Association Between Quality of Life and Viral Load Among People With HIV in the Current Antiretroviral Era

Van Nghiem, PhD[1], Shelita Smith, MPH[1], Ellen Eaton, MD[2], Aadia Rana, MD[2]
[1]Department of Health Policy and Organization, [2]Department of Medicine, Division of Infectious Diseases

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Introduction

- In 2005, first generic ARV treatments were discovered, initiating the new ART era.
- Quality of life (QoL) is deemed the 4th goal in the UNAIDS HIV/AIDS treatment and control program.
- Viral load (VL) has the most importance use of monitoring the effectiveness of ART treatment.
- HIV program economic evaluation has relied on CD4 count benchmarks and their relevant utility scores (Table 1).
- Whether or not VL is associated with quality of life, enabling the generation of utility scores for relevant economic evaluation is unknown.

Health state	Duration[h]	Utility value
Chronic HIV by CD4+ category[40]	Per cycle spent in category	
> 500		0.870
351–500		0.860
201–350		0.860
101–200		0.850
51–100		0.850
< 50		0.832

Table 1. Conventional utility scores for CD4 count as parameter input for economic evaluation of HIV care programs

Study objective

- To determine the association between QoL and VL through systematic review

Methods

- In January 2023, we conducted target searches on PubMed, PsyInfo and Embase for publications in English between 2000 and 2022.
- Articles were selected for final review if they provided results from assessments of the association between QoL and VL along with other eligibility criteria.
- SS and VN independently abstracted data and resolved debates by consensus.
- Population, Intervention (if any), Comparison (if any), and Outcomes framework was used to abstract the studies.
- Findings on the associations between QoL and VL were documented.
- We followed Herzog et al. 2013 to assess study quality.

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Results

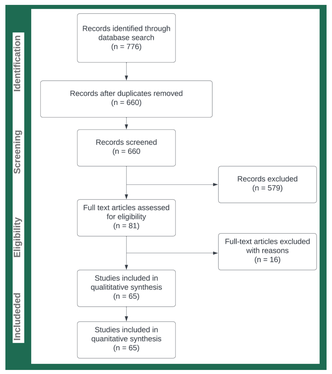

Figure 1. PRISMA flowchart

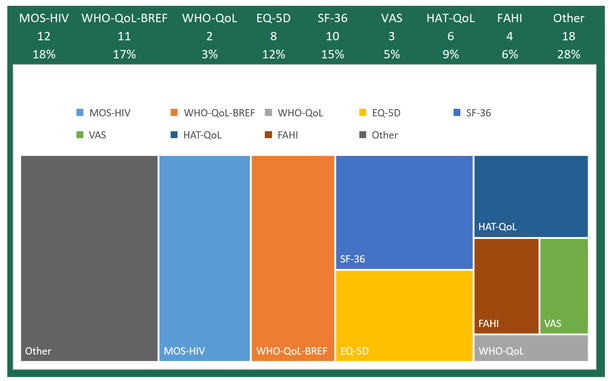

Figure 2. Decomposition of studies by QoL measure

Author Year	N, Country	Association Results	VL Measure	Population Setting	Age	Gender
F. Bajunirwe 2009	N=330 Uganda	Showed NO association between QoL and VL	VL < 50 copies/ml = virologically suppressed	Hospital	≤35 and 35+	Female: 222 Male: 107 Unknown: 1
S. Degroote 2013	N=237 Belgium	Showed NO association between QoL and VL	< 40 copies/ml undetectable	Hospital	Avg: 45.8	Female:50 Male: 187
S. George 2016	N=528 Ireland	Showed NO association between QoL and VL	VL (<40 copies/ml and ≥ 40 copies/ml)	Clinical trial within a clinic	Range: 20 - 70	Female: 160 Male: 361
V. R. Joyce 2009	N=368 US, UK, Canada	Showed association between QoL and VL	VL (>50,000,5001–50,000, or ≤ 5000 copies/mL)	Existing study patients, though not clinical	Avg: 47.51	Female: 7 Male: 361
T. C. Mast 2004	N=803 Uganda	Showed association between QoL and VL	VL <10,000 copies/ml or ≥10,000 copies/ml	General population	Range: 15 - 45+	All women
P. T. Nieuwkerk 2007	N=268	Showed NO association between QoL and VL	Change in plasma VL	Clinical trial	Avg: 39.9 18+	Female: 28 Male: 240
S. A. Safren 2012	Total N=1563 n=203 (US) n=1360 (Caribbean, S. America, Asia, Africa)	Showed different associations between QoL and VL	Different cutpoints of number of copies/ml: 4000, 40,000, 750,000	Clinical trial	≥18	Female: 739 Male: 824
A. L. Stangl 2012	N=947 Uganda	Showed association between QoL and VL	VL (≥ log10 copies/ml vs. ≤ log10 copies/ml)	2 clinics	≥18	Female: 710 Male: 237
I. M. Sumari-de Boer 2012	Total N=202 n=112 (immigrants) Netherlands	Showed association between QoL and VL	VL ≥40 copies/ml as detectable	Hospital	Median: 43 Range: 37 - 49	Female: 91 Male: 111
K. P. Weinfurt 2000	N=1112	Showed different levels of associations between QoL and VL	Continuous count of copies/mL	Clinical trial	Avg: 37.46 Range: 19 - 78	Female: 189 Male: 923
C. Zinkernagel 2001	N=397 Switzerland	Showed association between QoL and VL	lower limit of quanification of 400 copies/ml	General population	≥16 Avg: 40 Median: 38 Range: 20-76	Female: 134 Male: 263
T. Delate 2001	N=250 US	Showed PHS score associated with VL	HIV-1 RNA level of <30,000 copies/ml versus > 30,000 copies/ml	Specific clinic	Avg: 39.8 Median: 38.8 Range: 21.8 - 69.8	Female: 35 Male: 207

Figure 3. Characteristics of studies using MOS-HIV measure

Author Year	N, Country	Association Results	VL Measure	Population Setting	Age	Gender
A. Ahmed 2021	N=602 Pakistan	Showed association between QoL and detectable VL	VL< 20 copies/ml (undetectable) and ≥ 20 copies/ml (detectable)	Hospital	18–25: 157 26–50: 247 > 50: 198	Male: 393 Female: 189 Transgender: 20
R. Castro 2019	N=1480 Brazil	Showed association between QoL and VL	VL< 50 copies/ml (undetectable) and ≥ 50 copies/ml (detectable)	Specific clinic	Median: 43.1	Male 958 Female 522
C. Chapman Lambert 2020	N=335 US	Showed NO association between QoL and VL	<10,000 copies/mL or >10,000 copies/mL	Multiple clinics	Avg: 37.6	Female: 68 Male:267
V. R. Joyce 2009	N=368 US, UK, Canada	Showed association between QoL and VL	VL (>50,000,5001–50,000, or ≤ 5000 copies/mL)	Existing study patients	Avg: 47.51	Female: 7 Male: 361
H. L. Tillmann 2006	N=250 Germany	Showed association between QoL and VL in multivariable models	Mean VL: 34234 ± 98438 copies/ml	Unclear	Avg: 40.4	Female: 44 Male: 206
A. Venturini 2017	N=943 Italy	Showed NO association between QoL and VL	VL< 20 copies/ml (undetectable) ≥ 20 copies/ml (detectable)	Specific clinic	≥18 Avg: 50.9 Range: 21 - 86	Female: 322 Male: 621
T. Delate 2001	N=250 US	Showed PHS score asscociated with VL	VL <30,000 copies/ml vs > 30,000 copies/ml	Specific clinic	Avg: 39.8 Median: 38.8 Rnge: 21.8 - 69.8	Female: 35 Male: 207
E. Osati 2020	N=800 Tanzania	Showed association between QoL and VL	VL <50 copies/ml (undetectable) and ≥ 50 copies/ml (detectable)	Specific clinic	Range: 30 - 59	Female: 592 Male: 208

Figure 4. Characteristics of studies using EQ-5D measure

Results

- A total of 65 studies on 26,329 people living with HIV were selected for full-text review.
- Each study had 24 - 1,668 people living with HIV. The largest study was composed of U.S. military personnel.
- Another 16 studies satisfied all eligibility criteria except reporting the findings on the association between QoL and VL. Thus, they were not included in the final sample of studies.
- Studies were conducted on a wide geographic coverage across the globe.
- Among 65 studies: Sixty percent (39/65) of these articles reported a statistically significant association between QoL (or some subscales of the QoL measure) and VL while the remaining 26 articles reported no association. Another 16 articles (16/81) were inconclusive about the association between QoL and VL.
- One of the greatest challenges in studying QoL among people living with HIV is loss to follow up.
- There was a wide range of benchmarks to measure VL.

Conclusion

- Per QoL measure, there have been not so many studies.
- Conventionally, studies using EQ-5D have the highest potential to derive utility scores.
- Also, heterogeneity in VL definitions currently impedes the immediate next steps to derive standard utility measures based on QoL measure an VL assessment.
- More data and harmonization of data will be needed to facilitate an estimation of utility scores relevant to VL.

References

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