brings into focus the need for and importance of documenting the various dimensions of well-being among persons living with HIV in this region of the world. We thus sought to report on the performance of South African patients enrolled in a public government funded antiretroviral therapy (ART) program. We administered the Functional Assessment of HIV Infection (FAHI) to a convenience sample of patients receiving ART in the Western Cape in South Africa. We used confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) to determine the factor structure of the FAHI amongst South African ART users. The CFA revealed a poor model fit of the data. However the EFA factor structure closely approximated the subscales of the measure, indicating the dimensions of physical, emotional, functional, and social well-being and cognitive functioning. We identified problematic items contributing to the poor model fit and contribute to the knowledge base on QOL amongst ART users in South Africa.

Keywords

Antiretroviral therapy; Quality of life; Confirmatory factor analysis

Introduction

Over the last two decades, the introduction of life-saving antiretroviral medication has meant that living with HIV has changed from being considered a death sentence to a chronic illness (Nischal, Khopkar, & Saple, 2005). Indeed, experiences associated with living with HIV may create conditions for heightened psychological distress at various points of the illness trajectory. For example, receipt of information concerning one's positive status is likely to provoke profound emotional turmoil and psychological distress (Hult, Maurer, & Moskowitz, 2009); the pressure to conceal one's status from others due to fear of stigma and discrimination may be psychologically burdensome (Gaines, 2001); difficulties in accessing

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health care, especially in resource-constrained environments may lead to frustration (Coetzee, Kagee, & Vermeulen, 2011); the poor physical health associated with living with HIV, as well as side effects of antiretroviral treatment, such as nausea, diarrhoea, and headache may lead to psychological distress (Lyons, Berger, Masini, & Pinna, 2010); and end-stage AIDS may lead to neurocognitive impairment, including dementia (Baldewicz et al., 2004).

ART offers persons living with HIV the opportunity of a healthy life for several decades into the future. Compared to patients not receiving treatment, ART users may experience a lower viral load, an increased CD4 count, slower disease progression, fewer opportunistic infections, and more rapid recovery time from HIV-related illnesses (Karim & Karim, 2010). As such, health related quality of life (HR-QOL) is likely to be considerably greater for ART users than patients not receiving treatment (Jelsma, MacLean, Hughes, Tinise, & Darder, 2005).

HR-QOL is the subjective experience a patient has of the impact of his or her illness on various dimensions of well-being (Cella, McCain, Peterman, Mo, & Wolen, 1996). According to Cella et al. (1996), these dimensions are physical, emotional, functional, social well-being, all of which may be affected by living with HIV, the side effects of antiretroviral therapy, or the combination of the two. Various measures have been developed to assess QOL, including the Medical Outcomes Study Short Form 36 (SF-36) (Ware, Kosinski, & Keller, 1994); the Quality of Well-Being Scale – Self Administered (QWB-SA) (Kaplan, Anderson, & Ganiats, 1993); and the WHO Quality of Life Measure (WHOQOL-BREF) (Hays & Shapiro, 1992). The Functional Assessment of Chronic Illness Therapy (FACIT) system was originally designed for the assessment of QOL among patients diagnosed with various forms of cancer but also used with other chronic illnesses, including HIV. The Functional Assessment of HIV Infection (FAHI) is the version of the FACIT suite of measures. It has been designed specifically for use among populations seeking treatment for HIV. This measure assesses well-being on the various dimensions delineated by Cella (1996) as well as cognitive functioning.

Clayson, Wild, Quarterman, Duprat-Lomon, Kubin and Coons (2006) reviewed several HR-QOL measures, including inter alia, the Health Utilities Index, the Nottingham Health Profile, Quality of Well Being Scale, WHO Quality of Life – BREF. In their review, these authors found that the FAHI and Medical Outcomes Study-HIV scale were the most appropriate as disease-targeting measures, even though they cautioned “we are concerned about whole-heartedly recommending either” (Clayson et al., 2006, p.760). Numerous articles have reported on the FAHI, all of which have found the measure to be internally consistent (e.g. Cella et al., 1996) and responsive to changes in health status (Abrams, Steinhart, & Frascino, 2000; Peterman, Cella, Mo, & McCain, 1997).

Even though the FAHI has been widely used in many parts of the world, we found no scholarly publications reporting the use of this instrument anywhere in Africa. This is surprising as sub-Saharan Africa is the region where persons living with HIV are most concentrated, with prevalence rates among adults estimated at 17.8% in South Africa, 24.8% in Botswana, and 25.9% in Swaziland (Joint United Nations Programme on HIV/AIDS,

2010). Resource-constrained environments are characteristic of many sub-Saharan African countries and their attendant effects include inadequate housing, food insecurity, unemployment, and limited access to health services, as well as the disproportionate burden of disease of HIV. These conditions are likely to affect QOL among persons living with the virus. The dearth of QOL research in sub-Saharan Africa brings into focus the need for and importance of documenting the various dimensions of well-being among persons living with HIV in this region of the world. The purpose of the study was therefore to report on performance of South African patients enrolled in a public government funded antiretroviral therapy (ART) program on a quality of life measure.

Method

Participants

We recruited a convenience sample of 291 patients enrolled on the ART programme in the public health clinics in the Western Cape in South Africa. Participants received ART services at one of several community clinics associated with the Infectious Diseases Clinic of a major public hospital in a peri-urban area.

Enrolment procedures

Patients were supported by patient advocates (PA's) who were employed by a non-governmental organisation operating in the area. The role of the PA's was to encourage medication adherence by visiting patients at home, accompanying them to the clinic, and providing general social support so as to enhance the likelihood of treatment success. We asked the PA's to assist with patient recruitment. Each PA was provided with a flyer describing the study and was asked to inform the patients to whom they were assigned about the opportunity to participate. On agreement from patients, the PA's administered the questionnaire battery to their patients, either at the patient's home, at the clinic, or at the premises of the non-governmental organisation. The self-report measures were administered in both English and Afrikaans.

Patients who agreed to participate in the study signed an informed consent form and completed the questionnaire battery, after which they received a grocery voucher of ZAR 20 (\$3) as a token of appreciation for their participation. PA's similarly received a shopping voucher of ZAR 50 (\$6.25) for their assistance with participant recruitment.

Ethical clearance was obtained from the Health Research Ethics Committee of the University of Stellenbosch, the Western Cape Department of Health and the City of Cape Town Health Department. We also obtained permission from the NGO and the hospital and clinic administrators.

Design

The study was cross-sectional and was part of a larger investigation examining the structural barriers to adherence among ART users.

Instruments

HIV-related quality of life—Functional Assessment of HIV Infection (FAHI) Version 4. The FAHI-4 is based on the Functional Assessment of Cancer Therapy – General Questionnaire that was originally developed for use and validated among cancer patients. Additional items relevant to HIV infection were subsequently added to the FACT-G. The FAHI has undergone several iterations since its original version which was published in 1997. Now in its 4th version, the instrument consists of 47 items that encompass the domains of physical, emotional, functional, social, and cognitive functioning. The FAHI has shown high internal consistency with alpha reliabilities between 0.73 and 0.91 on its various subscales. The FAHI has been validated with the ECOG Performance Status Rating (PSR), the Profile of Mood States (POMS), and HIV disease status as measured by CD4 count (Peterman et al., 1997).

Data management and analysis

Descriptive statistics for demographic variables such as age, income, marital status, and educational level were computed to describe the sample. For the psychometric analysis, only the cases with completed data were included.

We performed a CFA on the FAHI items using Mplus Version 6 (Muthén, & Muthén, 1998) to investigate the validity of the FAHI as a measurement model. The specification of the measurement model is based on the assumption that the underlying constructs measured by the subscales of the FAHI are physical well-being (13 items), emotional well-being (10 items), functional well-being (13 items), social well-being (8 items) and cognitive functioning (3 items). Model fit was estimated by using three absolute fit indices (Chi-square; $p > .05$), the normed Chi-square (ratio 3:1; Hair, Black, Babin, & Anderson, 2010) and root mean square error of approximation (RMSEA, $< .09$, Hu & Bentler, 1999) and two incremental fit indices (comparative fit index, CFI, $> .90$, Hu & Bentler, 1999, and Tucker–Lewis index, TLI, $> .90$, Tucker & Lewis, 1973). The absolute fit indices are direct measures of how well the measurement model reproduces the observed data. The incremental fit indices assess how well the estimated model fits relative to the null model that assumes that all observed variables are not correlated (Hair et al., 2010).

To evaluate the convergent validity of the FAHI we examined the extent to which the items within each subscale converged on a common latent factor. This convergence is indicated by the significance and size of the standardized loadings of items on a factor. Factor loadings should be statistically significant and have a loading of .50 or higher and ideally .70 or higher (Hair et. al., 2010). We also calculated the average variance extracted (AVE), which is computed as the total of all squared standardized factor loadings (squared multiple correlations) divided by the number of items in each subscale. Adequate convergence is indicated by AVE values of .50 or higher (Hair et. al., 2010).

To evaluate the discriminant validity of the FAHI we compared the AVE estimates for any two subscales with the square of the correlation estimate between those two subscales. The AVE estimate should be greater than the squared correlation estimate for adequate discriminant validity (Hair et. al., 2010). The logic behind this approach is that a latent

construct (subscale) should explain more of the variance in its item measures than it shares with another construct (subscale).

CFA does not allow items to load onto more than one factor. We therefore performed an exploratory factor analysis (EFA) to investigate the possibility that some items load substantially ($> .40$) onto more than one factor.

Results

Demographic characteristics

A total of 291 persons living with HIV participated in the study. The mean age of the sample was 35 years ($M=35.49$, $SD=9.05$), with a range of 18 (minimum 18, maximum 65) years. The sample consisted 186 females (63.9%) and 103 males (35.4%). Approximately 70% were unmarried (69.4%) and 15.8% were married or cohabiting. The rest indicated that they were separated (2.7%), widowed (5.2%) or divorced (1%). Approximately 42% of the sample completed primary school; 44% had attended secondary school but did not complete grade 12; 1.4% had either attended university or college but did not graduate; and 0.3% graduated from a tertiary institution. Almost 60% of the sample stated they were unemployed, while the rest were employed either part-time (21.6%), full-time (8.6%), were students (0.7%) or homemakers (1%). Nearly half the sample (46%) stated that they did not know their annual family income; 0.3% indicated no income; one quarter reported an income less than ZAR12000; 4.1% stated their income was between R80,000 and R110,000; and 9.3% indicated their annual family income was R240,000 and above.

Quality of life

The results of item-by-item descriptive analyses of the FAHI are presented in Table 1. In order to establish the relative salience of the various FAHI items among members of the sample, we added together the total percentage that endorsed the “quite a bit” and “very much” response options. Using this summation, the most salient aspects of physical well-being that the sample endorsed were lack of energy (63.9%); nausea (67.8%); feeling ill (60.9%); being forced to spend time in bed (75.1%); getting tired easily (57.8%); feeling fatigued (66.8%); and feeling weak all over (61.6%). The most salient aspects of emotional well-being were feeling sad (66.3%); feeling nervous (60.6%); finding it hard to tell others about the infection (39.2%); and being embarrassed about the illness (45.4%). In terms of Functional and Global Well-being, 47.0% of the sample stated they were able to enjoy life and 59.1% stated they had accepted their illness. On the other hand, 57.9% indicated they were losing hope in the fight against the illness. In terms of Social Well-being, 47% of the sample stated they felt close to their friends; 60.3% stated they received emotional support from their family; 63.9% stated they were satisfied with family communication about their illness; and 65.5% reported that they had people to help them if they needed it. On the other hand, 25.5% stated they were satisfied with their sex life. Cognitive functioning appeared to be a problem for a large percentage of participants as 46.7% and 45.3% stated they had trouble concentrating and remembering things, respectively.

In terms of gender, we found non-significant differences in all the dimensions of well-being except for emotional well-being and cognitive functioning. However, these differences disappeared when we corrected for multiple comparisons. We also compared the subscale mean scores of our sample, presented in Table 2, with those obtained by Peterman et al. (1997) by means a series of t-tests. As can be seen in Table 3, our sample means were uniformly significantly lower than those of the comparison sample with the exception of the Emotional Well-being subscale.

Confirmatory Factor Analysis (CFA)

As can be seen from Table 4, all the indices did not reach the criteria for good fit: Chi-square $p < .05$, the normed Chi-square ratio 4:1, RMSEA = .105, CFI = .722 and TLI = .707. In terms of convergent validity, the factor loadings within each subscale were all statistically significant ($p < .01$). For physical well-being the factor loadings ranged from .60 to .90, emotional well-being from .60 to .80, functional well-being from .63 to .85 (except for items 9 and 10 which had loadings of .21 and .49 respectively), social well-being from .80 to .92 (except for item 8 with a loading of .19) and cognitive functioning from .80 to .94 (except for item 1 with a loading of .17) (see Table 5). The AVE of the subscales ranged from .51 (functional well-being) to .65 (social well-being). Taken together, the evidence supports the convergent validity of the FAHI as a measurement model. In terms of discriminant validity, the AVE estimates for all the subscales were greater than the squared correlation estimates, except for functional well-being which showed an AVE estimate lower than the squared correlation estimate with social well-being (see Table 5 and 6).

Exploratory factor analysis (EFA)

Principal-components factor analysis was performed on the FAHI items. The results of the EFA showed that most items loaded substantially onto only one subscale, except for the items forming the functional well-being subscale. As can be seen from Table 7, seven of these items loaded ($> .40$) onto both the functional well-being subscale and the social well-being subscale. Only one item from the social well-being subscale also loaded onto the functional well-being subscale.

Discussion

Living with HIV is accompanied by a variety of physical manifestations of the condition, including fatigue, weakness and low levels of energy. For this reason it is unsurprising that items reflecting these symptoms were commonly endorsed by the sample. Such symptoms may be common to the physical aspects of living with the virus and the side effects of treatment, as well as elevated levels of psychological distress that have been shown to be common among persons living with HIV in resource-constrained contexts. For example, Kagee and Martin (2010), using the Hopkins Symptom Checklist, showed that one third of a sample of South African clinic attenders living with HIV reported feeling low in energy, while 35% stated that they felt everything was an effort. The potential overlap of physical and psychological symptoms is a matter for further investigation.

In terms of emotional well-being, the most commonly endorsed FAHI items were feeling sad and nervous, items roughly approximating symptoms of depression and anxiety. While major depression and generalised anxiety has been shown to affect only a minority of persons living with HIV (11.1% and 0.4%, respectively (Freeman, Nkomo, Kafaar, & Kelly, 2007)), non-psychiatric psychological distress has been shown to be common among South Africans living with HIV, including worrying too much about things, feeling tense, feeling hopeless, and feeling worthless (Kagee & Martin, 2010).

Of the sample in the present study, almost 40% found it difficult to tell others that they were living with HIV and nearly half reported being embarrassed about their illness. This is hardly surprising, given the level of stigmatisation associated with being HIV positive (Kalichman & Simbayi, 2004). Stigma associated with HIV has been found to be one of the most salient barriers to adherence to antiretroviral therapy (Coetzee et al., 2011). Coetzee et al. (2011) found that many participants in their sample of ART users reported being unwilling to attend clinic appointments because they could not tell their employers of their need to do so. Several also reported the need to hide their medication from others, thus reducing the likelihood of pill-taking adherence. To this extent, HIV stigma, while compromising QOL at a general level as reflected by endorsement of the relevant FAHI, also influences health outcomes by means of compromising ART adherence.

Despite the concerns surrounding stigma, participants reported surprisingly high levels of social support. Nearly half of the sample stated they felt close to their friends and nearly two thirds reported that they were satisfied with family communication about their illness and that they have people to help them if necessary. These data are encouraging and bring into focus the importance of social capital (Campbell, 2003), i.e. a strong sense of connectedness within communities that play a role in the way people experience their illness condition.

The fact that close to half the sample reported having trouble concentrating and remembering things is in keeping with recent literature calling attention to neurocognitive problems among persons living with HIV, even though the causal trajectory of such problems is unclear (Becker, Thames, Woo, Castellon, & Hinkin, 2011). For example, non-adherence may lead to AIDS-related health problems including neuropsychological deficits. Such deficits such as forgetfulness and concentration difficulties may lead to poor adherence to pill-taking and clinic attendance, which in turn may impact HR-QOL. The high alpha coefficients for each subscale indicate that the measure has good internal consistency for these dimensions of HR-QOL.

The results of the CFA indicated a poor model fit with the data, indicating that the factor structure of the FAHI had limited applicability among our sample. On the basis of the discriminant validity analysis the subscales were found to be different from one another. However, there was considerable overlap between the subscales of social and functional well-being. EFA showed that seven items on the functional well-being sub-scale also loaded on the social well-being subscale. The overlapping items were: I am able to enjoy life, I have accepted my illness, I am sleeping well, I am enjoying the things I usually do for fun, I am satisfied with how I am coping with my illness, I feel motivated to do things and I am hopeful about the future. On the basis of this findings it may be argued that the items on the

social and functional well-being scales were interpreted similarly among our sample. The high convergent validity of the items suggested that the items within each subscale converged on a common latent factor. There was however some cross-loadings between the functional well-being and social well-being subscales.

Limitations of the study

We did not collect actual adherence data as part of this study, either by means of self-report or in terms of biological markers such as viral load. Given the association between adherence and health status, it is likely that adherence to ART will be associated with HR-QOL. The identification of such a relationship has not yet been documented. Moreover, it would be interesting and important to determine the extent to which being a recipient of ART is associated with high HR-QOL. While ART has been undeniably associated with improved health status among persons living with HIV, its associated side effects such as mood changes, vivid dreams, and insomnia, rash and others are often difficult for patients to endure and may affect HR-QOL. The relationship between ART use and HR-QOL awaits further investigation. Finally, as a society characterised by cultural, racial and linguistic diversity, research on translated versions of the FAHI into local indigenous South African languages such as Sotho, Zulu, and Xhosa, is necessary.

The present study has shown the utility of the FAHI among a sample of South African ART users. In keeping with its usefulness in other samples around the world, the FAHI has displayed good psychometric properties that make its use appropriate for South Africans living with HIV. The items have high relevance for ART users in the context of their illness, the side effects of treatment, and the level of stigmatisation associated with living with HIV. The data thus indicate that the FAHI is a useful HR-QOL measure for use among clinical and research populations.

References

- Abrams D, Steinhart C, Frascino R. Epoetin alfa therapy for anaemia in HIV-infected patients: impact on quality of life. *International journal of STD & AIDS*. 2000; 11
- Baldewicz TT, Leserman J, Silva SG, Petitto JM, Golden RN, Perkins DO, Evans DL. Changes in neuropsychological functioning with progression of HIV-1 infection: Results of an 8-year longitudinal investigation. *AIDS and Behavior*. 2004; 8(3):345–355. <http://doi.org/10.1023/B:AIBE.0000044081.42034.54>. [PubMed: 15475681]
- Becker BW, Thames AD, Woo E, Castellon SA, Hinkin CH. Longitudinal change in cognitive function and medication adherence in HIV-infected adults. *AIDS and Behavior*. 2011; 15(8):1888–1894. <http://doi.org/10.1007/s10461-011-9924-z>. [PubMed: 21437726]
- Campbell, C. *Letting them die: why HIV prevention programmes fail*. Oxford; James Currey: 2003.
- Cella DF, McCain NL, Peterman AH, Mo F, Wolen D. Development and validation of the functional assessment of human immunodeficiency virus infection (FAHI) quality of life instrument. *Quality of Life Research*. 1996; 5(4):450–463. <http://doi.org/10.1007/BF00449920>. [PubMed: 8840825]
- Clayson, DJ., Wild, DJ., Quarterman, P., Duprat-Lomon, I., Kubin, M., Coons, SJ. A comparative review of health-related quality-of-life measures for use in HIV/AIDS clinical trials. *Pharmacoeconomics*. 2006. <http://doi.org/10.2165/00019053-200624080-00003>
- Coetzee BJ, Kagee A, Vermeulen N. Structural barriers to adherence to antiretroviral therapy in a resource-constrained setting: the perspectives of health care providers. *AIDS Care*. 2011; 23(2): 146–151. <http://doi.org/10.1080/09540121.2010.498874>. [PubMed: 21259126]

- Freeman M, Nkomo N, Kafaar Z, Kelly K. Factors associated with prevalence of mental disorder in people living with HIV/AIDS in South Africa. *AIDS Care*. 2007; 19(10):1201–1209. <http://doi.org/10.1080/09540120701426482>. [PubMed: 18071963]
- Gaines SO Jr. Coping With Prejudice: Personal Relationship Partners as Sources of Socioemotional Support for Stigmatized Individuals. *Journal of Social Issues*. 2001; 57(1):113–128. <http://doi.org/10.1111/0022-4537.00204>.
- Hair, JF., Black, WC., Babin, BJ., Anderson, RE. *Multivariate data analysis*. 7th. New Jersey: Pearson Education; 2010.
- Hays RD, Shapiro MF. An overview of generic health-related quality of life measures for HIV research. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*. 1992; 1(2):91–97. <http://doi.org/10.1007/BF00439716>.
- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*. 1999; 6(1):1–55. <http://doi.org/10.1080/10705519909540118>.
- Hult JR, Maurer SA, Moskowitz JT. “I’m sorry, you’re positive”: a qualitative study of individual experiences of testing positive for HIV. *AIDS Care*. 2009; 21(2):185–188. <http://doi.org/10.1080/09540120802017602>. [PubMed: 19229687]
- Jelsma J, MacLean E, Hughes J, Tinise X, Darder M. An investigation into the health-related quality of life of individuals living with HIV who are receiving HAART. *AIDS Care*. 2005; 17(5):579–588. <http://doi.org/10.1080/09540120412331319714>. [PubMed: 16036244]
- Joint United Nations Programme on HIV/AIDS. UNAIDS REPORT ON THE GLOBAL AIDS EPIDEMIC; WHO Library Cataloguing-in-Publication Data. 2010. p. 6-8. Retrieved from http://www.unaids.org/documents/20101123_globalreport_em.pdf
- Kagee A, Martin L. Symptoms of depression and anxiety among a sample of South African patients living with HIV. *AIDS Care*. 2010; 22(2):159–165. <http://doi.org/10.1080/09540120903111445>. [PubMed: 20390494]
- Kalichman SC, Simbayi LC. Traditional beliefs about the cause of AIDS and AIDS-related stigma in South Africa. *AIDS Care*. 2004; 16(5):572–580. <http://doi.org/10.1080/09540120410001716360>. [PubMed: 15223526]
- Kaplan, RM., Anderson, JP., Ganiats, TG. *Quality of Life Assessment: Key Issues in the 1990s*. Dordrecht: Springer Netherlands; 1993. The Quality of Well-being Scale: rationale for a single quality of life index; p. 65-94. http://doi.org/10.1007/978-94-011-2988-6_3
- Karim, SSA., Karim, QA. *HIV/AIDS in South Africa*. 2nd. Karim, SSA., Karim, QA., editors. Cape Town: Cambridge University Press; 2010.
- Lyons T, Berger D, Masini B, Pinna G. Self-reported psychological distress associated with steroid therapy for HIV. *International Journal of STD & AIDS*. 2010; 21(12):832–834. <http://doi.org/10.1258/ijsa.2010.010163>. [PubMed: 21297094]
- Muthén, LK., Muthén, BO. *Mplus User’s Guide: Statistical analysis with latent variables*. 6th. Los Angeles, CA: Muthén & Muthén; 1998.
- Nischal KC, Khopkar U, Saple DG. Improving adherence to antiretroviral therapy. *Indian Journal of Dermatology, Venereology and Leprology*. 2005; 71(5):316–320.
- Peterman AH, Cella D, Mo F, McCain N. Psychometric validation of the revised functional assessment of human immunodeficiency virus infection (FAHI) quality of life instrument. *Quality of Life Research*. 1997; 6:572–584. <http://doi.org/10.1023/A:1018416317546>. [PubMed: 9330556]
- Tucker LR, Lewis C. A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*. 1973; 38(1):1–10. <http://doi.org/10.1007/BF02291170>.
- Ware, JE., Kosinski, M., Keller, S. *SF-36® Physical and Mental Health Summary Scales: A User’s Manual*. Boston, MA: The Health Institute; 1994.

Item analysis of FAHI

Table 1

	Item to total corr.	α fid*	Item Mean	SD	Not at all	A little bit	Some-what	Quite a bit	Very much	Quite a bit + Very much
I have a lack of energy.	0.66	0.55	2.73	1.21	6.5	10.7	18.9	30.6	33.3	63.9
I have nausea.	0.77	0.54	2.94	1.16	4.5	7.6	20.1	24.7	43.1	67.8
Because of my physical condition, I have trouble meeting the needs of my family.	0.71	0.54	2.76	1.32	9	11	17.9	22.1	40	62.1
I have pain.	0.68	0.55	2.59	1.16	5.6	13.9	26	26	28.5	54.5
I am bothered by the side effects of treatment.	0.51	0.57	2.33	1.41	14.5	17.3	20.1	19.4	28.7	48.1
I feel ill.	0.71	0.54	2.76	1.21	4.5	12.5	22.1	23.9	37	60.9
I am forced to spend time in bed.	0.68	0.55	3.11	1.19	4.8	6.9	13.1	20.4	54.7	75.1
I have been short of breath.	0.75	0.76	1.08	1.22	44.8	22.9	16	11.1	5.2	16.3
I am bothered by a change in weight.	-0.73	0.76	1.71	1.39	26.2	23.4	18.6	18.3	13.4	31.7
I get tired easily.	0.65	0.55	2.49	1.29	10.7	12.7	18.9	32	25.8	57.8
I feel fatigued.	0.73	0.54	2.81	1.15	4.8	9.7	18.7	32.5	34.3	66.8
I feel weak all over.	0.76	0.53	2.81	1.26	6.6	8.7	23.2	20.1	41.5	61.6
I have been coughing.	0.72	0.76	1.22	1.28	38.1	27.1	15.8	11.3	7.6	18.9
I feel sad.	0.63	0.9	2.7	1.3	10	8.2	15.5	34	32.3	66.3
I feel nervous.	0.7	0.89	2.59	1.29	10	10.7	18.7	32.2	28.4	60.6
I worry about dying.	0.7	0.89	2.04	1.68	34.7	10.5	9.5	14.7	30.5	45.2
I worry that my condition will get worse.	0.74	0.89	1.66	1.49	34	17.5	12.7	18.6	17.2	35.8
I am unhappy with my appearance.	0.64	0.9	1.85	1.46	27.5	15.8	19.6	17.6	19.2	36.8
It is hard to tell other people about my infection.	0.66	0.9	1.84	1.6	33.3	16.2	11.3	14.8	24.4	39.2
I worry about spreading my infection.	0.59	0.9	1.7	1.55	37.1	14.4	14.4	13.7	20.3	34
I am concerned about what the future holds for me.	0.61	0.9	1.56	1.45	36.2	17.9	16.6	14.5	14.8	29.3
I worry about the effect of stress on my illness.	0.71	0.89	1.65	1.42	31.7	19	16.2	19.3	13.8	33.1
I am embarrassed by my illness.	0.68	0.9	2.18	1.54	23.8	10.4	20.4	15.4	30	45.4
I am able to work (including work at home).	0.66	0.91	2	1.32	12.8	29.7	24.5	13.4	19.7	33.1
My work (include work at home) is fulfilling.	0.68	0.91	2.03	1.32	11.7	28.6	24.8	15.2	19.7	34.9
I am able to enjoy life.	0.8	0.9	2.28	1.42	15.4	14.7	22.8	18.2	28.8	47
I have accepted my illness.	0.82	0.9	2.55	1.45	12.3	15.5	13	22.5	36.6	59.1

	Item to total corr.	α id*	Item Mean	SD	Not at all	A little bit	Some-what	Quite a bit	Very much	Quite a bit + Very much
I am sleeping well.	0.75	0.9	2.39	1.41	11.6	18.3	20.1	16.5	33.5	50
I am enjoying the things I usually do for fun.	0.78	0.9	2.13	1.46	16.9	18.6	19	18.3	27.2	45.5
I am content with the quality of my life right now.	0.71	0.9	1.99	1.44	18.8	21.5	18.4	19.1	22.2	41.3
I am satisfied with how I am coping with my illness.	0.69	0.9	2.27	1.42	14.6	16	19.1	22.9	27.4	50.3
I am losing hope in the fight against my illness.	-0.26	0.94	2.63	1.35	8	17.8	16.4	19.2	38.7	57.9
I feel sexually attractive.	0.49	0.91	1.54	1.35	30	21.6	22.3	14.6	11.5	26.1
I have a good appetite.	0.67	0.91	2.41	1.43	11	19.7	20	13.4	35.9	49.3
I feel motivated to do things.	0.81	0.9	2.33	1.29	9.4	17.4	23.3	26.4	23.6	50
I am hopeful about the future.	0.77	0.9	2.45	1.39	12.1	14.1	15.9	26.6	31.4	58
I feel close to my friends.	0.83	0.83	2.32	1.51	17.5	20.3	15.1	14.4	32.6	47
I get emotional support from my family.	0.91	0.91	2.71	1.41	11	14.5	14.1	18.6	41.7	60.3
I get support from my friends.	0.86	0.86	2.42	1.54	16.8	19.9	10.1	17.1	36	53.1
My family has accepted my illness.	0.92	0.92	2.83	1.35	8.2	14.1	13.7	20.6	43.3	63.9
I am satisfied with family communication about my illness.	0.87	0.87	2.63	1.46	13.8	11.4	15.9	19.7	39.3	59
I feel close to my partner (or the person who is my main support).	0.84	0.84	2.6	1.48	16.4	11.1	15	20.2	37.3	57.5
I have people to help me if I need it.	0.84	0.84	2.77	1.41	10.3	13.8	10.3	23.4	42.1	65.5
I am satisfied with my sex life.	0.99	0.99	1.58	1.5	33.5	19	20.2	6.1	19.4	25.5
My thinking is clear.	0.76	0.76	2.54	1.35	11	12	21.3	22.7	32.3	55
I have trouble concentrating.	0.9	0.9	2.35	1.47	14.4	17.5	20.3	12.7	34	46.7
I have trouble remembering things.	0.83	0.83	2.26	1.41	13.4	21	18.9	17.5	27.8	45.3

Table 2Means, standard deviations and Cronbach's α

Scale/Subscale	Mean	SD	Possible score range	Observed score range	α	% variance
Physical WB	16.67	12.80	0–52	0–52	0.64	30.15
Functional and Global WB	20.22	10.89	0–40	0–40	0.91	20.01
Emotional WB	27.73	13.31	0–52	0–52	0.91	7.32
Social WB	19.48	9.10	0–32	0–32	0.83	5.43
Cognitive functioning	5.90	3.19	0–12	0–12	0.91	3.61
FAHI	119.44	44.23	0–188	29–188	0.91	66.52

Table 3

Results of t-test for difference between the sample subscale means and means obtained by Peterman et al.

	Mean	SD	t	df	p (2-tailed)	Mean diff.	Lower 95% CI	Upper 95% CI
Physical WB	16.67	12.80	-9.80	277	0.00	-7.52	-9.03	-6.01
Emotional WB	20.22	10.89	-2.61	249	0.79	-0.18	-1.5	1.17
Functional and Global WB	27.73	13.31	-5.45	263	0.00	-4.47	-6.08	-2.85
Social WB	19.48	9.1	-3.33	249	0.00	-1.92	-3.05	-0.79
Cognitive functioning	5.9	3.19	-11.51	286	0.00	-2.17	-2.54	-1.79

Table 4

CFA tests for model fit

TESTS OF MODEL FIT	
Chi-Square Test of Model Fit	
Value	4302.679
Degrees of Freedom	1024.000
P-Value	0.000
Normed Chi-Square	
Ratio	4:1
CFI and TLI	
CFI	0.722
TLI	0.707
RMSEA	
Estimate	0.105
90 Percent C.I.	0.102 – 0.108

Table 5
Standardized factor loadings for the CFA, average variance extracted (AVE) and reliability coefficients (α)

		PWB	EWB	FWB	SWB	CWB
PWB1	I have a lack of energy.	.66				
PWB2	I have nausea.	.76				
PWB3	Because of my physical condition, I have trouble meeting the needs of my family.	.73				
PWB4	I have pain.	.72				
PWB5	I am bothered by the side effects of treatment.	.60				
PWB6	I feel ill.	.78				
PWB7	I am forced to spend time in bed.	.81				
PWB8	I have been short of breath.	.82				
PWB9	I am bothered by a change in weight.	.70				
PWB10	I get tired easily.	.77				
PWB11	I feel fatigued.	.85				
PWB12	I feel weak all over.	.90				
PWB13	I have been coughing.	.78				
EWB1	I feel sad.		.72			
EWB2	I feel nervous.		.78			
EWB3	I worry about dying.		.79			
EWB4	I worry that my condition will get worse.		.80			
EWB5	I am unhappy with my appearance.		.70			
EWB6	It is hard to tell other people about my infection.		.69			
EWB7	I worry about spreading my infection.		.60			
EWB8	I am concerned about what the future holds for me.		.63			
EWB9	I worry about the effect of stress on my illness.		.73			
EWB10	I am embarrassed by my illness.		.73			
FWB1	I am able to work (including work at home).			.63		
FWB2	My work (include work at home) is fulfilling.			.63		
FWB3	I am able to enjoy life.			.81		
FWB4	I have accepted my illness.			.85		
FWB5	I am sleeping well.			.78		
FWB6	I am enjoying the things I usually do for fun.			.80		

		PWB	EWB	FWB	SWB	CWB
FWB7	I am content with the quality of my life right now.			.75		
FWB8	I am satisfied with how I am coping with my illness.			.75		
FWB9	I am losing hope in the fight against my illness.			.21		
FWB10	I feel sexually attractive.			.49		
FWB11	I have a good appetite.			.70		
FWB12	I feel motivated to do things.			.82		
FWB13	I am hopeful about the future.			.82		
SWB1	I feel close to my friends.				.80	
SWB2	I get emotional support from my family.				.88	
SWB3	I get support from my friends.				.82	
SWB4	My family has accepted my illness.				.92	
SWB5	I am satisfied with family communication about my illness.				.88	
SWB6	I feel close to my partner (or the person who is my main support).				.84	
SWB7	I have people to help me if I need it.				.86	
SWB8	I am satisfied with my sex life.				.19	
CWB1	My thinking is clear.					.17
CWB2	I have trouble concentrating.					.80
CWB3	I have trouble remembering things.					.94
AVE		.58	.52	.51	.65	.52
Alpha		.95	.91	.93	.91	.62 (.86) ¹

Note. 1 = Alpha without item CWB1

Table 6

FAHI subscale construct correlation matrix (standardized)

	PWB	EWB	FWB	SWB	CWB
PWB					
		.44	.06	.04	.13
EWB					
	.66**		.02	.05	.10
FWB					
	-.24**	-.15*		.58	.00
SWB					
	-.20**	-.22**	.76**		.00
CWB					
	.36**	.32**	.02	.01	

* p < .05
** p < .01

Note: Values above the diagonal are correlation estimates among subscales and values above the diagonal are squared correlations

Table 7

Factor loadings for the EFA

		Rotated Component Matrix				
		PWB	EWB	FWB	SWB	CWB
PWB1	I have a lack of energy.	0.7				
PWB2	I have nausea.	0.754				
PWB3	Because of my physical condition, I have trouble meeting the needs of my family.	0.659				
PWB4	I have pain.	0.75				
PWB5	I am bothered by the side effects of treatment.	0.42	0.701			
PWB6	I feel ill.	0.818				
PWB7	I am forced to spend time in bed.	0.827				
PWB8	I have been short of breath.	0.847				
PWB9	I am bothered by a change in weight.	0.568	0.553			
PWB10	I get tired easily.	0.689				
PWB11	I feel fatigued.	0.816				
PWB12	I feel weak all over.	0.855				
PWB13	I have been coughing.	0.794				
EWB1	I feel sad.	0.591	0.421			
EWB2	I feel nervous.	0.614	0.456			
EWB3	I worry about dying.	0.354	0.624			
EWB4	I worry that my condition will get worse.		0.727			
EWB5	I am unhappy with my appearance.		0.702			
EWB6	It is hard to tell other people about my infection.		0.782			
EWB7	I worry about spreading my infection.		0.748			
EWB8	I am concerned about what the future holds for me.		0.751			
EWB9	I worry about the effect of stress on my illness.		0.81			
EWB10	I am embarrassed by my illness.		0.636			
FWB1	I am able to work (including work at home).			0.729		
FWB2	My work (include work at home) is fulfilling.			0.747		
FWB3	I am able to enjoy life.			0.753	0.409	
FWB4	I have accepted my illness.			0.495	0.657	

Rotated Component Matrix						
		PWB	EWB	FWB	SWB	CWB
FWB5	I am sleeping well.			0.414	0.649	
FWB6	I am enjoying the things I usually do for fun.			0.646	0.475	
FWB7	I am content with the quality of my life right now.			0.747	0.366	
FWB8	I am satisfied with how I am coping with my illness.			0.53	0.493	
FWB9	I am losing hope in the fight against my illness.			0.409		
FWB10	I feel sexually attractive.			0.609		
FWB11	I have a good appetite.				0.709	
FWB12	I feel motivated to do things.			0.512	0.636	
FWB13	I am hopeful about the future.			0.432	0.694	
SWB1	I feel close to my friends.				0.811	
SWB2	I get emotional support from my family.				0.884	
SWB3	I get support from my friends.				0.83	
SWB4	My family has accepted my illness.				0.898	
SWB5	I am satisfied with family communication about my illness.				0.823	
SWB6	I feel close to my partner (or the person who is my main support).				0.815	
SWB7	I have people to help me if I need it.				0.875	
SWB8	I am satisfied with my sex life.			0.528		
CWB1	My thinking is clear.			0.43	0.513	
CWB2	I have trouble concentrating.					0.788
CWB3	I have trouble remembering things.					0.789