

## SCOPING REVIEW

# The '4th 90' target as a strategy to improve health-related quality of life of people living with HIV in sub-Saharan Africa

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## Abstract

**Objectives:** Next to monitoring the clinical health of people living with HIV through the triple 90 targets, a 4th 90 target was proposed in 2016 to improve HIV health-related quality of life (HrQoL) by addressing comorbidities and other psychosocial challenges. This scoping review aimed at understanding related psychosocial determinants, including strategies to improve HrQoL for people living with HIV in sub-Saharan Africa (SSA), as an initiative to ameliorate the continuum of care.

**Methods:** This scoping review followed PRISMA guidelines. We searched PubMed and Wiley databases from 01 January 2011 to 19 April 2021 for articles on HrQoL, including determinants and related interventions in SSA. We also conducted a manual search to retrieve grey literature on the '4th 90' target. The six domains of HrQoL defined in the most widely used instrument (i.e., WHOQOL-HIV-BREF tool) served as a guiding framework.

**Results:** Thirty-three articles were included for analysis. Seven articles illustrated the ongoing debate on the 4th 90 target, highlighting challenges with measuring indicators. Nine articles discussed HrQoL domains, reporting the highest scores in the spirituality and physical domains and lowest scores in the social and environmental domains. The presence of stigma and depressive symptoms was associated with low HrQoL. Seventeen articles discussed HrQoL interventions, highlighting that improved HrQoL enhanced health-seeking behaviour. Only two interventions addressed the environmental domain highlighting the fact that selection of intervention aims were not evidence led.

**Conclusion:** Introducing the 4th 90 target in SSA as a strategy to enhance HrQoL amongst people living with HIV could improve the HIV continuum of care; however, efforts are required to effectively address environmental and structural determinants.

## KEYWORDS

health related quality of life, HIV, scoping review, sub-Saharan Africa

## INTRODUCTION

In 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) introduced the 90–90–90 target to assess, monitor and improve testing and treatment of HIV [1]. The aim was to increase the proportion of people on effective treatment, thus achieving undetectable levels of HIV to improve individual disease outcomes and to contribute to treatment as prevention [2, 3]. By 2016, global commitments were made to these three targets as a strategy to improve the HIV

continuum of care (Coc) [3]. The 90–90–90 targets aspired for 90% of all people living with HIV to be diagnosed, for 90% of those diagnosed to receive antiretroviral therapy (ART) and for 90% of those receiving ART to be virally suppressed by the year 2020 [4]. By the end of 2019, global estimates suggested that 81% of people living with HIV knew their HIV status, more than two thirds of them (67%) were on ART, but only 59% of those on ART had achieved viral suppression [5]. Although the targets were not met globally, the cascade demonstrated tremendous progress in HIV care. Nevertheless, the goals only got more ambitious with the fast-track targets set forth by the UNAIDS, which focuses

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on high-impact prevention, accelerated HIV testing, treatment and retention in care [2]. The fast track sets out for the 95–95–95 targets aiming at reducing the number of adults acquiring HIV infection from 1.7 million in 2019 to less than 200,000 by 2030 [2]. Achieving these goals would mark the end of the AIDS epidemic as a public health threat [2].

Since the introduction of ART on a large scale, HIV prognosis has drastically improved [5–7]. The 90–90–90 cascade has accentuated more focus on the clinical aspects of HIV/AIDS control. However, experts acknowledged that the ultimate goal in the process of ending the AIDS pandemic should not only take into account clinical outcomes but also psycho-social well-being [8]. This concept of improving Health related Quality of Life (HrQoL) of people living with HIV was coined as ‘the 4th 90 target’ [9]. Proposed for the first time in 2016 and revised in 2019 to include all people living with HIV and not only those virally suppressed, the 4th 90 target called for 90% of those living with HIV to have good HrQoL [7, 9]. The target focused on the enormous psychological and social challenges associated with living with HIV, including uncertainty about starting a family, fear of passing on the virus to sexual partners, lack of family support, depression, anxiety, stigma and discrimination [7, 9]. By moving from clinical to patient-reported indicators, this target aimed to provide person-centred care to successfully tailor care to the needs of people living with HIV. This was also a means of improving outcomes along the entire HIV care cascade, including progression to treatment initiation, and sustained viral suppression [7]. The 4th 90 target quickly gained attention and became a highly debated topic based on its high subjectivity [10, 11]. However, it was never adopted as one of the official UNAIDS targets.

Sub-Saharan Africa (SSA) is the region most affected by HIV globally, accounting for more than two thirds of all people living with HIV [4]. These low- and middle-income settings usually tend to have fragile health systems. Hence, HIV testing and treatment remain a challenge in SSA with estimated viral suppression rates estimated at 58% [4]. It is therefore imperative to understand the main challenges in achieving the testing and treatment targets and to propose possible solutions to improve the HIV care cascade. Notably, evidence suggests mental health to be a cross-cutting factor, negatively impacting on all steps of the HIV continuum of care [12]. This review therefore aimed at mapping the available evidence on the 4th 90 target, identifying affected HrQoL domains, associated determinants and contextualised HrQoL interventions in order to improve the HIV continuum of care.

## METHODS

We conducted a systematic scoping review based on PRISMA guidelines [13, 14]. The review followed five main steps as outlined by Arksey and O’Malley [15]. These steps

included: [1] developing the research question, [2] identifying relevant studies, [3] study selection, [4] charting the data, [5] collating, summarising and reporting the results. Given the wide range of psychometric tools available for measuring HrQoL, we narrowed our research scope to the HIV-specific instrument developed by WHO (the WHOQOL-HIV-BREF) [16], that is, a shorter version than the generic instrument with 31 HIV-specific items. The tool is the most commonly used instrument globally, and was found to be relevant to people living with HIV in SSA with a good psychometric property and proven cross-cultural validity [17, 18]. This tool includes six domains of HrQoL: 1—Physical health (Sleep, fatigue, Pain); 2—Psychological health (feelings, thinking, concentration, self-esteem); 3—Level of Independence (dependence, mobility); 4—Social relationships (personal relationships, social support and inclusion); 5—Environmental health (transport, safety, home environment, finances, health/social care: accessibility/quality, recreation/leisure activities); 6—Spirituality (spirituality, religion and personal beliefs). Items are rated on a 5 point scale (then multiplied by 4 to yield a score between 4 and 20) [16].

## Developing the research question

We used the PICO approach (Population, phenomenon of Interest and Context) to develop the review question [19]. As for the ‘population’, we focused on adults living with HIV, our phenomenon of interest was the 4th 90 target and effective related interventions, while the context was the SSA region as the region most affected by HIV. Based on this information, we formulated the following review question: What evidence is available to support strategies aimed at improving HrQoL amongst adults living with HIV in sub-Saharan Africa in order to address gaps in the HIV continuum of care? The HIV continuum of care will be referred here as the various steps that people go through from diagnosis to achieving and maintaining viral suppression through HIV care and treatment.

## Identifying relevant studies

We developed a search string using terms derived from the PICO approach in the PubMed search builder. The following core terms were retained to develop the final search formula: [(HIV) OR (people + living + with + hiv) AND (quality of life) AND (sub-Saharan African countries)]. Where available, appropriate MeSH terms or field tags were used, supported by free-text formats. This search string was subsequently adapted to different databases including PubMed and Wiley (Supporting Information File S1 for full search string). Filters were used to limit search hits to a period of 10 years (01 January 2011–19 April 2021) to capture relatively recent concepts. Other database-specific filters included studies on human subjects. PubMed was chosen

**TABLE 1** Selection criteria

Criteria	Definition	Description
Population	People living with HIV [18+]	Articles focusing on HrQoL in the adult age group living with HIV, and articles with a wider age range are included if a separate analysis is provided for the age group 18+.
Scale of measurement	HrQoL measuring instrument	For purposes of analytical uniformity and standardised result comparisons in HrQoL scores in line with the selected WHO HrQoL framework, only articles that used the WHOQOL-HIV-BREF instrument to assess the 6 HrQoL domains are included.
HrQoL Intervention	Interventions aiming to improve HrQoL	Interventional studies are included if they are associated with any of the steps of the HIV continuum of care and mention/assess or demonstrate improvement in at least one of the six domains of HrQoL described in the WHOQOL-HIV BREF tool.
Context	SSA	Articles focusing on the HrQoL of people living with HIV in SSA including interventions implemented in this region.
The proposed 4th 90 target	Goal to achieve good HrQoL from point of HIV diagnosis	Articles that capture the available range of practice based evidence including grey literature [debates, view-points, comments] regarding the target with emphasis on HrQoL of people living with HIV are included.

for its wide scope and coverage of the biomedical literature. The Wiley database offered complementary output from the life, health and social sciences possibly not covered by PubMed. Additionally, we conducted hand-searches for grey literature on the relatively new concept of the 4th 90 target, assuming that only few peer-reviewed publications were available. The hand search was done on Google Scholar and Google search by indexing the concept, authors and organisations that had a stake in this discussion.

## Study selection

We used the criteria described in Table 1 to select relevant studies. Using these criteria, a random sample of 100 articles was generated from the total search output, using the RAND function in MS Excel 2016. This sample was subsequently

screened independently by four reviewers (Nti Mvilongo, Magdalena Siegel, Jef Vanhamel, Christiana Nöstlinger) to pilot eligibility criteria and assess interrater reliability (Supporting Information File S2 has details). With an interrater agreement of 86% and a Fleiss kappa of 0.646, the level of agreement was found to be substantial [20]. Based on this, the full sample of records was split randomly into four groups and each reviewer proceeded independently with a preliminary title and abstract (tiab) screening. In a second screening round, full text articles were selected and assessed based on the eligibility criteria. Full text articles retained at this phase were analysed by one reviewer (Nti Mvilongo). The Prisma Flow Chart (Figure 1) depicts the full selection process.

## Charting the data

We developed a data extraction sheet (with the relevant study features of interest) to chart the data and piloted it for consistency across reviewers (Supporting Information File S3). The extraction fields in the sheet were then adapted to fit each category of articles to be included (Tables 2–4).

## RESULTS

The initial search yielded 1788 articles, of which we included 33 papers in the final analysis. Seven were viewpoints, comments and opinion pieces on the 4th 90 concept (three were viewpoints and four were peer reviewed), nine articles described HrQoL domains and determinants using the WHO-QOL-HIV-BREF assessment, and 17 articles discussed HrQoL interventions that improved one of the six HrQoL domains as measured by this instrument. We present our results along this distinction (Figure 2).

### Viewpoints and opinions on the 4th 90 target

The viewpoints and opinion pieces retrieved (Table 2) reflect the picture of the ongoing debate around the 4th 90 [7, 9–11, 21, 22]. These perspectives evolved over time.

The 4th 90 target was proposed in 2016 to complement the UNAIDS 90–90–90 HIV cascade moving beyond the purely clinical indicators (i.e., testing, treatment and viral suppression). The target was proposed to measure the response to multiple psychosocial challenges faced by people living with HIV in the context of ageing with HIV and related co-morbidities. Such challenges related amongst others to stigma, discrimination and mental health faced by people living with HIV, and to inform integrated, person-centred care. Some authors advocated for accountability by proposing its inclusion as an official UNAIDS target hence globally committing countries to the new target [9].

In 2018, the concept was presented at the Glasgow HIV Drug Therapy Conference. It received a major critique calling on a bias created by making the target relevant only for

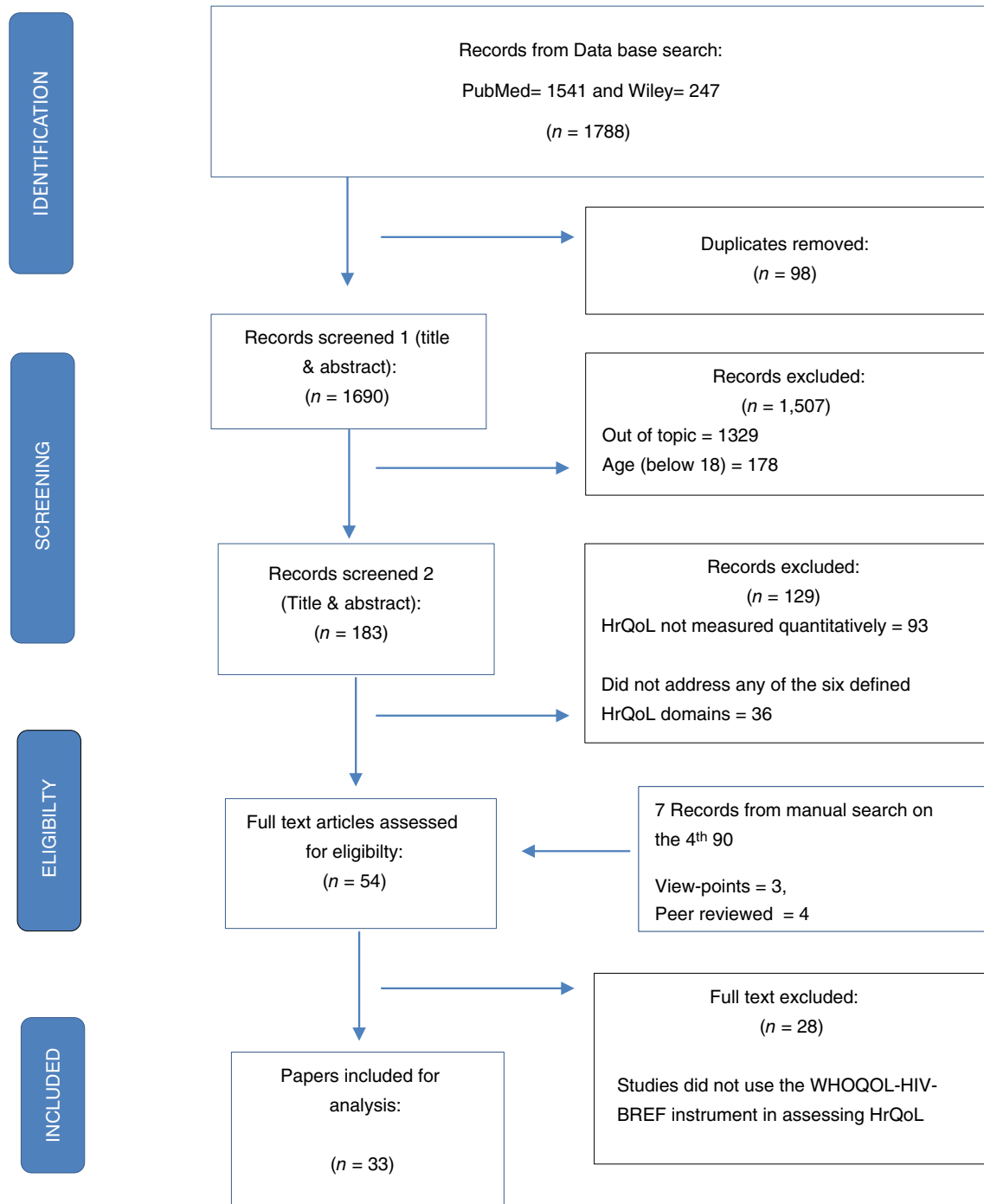


FIGURE 1 PRISMA flow chart

people who achieved viral suppression, not considering all others who may be facing similar psychosocial challenges [11]. Based on a subsequent debate, the 4th 90 concept was revised in 2019 and presented as cutting across all steps of the HIV continuum of care, including all people living with HIV from the point of diagnosis. The new target aimed at ensuring that 90% of all people living with HIV from the point of diagnosis have a good HrQoL [7]. An opinion piece reported in 2021 that the 4th 90 target was not adopted as an official UNAIDS target due to difficulties in its objective

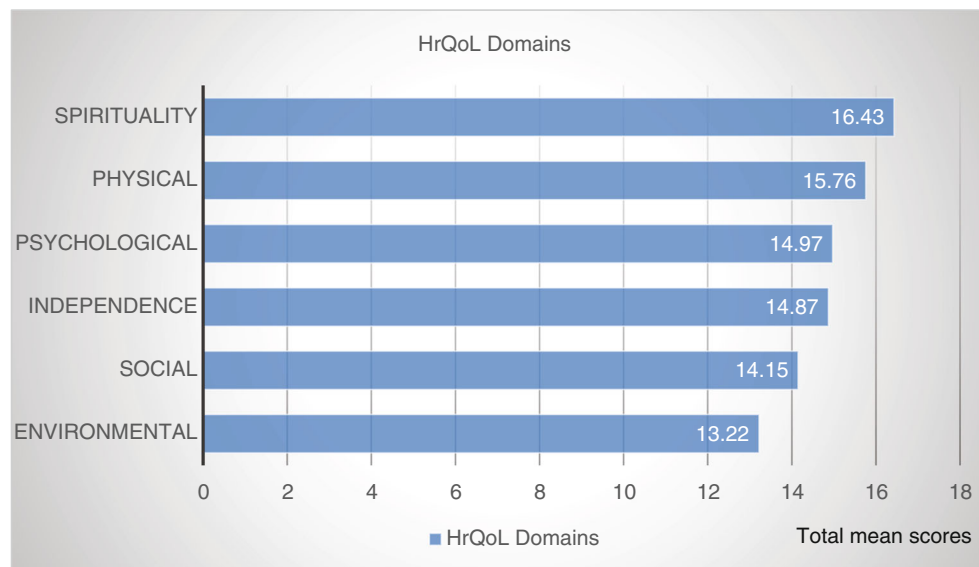
measurement. Compared with the first three targets (testing, treatment uptake and viral suppression) measuring HrQoL was deemed much more complex [11].

### Health related quality of life domains and determinants

Nine articles described HrQoL domains and determinants using the WHO-QOL-HIV-BREF assessment tool.

**TABLE 2** Viewpoints and opinion pieces on the 4th 90 target (sorted by date)

Author	Paper type/journal/website	Main content
Lazarus et al, 2016 [9]	Peer-reviewed BMC Medicine	Proposed adding a '4th 90' target to the UNAIDS 90–90–90 HIV testing and treatment targets to ensure that 90% of virally suppressed PLHIV have good HrQoL.
Glasgow HIV Drug Therapy Conference, 2018 [11]	Conference comments	Argues against good HrQoL being relevant only for PLHIV with suppressed viral levels.
Guaraldi et al., 2019 [10]	Peer-reviewed European Geriatric Medicine Society	Argues in favour of the 4th 90 target based on the argument that significant improvement in clinical health has been achieved with effective ART. Hence, new outcomes should go beyond undetectable viral load and care should be patient-centred (i.e., taking geriatric medicine as an example).
Guaraldi et al., 2019 [21]	Peer-reviewed AIDS Reviews	Proposes a framework which entails a continuous process of measuring HrQoL with discussions between PLHIV and their health providers. Also proposes interventions in areas of QoL to improve healthy living.
Amy Flood (Gilead/Devex) September, 2019 [22]	Opinion piece, not peer-reviewed <a href="https://www.devex.com/news/sponsored/opinion-how-to-achieve-the-fourth-90-for-hiv-95638">https://www.devex.com/news/sponsored/opinion-how-to-achieve-the-fourth-90-for-hiv-95638</a>	Proposes that challenges experienced by PLHIV should be addressed including factors that affect QoL like discrimination and depression. Highlights on-going interventions like the Vihaan national project in India, which demonstrate HrQoL benefits in the target population.
Safreed-Harmon et al., December, 2019 [7]	Peer-reviewed Lancet HIV 2019	Original authors re-think the concept of the 4th 90 to include all PLHIV from the point of diagnosis.
Sarah Wheaton March, 2021 [11]	Not peer-reviewed opinion piece, TELESCOPE: The new AIDS epidemic A report: POLITICO case study <a href="https://www.politico.eu/article/hiv-90-90-90-aids-why-living-well-is-not-a-goal/">https://www.politico.eu/article/hiv-90-90-90-aids-why-living-well-is-not-a-goal/</a>	Highlights the fact that difficulty in adopting the 4th 90 target may be linked to the complexity of its multidimensional nature and subjectivity making comparable measures complicated. Adds that though not yet adopted the discussions around the new target has made an impact, which likely stick around.

**FIGURE 2** HrQoL domains (highest to lowest mean scores)

The majority (7/9) of studies (Table 3) adopted a cross-sectional methodology, while two were prospective cohort studies. Countries of data collection are described in Supporting Information File S4. In all studies, the majority of respondents were female with an unweighted average of 67%; as such, responses reflect mostly choices from the female participants, with females often

reporting higher HrQoL [29]. Figure 3 summarises the domains according to the combined computed mean scores (total mean scores were obtained from the sum of all individual domain mean scores in studies divided by 9, the total number of studies). The majority (8/9) of studies [23–29, 31] reported lowest mean scores for the environmental domain of HrQoL, and highest mean

TABLE 3 Studies reporting on HrQoL domains and determinants

Author	Country	Study design	Study population	Findings 1 (Domain)	Findings 2 (Factors)	Conclusion
Akinboro et al., 2014 [23]	Nigeria	Cross-sectional	491 PLHIV (71% females) attending an HIV clinic	Spirituality—16.93 <sup>a</sup> Physical—16.85 Independence—16.33 Psychological—16.23 Social 16.09 Environment—16.08	<i>Lower HrQoL:</i> AIDS (Ind), CD4 count <350 cells/mm <sup>3</sup> (Phy, Psy, Ind), TB coinfection (Phy, Ind), tertiary education (all except Soc) <i>Higher QoL:</i> ≥ 40 years (Env, Spi), married (Soc), rated health status as good (all), BMI ≥25 kg/m <sup>2</sup> (Ind, Env), on ART (Phy, Psy, Ind, Spi)	Results reflect effect of stigmatisation, discrimination and marginalisation. <i>Limitation:</i> Risk of recall bias; cross-sectional design (causality cannot be inferred).
Asrat et al., 2020 [24]	Ethiopia (North west)	Cross-sectional	391 PLHIV (69% females) attending an ART clinic	Spirituality—17.68 Physical—16.64 Independence—16.08 Social—15.04 Psychological—14.92 Environment—13.08	<i>Lower HrQoL:</i> Major Depressive Disorder (MDD) (all domains) <i>Higher HrQoL:</i> Tertiary education (all except Soc), 1st line ART regimen (Phy, Psy, Ind), on ART for long ≥6 years (Phy, Spi), high perceived social support (all), no functional disability (all except Env)	Link between MDD and HrQoL indicates need to integrate mental healthcare. <i>Limitation:</i> Design does not permit robust causal relationships; self-report; risk of recall bias.
Bakiono et al., 2015 [25]	Burkina Faso	Prospective study; HrQoL assessed at baseline, 6 and 12 months	424 PLHIV (87% females); Health facility 67.2% and 32.8% community (73 drop outs) Enrolment 1 month	Spirituality—16.3 Physical—14.9 Psychological—13.7 Social—13.5 Independence—13.4 Environment—11.0	<i>Consistently Low HrQoL:</i> Not yet on ART <i>Increased HrQoL:</i> 4 domains significantly improved with time from baseline to 12 months: Psy (+0.8), Ind (+1.0), Soc (+1.2) and Env (+2.1). Factors associated with this change included: Support for medical care, ART, self-perceived as healthy, higher global QoL at baseline (>77)	Environmental domain remained lowest over time (but improved the most); strategy to enhance HrQoL recommended. <i>Limitation:</i> Short period of enrolment may not be representative of all year round PLHIV.
Deribew et al., 2013 [26]	Ethiopia	Prospective study for 6 months. HrQoL assessed at baseline and 6 months	455 PLHIV without TB (59% females) 97 with TB (56% females) 37 LTFU	Spirituality—17.9 Physical—16.8 Psychological—16.2 Independence—15.0 Social—13.6 Environment—12.4	After 6 months all dimensions improved <i>Lower HrQoL:</i> (CMD, Common Mental Disorder measured on Kessler 10 scales strongly affected Phy and Psy domains), TB-coinfection (all), no source of income (Psy) <i>Higher HrQoL:</i> /	CMD was a main predictor of HrQoL; Screening/treatment of CMDs could be an important strategy to improve HrQoL. <i>Limitation:</i> LTFU and missing data on CD4 may have obscured effect of clinical staging on HrQoL.

Desta et al., 2020 [27]	Ethiopia (South West)	Cross-sectional study	240 PLHIV (63.75% females) (MTUTH ART Pharmacy)	Spirituality—17.13 Physical—16.34 <sup>a</sup> Independence—16.21 Psychological—14.30 Social—13.82 Environment—13.58	<i>Lower overall HrQoL:</i> Current ill health, low/medium ART adherence <i>Higher overall HrQoL:</i> family support	ART adherence affects QoL. <i>Limitation:</i> Snapshot Study in a single facility (limited extrapolation)
Surur et al., 2017 [28]	Ethiopia	Cross-sectional study	400 PLHIV (54.7% females) (Gondar Hospital)	Physical—15.55 Spirituality—15.47 Independence—15.27 Psychological—13.93 Environment—12.78 Social—12.11	<i>Lower HrQoL:</i> no education (Soc and Env), being married (Env), WHO clinical stages 3 and 4 (all). <i>Higher HrQoL:</i> Being female (Psy) and age ≥ 30 (Psy), living in an urban area (Ind)	Strategies to improve environmental/social relations are most demanded. <i>Limitation:</i> Only patient on ART included (less comprehensive).
Veld et al., 2017 [29]	South Africa	Cross-sectional study	2230 PLHIV (66.5% females) (3 clinics in Pretoria)	Spirituality—17.74 Physical—16.57 Psychological—15.68 Independence—15.18 Social—14.86 Environment—14.46	<i>Lower overall HrQoL:</i> High risk alcohol use <i>Higher overall HrQoL:</i> Being female	Need for reduction of alcohol use in PLHIV. <i>Limitation:</i> self-reporting assessments (risk of recall bias).
Ndubuka et al., 2017 [30]	Botswana	Cross-sectional study	456 PLHIV (68% females) in 6 ART clinics	Physical—15.8 Psychological—15.3 Independence—15.1 Social—14.7 Spirituality—13.0 Environment—12.9	<i>Lower HrQoL:</i> Poor health status (phy, psy), older age (>45 years) (Ind), missed Clinic appointments (phy), being married (Soc) <i>Higher HrQoL:</i> Self-education about HIV (Env), coping experience (psy)	Moderate HrQoL scores across all six domains. HIV knowledge improved perceived health status. <i>Limitation:</i> Snapshot study (time-related associations not ascertained).
Mekuria et al., 2015 [31]	Addis Ababa Ethiopia	Cross-sectional study	870 PLHIV (63.6% females) (10 health facilities)	Spirituality—15.8 Physical—15.4 Independence—14.5 Psychological—14.4 Social—13.6 Environment—12.7	<i>Lower HrQoL:</i> depressive-symptoms present (all), HIV-Stigma present (all) <i>Higher HrQoL:</i> sufficient nutritious food (all except Spi), having or maintaining a job (all except Soc)	HIV-staff should be sensitive to depressive-symptoms and HIV-stigma. <i>Limitation:</i> Snapshot study hence no causal inference can be made.

<sup>a</sup>Domains affected are abbreviated as (Spiritual: Spi, Physical: Phy, Independence: Ind, Psychological: Psy, Social: Soc and Environmental: Env). PLHIV, people living with HIV; LTFU, loss to follow up (only statistically significant factors [ $p < 0.05$ ] from multivariate analysis are presented, Domains are Scored on 20).

scores for the spirituality domain in seven studies [23–28, 31]. Determinants with a statistically significant association with a higher HrQoL included being female, receiving and being adherent to ART, high body mass index (BMI), social/family support, having a job, living in an urban area and intake of sufficient nutritious food [23–25, 27–29, 31]. Determinants with a statistically significant association with a low HrQoL were: low CD4 counts, being symptomatic, advanced disease and tuberculosis co-infection for medical factors; low adherence to ART, alcohol use, depressive symptoms for psychological factors; and no source of income and stigmatisation for environmental factors [23, 24, 26, 27, 29–31]. Some factors were inconsistently related to HrQoL across studies (i.e., associated with either higher or lower HrQoL). These were older age, being married and low education.

## Health-related quality of life interventions

About half of the studies (8/17) applied qualitative methods to describe intervention outcomes (Table 4c,d). Six studies used quantitative methods (Tables 4a,b) and further three studies adopted a mixed method approach (Table 4b). We summarised them according to the target intervention. The methods, study designs and summary of interventions are further described below.

## Study methods

Two interventional studies were randomised control trials, hence demonstrating robust evidence of HrQoL benefits; a 16-week home based rehabilitation program to assess intervention benefits and a Phase II mixed methods' feasibility cluster

randomised controlled trial on person-centred care. Both were found to be effective in improving patient experience [32, 37]. Other studies adopted quasi-experimental designs without randomization of participants (e.g., a 12 weeks nutrition program and a 1-year single group task shifting for screening and treatment of depressive symptoms in PLHIV [36, 40]). The other interventions evaluated an ongoing program using either mixed methods, quantitative or qualitative methods. Mixed-method approaches permitted the descriptive interventional studies to complement their observations with qualitative data collected through interviews. They were hence able to triangulate their findings resulting in a more comprehensive analysis with subjective insights to their quantitative results. An example of a mixed method study is the evaluation of community ART groups as an ART delivery model [38]. Other studies used quantitative methods (e.g., stigma reduction interventions) or qualitative methods (e.g., role of peer counsellors) describing individual patients views [33, 34, 41].

### Summary of interventions: Stigma reduction interventions

About a third (6/17) of HrQoL interventional studies described or assessed specific HIV-related stigma reduction strategies [33, 34, 42–44, 48]. Three broad definitions of stigma emerged: Internalised or self-stigma (i.e., absorbed negative messages and stereotypes people living with HIV have about themselves), anticipated or future stigma (i.e., expectation or fear of experiencing stigma in the future) and enacted/external stigma (i.e., experiences of unfair treatment by others). While counselling and public testing campaigns significantly reduced anticipated stigma [44], other interventions reduced internalised stigma but demonstrated minimal or no effect on enacted stigma [33, 34, 42, 43, 48]. Effective stigma reduction strategies included ART programs, which significantly improved physical health, restoring hope for survival and reducing fear of contagion in people living with HIV. As a result, the community viewed people living with HIV as being healthy, which decreased enacted stigma [44]. Further interventions included group networks of people living with HIV and social networks of HIV negative and HIV positive persons, which enhanced social interactions and reduced social exclusion of the latter [42, 44, 48].

### Differentiated HIV service delivery interventions

Four articles described differentiated HIV services [35, 37, 38, 46]. Two studies reported on widely accepted and effective community ART delivery models in which people living with HIV, found to be stable on ART and sharing the same neighbourhood, were organised into small groups and took turns to collect ART refills for the rest of the group [38, 46]. These community ART groups reduced clinic visits, overcrowding, waiting time, transport cost and

discriminatory labels to people living with HIV by community members. Person-centred HIV care, a holistic approach, addressed the psychological, social and spiritual well-being tailored to the people living with HIV [37]. Healthcare care workers were trained to provide such care to people living with HIV, which improved patient experience. Decentralisation of HIV services from the central to provincial and district levels was effective in delivering ART in a less congested and person-centred manner improving psychological HrQoL [35]. Peer community social support workers were trained to deliver home visits and followed up adherence to ART and psychological health of people living with HIV [39]. They also provided HIV education and discussed negative feelings and drug side effects with their Clients.

### Mental health interventions

Five articles discussed interventions addressing the mental health component of the psychological health domain [40, 41, 43, 45, 47]. Depression screening and treatment by non-physicians through task shifting was a resource-efficient strategy in improving mental health outcomes amongst people living with HIV [40]. Peer counsellors (i.e., people living with HIV who were trained to act as facilitators and role models) created awareness and shared their experience with other people living with HIV in counselling sessions. This improved ART adherence and reduced distress [41]. Support group meetings for people living with HIV demonstrated enhanced peer motivation, and facilitated sharing of coping experiences and HIV status acceptance [43]. Two interventions at the family and peer level were qualitatively evaluated: Treatment partners and care supporters were designated family members or friends who assisted people living with HIV in adhering to their ART, reducing isolation and improving their psychological and physical health [45, 47].

### Rehabilitation and nutrition programs

Lastly, we also identified a home based rehabilitation program with therapist assisted physical exercises and a nutrition education program. Both effectively improved physical health [32, 36]. Figure 3 describes HrQoL interventions according to the domains positively affected and level offered (micro for individual, meso for community and macro for structural). None of the interventions significantly affected the domains 'level of independence and spirituality' and were therefore not included here.

## DISCUSSION

This scoping review synthesised the available evidence on the 4th 90 target, including strategy to enhance HrQoL of



TABLE 4 HrQoL interventional study description

Author	Study title	Country	Design	Population sampling	Outcome assessed	Intervention	Relevant findings	Strengths/ *Challenges
<b>(a) Quantitative interventional studies</b>								
Cobbing et al., 2017 [32]	A Home-Based Rehabilitation Intervention for Adults Living With HIV: A Randomised Controlled Trial	South Africa	Single blinded RCT; 16 weeks	76 PLHIV ART from clinics in the eThekweni district (disability inclusive)	QoL, Functional capacity	Aerobic exercise, resistance exercise, functional rehabilitation by community health worker trained by a physical therapist.	Improved physical QoL (mean score from 12.7 to 14.09 in the intervention group versus 12.79–12.94 in control (difference not SS))	Task shifting is cost saving. *Need to screen those physically fit to participate
Chidrawi et al., 2015 [33]	Change over time in psychosocial wellbeing of PLHIV and people living close (PLC) to them after an HIV stigma reduction and wellness enhancement community intervention	South Africa	Quantitative single system design, 1 year (urban and rural groups)	Purposive sampling of 18 PLHIV then snowball sampling to identify 60 PLC pre/4 post test	Stigma, mental psychosocial coping, spirituality, satisfaction with life	Sharing HIV stigma /coping information, equalising relationships of PLHA and PLC (through interaction/contact), empowering towards leadership in HIV stigma reduction	Spirituality domain (SS) improved for PLC and they became more empathic towards PLHIV. PLHIV were less isolated and symptom remission for those with mild depression (SS)	Enhanced interaction between PLHIV and PLC. *Design not fit for large number of participants
Chidrawi et al., 2014 [34]	Health behaviour change of people living with HIV after a comprehensive community-based HIV stigma reduction intervention	South Africa (NW)	Quantitative single system design (urban and rural groups)	18 PLHIV purposive voluntary sampling. Pre-test and 4 post-tests measures	HIV Kenya, Uganda experiences (6 domains) and health behaviour of PLWH	Same as study above. The HIV/AIDS stigma instrument PLWA (HASI-P) was used to measure verbal abuse, self perception, health neglect, social isolation, fear of contagion	(SS) Benefit observed in 2 stigma domains, Healthcare neglect mean scores (7.6–6.97) and (fear of contagion (7.7–6.08).	Stigma reduction improved QoL and health behaviours. *Design did not allow large # participants

(Continues)

TABLE 4 (Continued)

Author	Study title	Country	Design	Population sampling	Outcome assessed	Intervention	Relevant findings	Strengths/ *Challenges
<b>(a) Quantitative interventional studies</b>								
Boyer et al., 2012 [35]	Performance of HIV care decentralisation from the patient's perspective: health-related quality of life and perceived quality of services	Cameroon	Longitudinal survey during a 6 months period	Random sample of 3151 PLHIV, followed up in 27 hospitals	HrQoL and quality of care	and workplace stigma Decentralisation of ART services (district, provincial) assessing performance compared to central level	Decentralised centres perform better than central ones in terms of psychological HrQoL. Centres with 1200 should have at least 1 social worker 4 physicians, and 3 nurses	Quality performance from PLHIV view. *Need for more staff at decentralised centres
<b>(b) Quantitative/Mixed method interventional studies</b>								
Bello et al., 2019 [36]	A nutrition education programme improves quality of life but not anthropometric status of adults living with HIV	Nigeria Abeokuta	Quasi-experimental control group (nutrition brochure) 12 weeks	200 conveniently selected people stratified by gender, duration on ART	QoL and anthropometric status	Nutrition education programme (NEP). Discusses importance of nutrition, barriers to healthy eating, nutrition health tips	(SS) improvement in the physical HrQoL of the intervention group compared with the control group	Easy and cost effective. *Need for beneficiaries to be financially stable to follow diets
Abboah-Offei et al., 2020 [37]	Phase II mixed methods' feasibility cluster randomised controlled trial of a novel community-based enhanced care intervention to improve person-centred outcomes for people living with HIV	Ghana	Parallel mixed method cRCT quantitative data + post-trial exit interviews 3 months	Random selection of 60 PLHIV 30 allocated to each arm. Clinics were randomised to intervention or control groups	Person-centred care (PCC), patient Experience, positive outcomes, care measure	Care from trained staff with three sessions on PCC and communication; holistic care on physical, psychological, social and spiritual well-being Control arm: standard routine HIV care	(SS) protective effect size on person-centred outcomes [0.7 (95% CI 0.17–1.23)], patient experience [0.8 (95% CI 0.27–1.31)] CARE measure [1.0 (95% CI 0.45–1.55)], positive outcomes [0.7 (95% CI 0.17–1.23)]	PCC is feasible and acceptable to PLHIV and HCW. *Time spend on a clinic appointment lengthened to 30–60 min per patient

(Continues)

TABLE 4 (Continued)

## (b) Quantitative/Mixed method interventional studies

Rasschaert et al., 2014 [38]	Adapting a community-based ART delivery model to the patients' needs: a mixed methods research in Tete, Mozambique	Mozambique	Mixed methods triangulating 1 year qualitative IDI, FDG quantitative (regimen, CD4 refills) findings	Purposive sampling of 105 participants: 79 PLHIV (68 in ART group). Nurses, implementers	Outcomes of community ART groups since 4 years in place	Patients stable on ART participated in the ART provision and peer support through Community ART Groups (CAG)	Better HIV awareness, decreased stigma, improved health seeking behaviour, and better quality of care	Cost and time saving benefits *Close monitoring for quality of care
Lifson et al., 2017 [39]	Implementation of a Peer HIV Community Support Worker Program to Promote Retention in Care	Ethiopia	Before and after survey from 2010 to 2012 community health social worker (CHSW) trained	142 PLHIV/13 (CHSW) also PLHIV from same area through word-of-mouth recruitment	Knowledge, social support, HRQOL and feelings of internalised stigma	CHSW provide education on HIV, nutrition and other health promotions, counselling, social support, discussion on negative feelings and facilitated communications with clinic	(SS) after 12 months: HIV knowledge from 4.7 to 5.5/6, Physical QoL from 7.5 to 13.6/14, mental QoL 6.8–8.2/10, Social support 18.2–22.5/24, internal stigma reduced 1.6– 0.05/5	CHSW being PLHIV reduced feeling of isolation and promoted peer support *Recruiting PLHIV as CHSW
Pence et al., 2014 [40]	Feasibility, safety, acceptability and preliminary efficacy of measurement-based care depression treatment for HIV patients	Cameroon Bamenda	Single group pilot study, mixed method care at 12 weeks and, maintenance at month 4, 8, 12	Purposive sample (criteria) of 55 PLHIV presenting for care at Bamenda day AIDS centre	Task-shifting in treatment. Remission of depression symptoms (PHQ-9 scale)	Non-physician Depression Care Management, screening and treatment of current major depression with Amytryline 25– 50 mg daily baseline	By week 12 of depression treatment remission rate was 46/55 (87%; PHQ-9 < 5); all participants were satisfied with care.	Resource-efficient strategy *Trained staff (nurse should have 12 years experience)

## (c) Qualitative interventional studies

Gusdal et al., 2011 [41]	Peer counsellors' role in supporting patients' adherence to ART in Ethiopia and Uganda	Uganda, Ethiopia	Qualitative: semi-structured interviews	79 PLHIV, 17 peer counsellors, 22 providers in urban/rural ART facilities	Explore peer counsellors' role, patients' ART adherence	Peer counsellors as facilitators of ART adherence and role models; creating awareness and sharing their experience	Peer counsellors are being close to the patients (as confidants reducing isolation and distress) while acting as a bridge to the health system.	Continuous peer motivation *Need for remuneration of peer counsellors
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TABLE 4 (Continued)

(c) Qualitative interventional studies								
		Uganda (AIDS Support Organisation)	Qualitative: semi structured interview, FGD, participant observation	Purposive sampling of 46 PLHIV part of HIV networks in 2 districts	Relationships, HIV perceptions, Networks of PLHIV	Sharing knowledge and skills and resources between groups. Community sensitization on HIV prevention	Enhanced treatment access and adherence, decreased stigma, improved self-perception and a sense of belonging with capacity building	Motivation to survive *With scarce resources groups are less willing to share
Hodgson et al., 2012 [42]	Only connect—the role of PLHIV group networks in increasing the effectiveness of HIV services							
Kave et al., 2019 [43]	The role of support groups in linking and retaining newly diagnosed clients in HIV care in a peri-urban location in South Africa	South Africa	Qualitative, 9 in-depth interviews (IDIs), 3 FGD of 23 PLHIV	Purposive sampling of members of HIV support groups for >6 months	Psychosocial support, stigma, retention in care	Peer-to-peer psychosocial support (group meeting by three NGOs), HIV information adherence, acceptance of status/disclosure, healthy living	Improved link between clients and clinics, reduced effect of felt and enacted stigma, advocacy and network tool for newly diagnosed	Continuous peer motivation *Need to integrate NGOs in intervention
Camlin et al., 2020 [44]	Pathways for reduction of HIV-related stigma: a model derived from longitudinal qualitative research in Kenya and Uganda	Kenya, Uganda	Longitudinal qualitative design for 2 years, in-depth interviews (mixed groups HIV +/–)	Purposive and systematic sampling, 32 community leaders, 112 community members	Stigma (internalised and enacted) reduction strategies	ART uptake and adherence reduces internalised stigma, widespread engagement in HIV testing reduces anticipated stigma, communities viewing PLHIV as healthy reduces enacted	Identification of three pathways to reduce three forms of stigma (improving optimism in PLHIV, promoting testing, reducing fear of contagion in population)	In-depth perception of PLHIV. *Strategies only recommended no intervention actually tested
(d) Qualitative interventional studies								
Root et al., 2013 [45]	A qualitative study of community home-based care and antiretroviral adherence in Swaziland	Swaziland	Qualitative descriptive: Semi-structured questionnaires, key informant interviews/record	Purposive sampling of 79 PLHIV from 11 communities	Care supporters role in ART, experiences of PLHIV and stigma	Care supporter talk to enhance treatment uptake and literacy, reduce felt stigma and challenge pressures to desist from ART (side	General health improved in 92% of respondents, 53% No longer had suicidal ideations, (31%)	Care supporter enabled ART adherence in hard to reach areas *Sustainability with training/motivation for care supporters

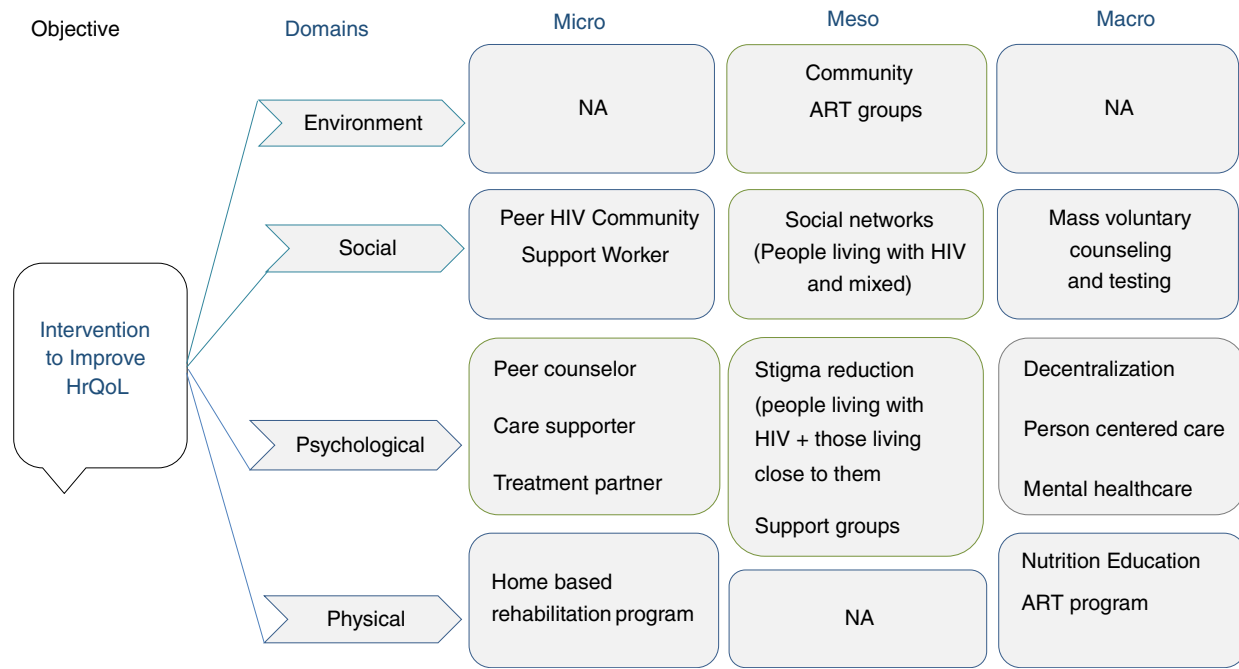
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TABLE 4 (Continued)

## (d) Qualitative interventional studies

Pellecchia et al., 2017 [46]	'We are part of a family'. Benefits and limitations of community ART groups (CAGs) in Thyolo, Malawi: a qualitative study	Malawi	15 focus group discussions, 15 in-depth interviews and participant observation in 2 health centres, 4 months	Purposive sampling (ART register) of 94 PLHIV including those part of ART groups	Benefits and challenges of CAGs view of healthcare worker (HCW) and PLHIV	Community ART groups CAGs are self-formed groups of patients on ART taking turns to collect ART refills for all group members from the health facility	Reduced clinic visits, reduced transportation costs and time savings reduce exposure to discriminatory labelling by community members	Acceptable model of ART delivery *CAGs were not well known by patients and had a limited impact on reducing HIV-related stigma
O'Laughlin et al., 2012 [47]	How treatment partners help: social analysis of adherence support interventions	Tanzania	Grounded theory patient centered qualitative 2 year interview study treatment centre in Dar es Salaam	20 PLHIV 20 treatment partners randomly selected following criteria based on age ART duration and residence distance	Experience on ART, treatment partner, type of help	Treatment partners (TPs) also treatment supporters or treatment assistants help individuals prescribed ARV therapy to adhere to the medications. TP could be friends, family nominated	Resources (PLHIV often borrowed money from TP for food and transport to clinic), PLHIV felt less isolated, sad and anxious, TP combat stigma by publicly interacting with PLHIV	TP generally restore hope and promote ART adherence for PLHIV *Monitoring for sustainability and continuity
Salmen et al., 2015 [48]	'Wan Kanyakla' (we are together): Community transformations in Kenya following a social network intervention for HIV care	Kenya	1 year quasi-experimental trial, qualitative data through FGD (mixed groups with HIV-members)	Convenience sampling of 369 patients on ART and members of their social networks	HIV stigma, HIV testing, ART adherence and linkages to care	Microclinic intervention: therapy management collective—small group of neighbours, relatives and friends trained as a team to provide psychosocial and adherence support for HIV-infected members	(1) Enhanced HIV treatment literacy, (2) reduced stigma, (3) improved environment for HIV status disclosure and (4) improved material and psychosocial support for PLHIV	Widespread acceptability and enthusiasm *Confidentiality Breach with unwanted disclosure occurred

Abbreviations: FGD, focused group discussions; PLHIV, people living with HIV; SS, statistically significant.



**FIGURE 3** HrQoL interventions (interventions such as; ART groups, social networks, stigma reduction and care supporters, improved the HIV continuum of care by improving health seeking behaviour or access to ART)

people living with HIV in SSA to improve outcomes across the HIV continuum of care. By means of a systematic research synthesis, we identified key concepts, types and sources of evidence, including research gaps on strategies to improve HrQoL amongst people living with HIV in SSA. This evidence can inform practice and policymaking aimed at improving the HIV continuum of care in the SSA context.

### The proposed 4th 90 target

Though not officially adopted, this review identified the 4th 90 target, which calls for good HrQoL for all people living with HIV, as a promising step towards improving the HIV continuum of care in SSA. We identified a positive link between good HrQoL and improved health seeking behaviour [34, 38, 41–43, 45–48]. This link suggests that improving HrQoL in people living with HIV indirectly improves all the steps of the HIV care cascade (i.e., continued testing, taking ART and achieving viral suppression). This is especially important from both an individual and a public health point of view as sustained viral suppression reduces the risk of onward HIV transmission to almost zero [49]. However, to achieve sustained viral suppression, a person living with HIV should be adherent to treatment, consequently any psychosocial factor, which prevents initiation, or adherence to therapy will be detrimental to HIV clinical health. Many HIV programs seem to focus only on clinical treatment and do not give much attention to the psychosocial aspect. We have seen that there are several ways of measuring HrQoL. If countries would demonstrate the same commitment in improving HIV HrQoL as cross-cutting factors as they do

for the first three targets, then significant improvements will be observed in health outcomes. This is illustrated in experimental and quasi-experimental HrQoL interventional studies in this review as further explained below.

### Health related quality of life and clinical determinants

Our review clearly suggests that HrQoL plays a central role in the clinical outcomes of people living with HIV and vice versa. We found a statistically significant associations between low HrQoL and clinical determinants such as low CD4 counts, tuberculosis co-infection (advanced disease) and poor adherence to ART [23, 27, 29, 30]. These findings align with those of a meta-analysis which illustrated that timely diagnosing HIV and availability of HIV care through hospital services had a significant relationship with a higher HrQoL, while CD4 counts <200 cells/cubic ml of blood was associated with a lower HrQoL [50].

### Health related quality of life and stigma

This review also highlights the fact that in the sub-Saharan African context, environmental determinants such as HIV-related stigma (i.e., negative labelling) and discrimination (i.e., social exclusion, marginalisation in health care settings, inability to have/maintain a job, loss of travel or educational opportunities, etc.) negatively affect HrQoL of people living with HIV [23]. These findings are in line with stigma research showing that HIV related stigma also presents

challenges in other contexts: a study in Finland (Northern Europe) found self-stigma to be associated with lower HrQoL [51]; while study findings from India (Asia) highlighted HIV related stigma as a high risk factor for poor HrQoL [52]. The presence of stigma can lead to psychological distress in people living with HIV. This could in turn negatively affect their health seeking behaviour and worsen outcomes along the HIV continuum of care (i.e., delay to begin ART, treatment interruption or cessation) leading to low viral suppression [23, 31]. This reiterates the compelling link between low HrQoL and poor clinical outcomes.

This review suggests that the centralised way of delivering HIV services can in itself indirectly contribute to HIV related stigma [38, 46]. Clients who queue up in specialised HIV clinics or treatment centres may receive negative labels from the community members and health care providers [53]. However, differentiated HIV services (like community ART groups and other de-centralised and patient centred services) seem to be a good alternative contributing to 'de-stigmatisation' by making care less 'exceptional' for people living with HIV [35, 37, 38, 46] [54]. This review also provides an inventory of other effective stigma reduction interventions and strategies to improve ART access or health seeking behaviour thus improving the HIV continuum of care [33, 34, 42–44, 48].

### Health related quality of life and other environmental factors

Other environmental factors such as limited finances, lack of social security, limited access to quality health/social care, inadequate access to information, were also found to negatively affect the HIV care cascade including HIV testing, ART initiation and retention in care. This is reflected in the particularly low scores reported for the environmental domains across studies [23, 31]. However, Community ART groups were again an example of interventions, which improved this domain of HrQoL. In this case, the community ART groups improved the environmental domain by reducing community related stigma, reducing clinic transport cost while improving access and adherence to ART. It should be noted that the specific HrQoL domain outcomes could vary across the different socio-cultural and sociological contexts. This review revealed that the spirituality and physical domains recorded the best scores while the social and environmental domains recorded the lowest scores in the SSA region [23–28, 31]. In Indonesia (Asia), the social domain instead had the best scores with majority of participants being married while physical and independence instead recorded the lowest scores as many participants were in denial and refused to begin their ARTs [55].

### Measuring and monitoring health related quality of life

To effectively evaluate HrQoL interventions and better inform policy making, routine HrQoL monitoring should be

integrated into care for people living with HIV [56]. To this end, an international panel has developed consensus on indicators for measuring well-being of people living with HIV. This will provide a person centred approach to identify and address factors that negatively affect HrQoL and related clinical outcomes [56]. In line with WHO definition of health, It is only by recognising and measuring the full range of health, mental and social outcomes that the health status of people living with HIV can be fully understood [57].

Fortunately, a wide range of HIV specific instruments is available to measure psychosocial outcomes added to the biological markers such as viral loads and CD4 counts used to measure clinical outcomes of people living with HIV. This provides better understanding of the observed health status of the clients [57, 58]. For this review, the most widely used HrQoL measuring tool [58], the WHOQOL-HIV-BREF instrument, was explored providing insights on HrQoL outcomes in the SSA context. Nevertheless, the choice of instrument might be based on the different characteristics measured, and reason for application to provide a more context specific outcome measure [58].

### Research gaps

The majority of studies assessing HrQoL domains and determinants adopted a cross-sectional study design to evaluate HrQoL and were hence unable to directly attribute a cause-effect link between the determinants and their observed effect on the HrQoL amongst PLHIV [23, 24, 27–31]. All of these nine studies used quantitative methods to measure HrQoL outcomes but lacked a qualitative component for thematic analysis to better understand the multi-dimensional nature of HrQoL domains and give better insights into observed results.

Generally speaking, about half of stigma reduction interventions conducted in low and middle income countries do not include a component to assess their effect on HrQoL outcomes [59]. Hence, we note a significant research gap in well-designed intervention studies that specifically assess the impact of stigma on HrQoL [59]. Here, we included only stigma reduction interventions containing a component to measure HrQoL outcomes. These interventions had minimal impact on enacted stigma with a lack of established anti-stigma/discrimination policies. As such, factors, which affect the environmental health of people living with HIV such as verbal abuse, marginalisation, limited access to quality medical care or access to job and travel opportunities were insufficiently explored.

With regards to addressing the environmental domain (identified as the most affected in this scoping review), only two interventions (e.g., ART groups) as analysed in this review, particularly addressed and demonstrated significant improvement in this dimension of HrQoL. As such, this finding suggest that most interventions are not necessarily based on a prior needs assessment. This finding could help provide better orientation for future HrQoL interventions

and this highlights the importance of a needs assessment across different context.

## Study limitations

Several limitations have to be acknowledged. Using the six domains of HrQoL (defined in the WHOQOL-HIV-BREF instrument) as a framework to select and extract data permitted us to perform a standardised and comparable analysis with concrete examples useful in policy formulation and implementation. However, narrowing the synthesis to one instrument only may have resulted in limited insights into the conceptualization of HrQoL, its related determinants and interventions. Including other available instruments that measure HrQoL could give more comprehensive understanding of HrQoL domains that were not explored in this review. Second, interventions which did not assess outcomes related to any of the six HrQoL domains as described in the WHOQOL-HIV-BREF tool were not included in the analysis. Hence, information on lessons learnt from such interventions have not been included in this review.

## Recommendations

The evidence indicates that improving HrQoL of people living with HIV enhances individual health outcomes and improves viral suppression. Hence, It is important to devise strategies for early HIV diagnosis and linkage to care with continued monitoring of clinical and HrQoL outcomes in people living with HIV. Interventions geared towards improving HrQoL of people living with HIV should be considered as a promising strategy in HIV disease control. This review identified some effective examples targeting various levels (micro, meso and macro). Given the lack of effective interventions addressing the environmental domain, anti-discriminatory policies to protect the interest and rights of people living with HIV (laws against verbal abuse, equal access to quality health care, job and travel opportunities) should be developed in combination with environmental interventions geared towards reducing enacted stigma. To continue advocating for HrQoL as patient-reported outcome measures, more studies are needed that accurately measure the concepts related to HrQoL, both quantitatively and qualitatively.

## CONCLUSION

In this review, we found that HrQoL interventions addressed gaps in the HIV continuum of care by improving health-seeking behaviour. In addition, culturally valid instruments exist to track the progress of HrQoL indicators over time and a broader use of such instruments would help to deliver the evidence needed to solve the current debate around the 4th 90 target. However, the environmental

domain emerged as having the lowest scores and despite this finding; we identified a gap in effective structural interventions addressing external factors such as enacted stigma. Therefore, introducing the 4th 90 as a strategy to improve HrQoL in SSA, and by extension in low and middle-income countries, will require efforts to address environmental and structural determinants, to subsequently improve the HIV continuum of care

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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