

Quality Adjusted Life Year (QALY) in Subjects with and without HIV-infection Enrolled in the HIV UPBEAT (Understanding the Pathology of Bone Disease in HIV Infected Subjects) Cohort Study

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Introduction

- The quality-adjusted life year (QALY) is a generic measure of disease burden and has been used in health economics as a measure of health outcome that capture both the quality (QoL) and quantity of life lived.
- Despite a near-equivalent life expectancy of people living with HIV (PLWH) to the general population in the current antiretroviral treatment era¹, quality of life (QoL) has previously been found to be impaired in PLWH.
- With emerging focus on HIV prevention, assessing the impact of living with HIV on QoL and QALY will help inform cost-effectiveness of prevention interventions.

Study Aims

- To explore differences in QoL in HIV+ and HIV- subjects over time.
- To explore the association between HIV-status and changes in QoL.
- To compare differences in QALY between HIV+ and HIV- subjects.

Methods

- QoL was assessed at study entry and year-5 in the HIV UPBEAT cohort study, a prospective cohort of HIV+ and HIV- subjects from similar demographic backgrounds, using the SF-36. Physical and emotional SF-36 sub-scales were scored from 0-100, with higher scores indicating better health.
- QALY values were calculated using the SF-6D², which is a measure of health utility and can be derived from the SF-36, multiplied by the expected remaining lifespan (79.3 years for men and 83.5 years for women, obtained from the national statistics office (<http://www.cso.ie>) to estimate QALY.
- Socio-demographic, medical and clinical history were also obtained from the HIV UPBEAT database.
- Statistical analysis:
 - Descriptive analysis: socio-demographic and clinical data are presented as median (interquartile range [IQR]) or absolute numbers and percentage as appropriate. QoL and QALY data are presented as mean ± standard deviation.
 - Comparisons: Within-group changes in QoL were assessed using Wilcoxon signed rank tests; between-group comparisons were assessed using Mann-Whitney/Student's t test and Chi-square test.
 - Multivariable linear regression models were used to explore the impact of HIV on changes in QoL over time.

Results

Table 1: Year 5 characteristics

Socio-demographic characteristics	Total (n=181)	Controls (n=114)	Cases (n=67)	P value
Age, median (IQR)	49 (42,55)	50(43,56)	47(40,52)	0.09
Male, n (%)	109 (60.2)	53 (46.5)	56 (83.6)	<0.0001
Caucasian, n (%)	142 (79.8)	96 (86.5)	46 (68.7)	0.011
African, n (%)	35 (19.7)	15 (13.5)	20 (29.9)	
3 rd Education level or less, n (%)	59 (32.6)	40 (35.1)	19 (28.3)	1.00
Currently Employed, n (%)	104 (57.5)	72 (63.2)	32 (47.7)	0.31
<575 euros, n (%)	73 (40.3)	40 (35.1)	33 (49.3)	0.001
Current smoker, n (%)	25 (13.8)	8 (7.0)	17 (25.4)	0.001
Other drugs of abuse, n (%)*	18 (9.9)	3 (2.6)	15 (22.4)	<0.0001
Other comorbidities, n (%)**	32 (17.7)	15 (13.2)	17 (25.4)	0.044
QALY assessment (mean (SD))	Total 164 (90.6)	Controls 106 (93.0)	Cases 58 (86.6)	P value
Health utility score (SF-6D)	0.79 (0.08)	0.81 (0.07)	0.76 (0.09)	0.003
Estimated survival				
Whole cohort	32.3 (8.9)	32.5 (9.5)	31.8 (7.9)	0.66
Survival men	29.9 (8.5)	28.5 (8.6)	31.2 (8.3)	0.12
Survival women	35.6 (8.5)	35.6 (8.9)	35.3 (4.9)	0.85
QALY	25.6 (7.8)	26.3 (8.3)	24.3 (6.7)	0.11

* Weed, Ecstasy, Cocaine, cannabis; ** Cancer, Rheumatoid arthritis, irritable bowel disease, Chronic Kidney Disease, Chronic Liver Disease

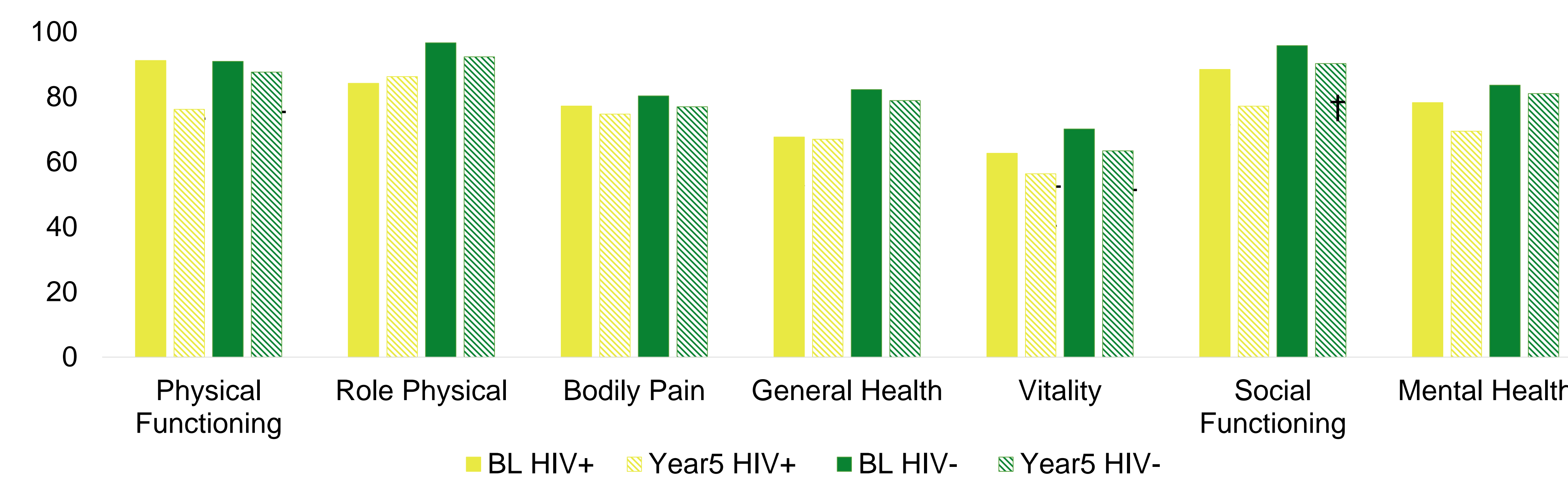


Figure 1. QoL sub-domains scores in HIV+ and HIV- subjects at baseline and year 5.

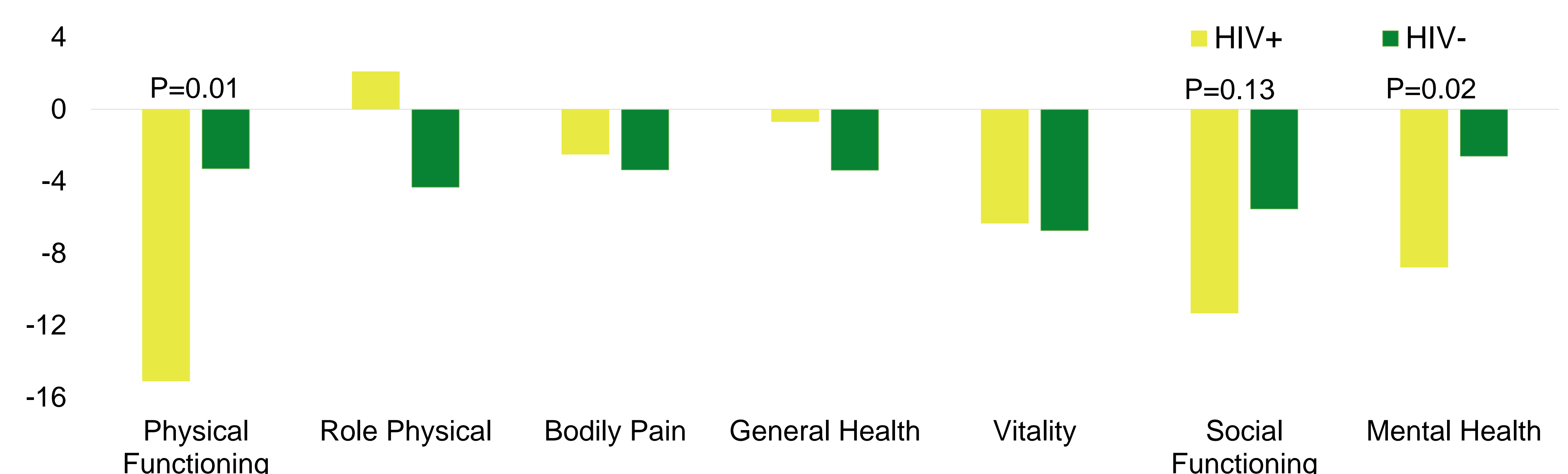


Figure 2. Differences in absolute change in QoL-subdomain scores from baseline to year 5 between HIV+ and HIV- subjects.

Results

- Of the 449 subjects enrolled in the HIV UPBEAT study, 181 (114 HIV-, 67 HIV+) completed year 5 visit by 05/2017, with 164 (90.6%) providing full SF-36 data for QALY estimates. Subjects' characteristics are summarized in Table 1.
- The HIV+ group was younger, more likely male, and of African origin. There were no between-group differences in education level or current employment, but HIV+ had lower income, were more likely to smoke, use recreational drugs, and have other co-morbidities (Table 1). All the HIV+ were on ART; 97% had undetectable HIV-RNA and median CD4+ count was 674 (513-675) cells/mm³.
- The HIV+ group reported lower QoL scores for all sub-domains compared to HIV- (Figure 1). Although QoL scores declined over time in both groups, the HIV+ group had significantly greater declines in Physical Functioning (PF) and Mental Health (MH) than HIV- (Figure 1 and 2). HIV+ status remained associated with reduced PF and MH (estimate (95%CI) -11.7 (-21.8, -2.3), p=0.01 and -6.1 (-12.2, 0.0), p=0.05) after adjusting for socio-economic variables, recreational drug use and other co-morbidities.
- Despite no differences in predicted survival between HIV+ and HIV- (31.8 (7.9) vs 32.5 (9.5) years), HIV+ subjects had a loss of 2 QALYs compared to HIV- subjects: 24.3 (6.7) vs 26.3 (8.3) (Table 1).

Conclusion

- Over five years, greater declines in physical and mental health components of QoL were observed in those with HIV, despite effective treatment.
- Subjects with HIV had lower QALY than HIV-negatives even though they had similar estimated survival and were on effective treatment.
- Prevention of HIV could contribute to a two-year improvement in QALY while avoiding additional lifetime HIV-associated treatment and medical care costs.

References & Acknowledgements

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Acknowledgements: Dr. Elaine Kohler Summer Academy of Global Health Research and the Medical College of Wisconsin Office of Global Health; Patients of the Infectious Diseases Clinic at the Mater Misericordiae University Hospital, Dublin, Ireland, and the healthy volunteers who contributed to the study. This work was supported by the Irish Health Research Board who funded A.G.C. (award HRA_POR/2010/66) and an unrestricted grant awarded to P.W.G.M by GlaxoSmithKline Ltd.