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Review

A Scoping Review of How High-Income Country HIV Guidelines Define, Assess, and Address Oral ART Adherence

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Abstract

Background/Objectives: An optimal approach to addressing oral antiretroviral therapy (ART) adherence remains unclear in the research literature. This review aimed to identify definitions and thresholds of adherence, proposed methods and frequencies of evaluating adherence levels, barriers to adherence, and interventions to address adherence problems. **Methods:** A scoping review of HIV guidelines drew on guidance from the Joanna Briggs Institute. Eligible English and French guidelines and their updates concerned adults with HIV and oral ART from developed countries and international health organizations from 2017 to May 2023. Three databases were systematically searched, along with the gray literature. Then, a targeted search for omitted developed countries was conducted. Document selection and data charting were performed with two reviewers for 20% of records and full texts, followed by an independent review. Inductive–deductive content analysis of extracted data was performed using NVivo 14 software. **Results:** Twenty-four guidelines were identified from seven countries and two international health organizations. Only two defined ART adherence, and none offered a threshold for adequate adherence. Most guidelines (n = 22/24) reported adherence interventions, 20 guidelines (83%) identified adherence barriers, 20 guidelines (83%) noted variable methods to evaluate adherence, and 17 guidelines (71%) proposed a range of frequencies for assessing adherence. **Conclusions:** This review underscored a lack of consensus around adherence and its management. Very few guidelines defined adherence, none proposed an optimal threshold, and there was no agreement on how to gauge adherence. These gaps and variability raise questions about how clinicians manage adherence in practice. More systematic and preventative approaches to monitoring adherence may be needed.

Keywords: HIV; clinical guidelines; antiretroviral therapy; adherence; scoping review; barriers; threshold

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1. Introduction

Several terms, such as compliance and adherence, have been used to describe appropriate medication-taking behaviors [1]. Compliance refers to "the extent to which the patient's behaviour coincides with the clinical prescription" [2], and is now less favored due to its

implied paternalism. Conversely, adherence emphasizes an agreement between the patient and provider, encompassing behaviors such as medication-taking and lifestyle changes [3]. In the context of HIV research, adherence has been traditionally measured by self-report [4], although it has also been defined and measured in terms of virologic outcomes, such as sustained viral suppression [5]. Pharmacological adherence, by contrast, refers to pharmacy refill records or drug concentration levels [6]. Although broader definitions of adherence exist [7], this review focuses on adherence to oral antiretroviral therapy (ART). This focus stems from the vital role of ART, which suppresses HIV viral replication, maintains or restores the health of people living with HIV, and prevents its transmission to others [8].

Despite the importance of ART adherence, in North America and Europe, adults living with HIV have lower rates of optimal adherence compared to those in developing countries in Asia and Africa with older ART regimens [9,10]. Furthermore, some subpopulations of people living with HIV in developed countries are disproportionately affected by low adherence rates [11,12]. These include Indigenous peoples [12], women [13], immigrants [13], and youth [14]. These suboptimal adherence rates can result from a wide range of barriers, such as personal or cultural beliefs, co-morbidities, poor cognition or mental health, and a lack of housing [15].

How adherence problems should be best addressed in clinical care is unclear from the research evidence. Notably, proposed definitions of adherence and its thresholds diverge widely. Early HIV research showed that almost perfect adherence ($\geq$95%) was required for excellent virological outcomes [16]. More recent work suggests that thresholds may vary between regimens, as published thresholds for acceptable adherence can range from 80% to 100% [9,17]. Beyond adherence assessment, an array of promising interventions for suboptimal adherence are available, including patient and caregiver education, mobile phone text messaging, single-tablet ART regimens, and long-acting ART [18].

Considering the diversity of approaches to oral ART adherence within research, how these are operationalized in health systems remains unclear. Clinical guidelines are important tools for translating evidence into practice, shaping healthcare delivery and policy, and healthcare providers' decision-making. However, adherence is often treated as a clinical outcome, rather than a health systems challenge. Sustained adherence needs system-level guidance to promote it and address its barriers [19]. Framing ART adherence through a health systems lens allows us to examine HIV clinical guidelines as an indication of how evidence-based practices may be integrated into health systems. As such, a review of these guidelines across developed countries could help synthesize the common ground around ART adherence and interventions to address its barriers within HIV care. It could also help narrow the definition of sufficient adherence to ART as well as streamline the various clinical approaches in this area.

Research question and objectives: This review poses the research question, "How are adult adherence to oral ART and barriers to adherence addressed by current clinical guidelines for HIV treatment?" To address this question, the first objective is to synthesize current clinical guidelines for HIV treatment to identify the following: (1) definitions of adherence and its thresholds; (2) the proposed methods and frequencies of evaluating adherence levels; and (3) interventions to address suboptimal adherence or specific adherence barriers, including those for distinct subpopulations.

2. Materials and Methods

2.1. Study Design

We conducted a scoping review of HIV guidelines from developed countries in the Organization for Economic Cooperation and Development (OECD) or international health organizations. A scoping review of clinical guidelines was selected as it was appropriate

to examine the breadth of evidence surrounding how adherence is operationalized by health authorities. This review drew on guidance from the Joanna Briggs Institute [20], which included the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) [21].

2.2. Timeframe

The search was conducted in May 2023, and documents published from January 2017 to May 2023 were included. Typically, guidelines are updated every 3–5 years, and this timeframe allows us to capture the latest iteration of each guideline [22].

2.3. Search Strategy

The search strategy was developed with two librarians. One librarian developed the search strategy, and a second librarian validated the search. The search included Medical Subject Headings (MeSH) headings or MeSH terms as well as keywords related to "HIV", "antiretroviral therapy", "adherence", and "clinical guidelines". The full search strategy for Medline was initially developed (Table 1) and was subsequently adapted to all other databases.

Table 1. Full search strategy conducted in Medline.

Search Number	Terms
1	exp HIV/or exp Anti-Retroviral Agents/or exp HIV Infections/or Antiretroviral Therapy, Highly Active/
2	((immun* deficien* or immun?deficien*) adj3 (virus* or syndrome)).tw,kf.
3	HIV*.tw,kf.
4	(aids adj5 (virus* or viral or retrovirus or lentivirus or infection* or syndrome*)).tw,kf.
5	(anti-retroviral or antiretroviral).tw,kf.
6	("nucleoside reverse transcriptase inhibitor*" or NRTI* or abacavir or emtricitabine or ziagen or emtriva or iamivudine or epivir or tenofovir or viread or zidovudine or retrovir or "azidothymidine non-nucleoside reverse transcriptase inhibitor*" or NNRTI* or doravirine or pifeltro or efavirenz or sustiva or etravirine or intelence or nevirapine or viramune or rilpivirine or edurant or protease inhibitor* or PIs or atazanavir or reyataz or darunavir or prezista or fosamprenavir or lexiva or ritonavir or norvir or tipranavir or aptivus or fusion inhibitors enfuvirtide or fuzeon or CCR5 antagonist* or maraviroc or selzentry or "integrase strand transfer inhibitor*" or INSTI* or cabotegravir or vocabria or dolutegravir or tivicay or raltegravir or isentress or attachment inhibitor* or fostemsavir or rukobia or post-attachment inhibitor* or ibalizumab-uiyk or trogarzo or pharmacokinetic enhancer* or cobicistat or tybost).tw,kf.
7	(epzicom or dolutegravir or triumeq or trizvir or cobicistat or evotaz or bictegravir or alafenamide or biktarvy or rilpivirine or cabenuva or prezcobix or symtuza or juluca or disoproxil or delstrigo or atripla or symfi or elvitegravir or genvoya or stribild or odefsey or complera or descovy or truvada or cimduo or combivir or lopinavir or ritonavir or kaletra).tw,kf.
8	(atripla or apo-efavirenz or mylan-efavirenz or teva-efavirenz or dovato or lamivudine or apo-lamivudine or auro-lamivudine teva-lamivudine or kivexa or apo-abacavir or auro-abacavir or teva-abacavir or apo-emtricitabine or mylan-emtricitabine or apo-darunavir or auro-darunavir or mylan-atazanavir or teva-atazanavir celsentri or 3TC or apo-zidovudine or apo-tenofovir or auro-tenofovir or mylan-tenofovir or teva-tenofovir or apo-abacavir or mint-abacavir auro-efavirenz or mylan-efavirenz or teva-efavirenz or auro-nevirapine).tw,kf.
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8
10	exp "treatment adherence and compliance"/

Table 1. *Cont.*

Search Number	Terms
11	((treatment or therap* or patient* or medication* or drug*) adj2 (adhere* or compliance or comply or accept* or refus* or non-adher* or non-compliance or noncompliance or nonadhere* or persist* or cooperat*)).tw,kf.
12	10 or 11
13	9 and 12
14	exp clinical pathway/or exp clinical protocol/or clinical protocols/or exp consensus/or exp consensus development conference/or exp consensus development conferences as topic/or critical pathways/or exp guideline/or guidelines as topic/or exp practice guideline/or practice guidelines as topic/or health planning guidelines/or exp treatment guidelines/or Clinical Decision Rules/
15	(guideline or practice guideline or consensus development conference or consensus development conference, NIH).pt.
16	(position statement* or policy statement* or practice parameter* or best practice*).ti,ab,kf.
17	(standards or guideline or guidelines).ti,kf.
18	((practice or treatment* or clinical) adj guideline*).ab.
19	(CPG or CPGs).ti.
20	consensus*.ti,kf.
21	consensus*.ab./freq = 2
22	((critical or clinical or practice) adj2 (path or paths or pathway or pathways or protocol*)).ti,ab,kf.
23	recommendat*.ti,kf. or guideline recommendation*.ab.
24	(care adj2 (standard or path or paths or pathway or pathways or map or maps or plan or plans)).ti,ab,kf.
25	(algorithm* adj2 (screening or examination or test or tested or testing or assessment* or diagnosis or diagnoses or diagnosed or diagnosing)).ti,ab,kf.
26	(algorithm* adj2 (pharmacotherap* or chemotherap* or chemotreatment* or therap* or treatment* or intervention*)).ti,ab,kf.
27	(guideline* or standards or consensus* or recommendat*).au.
28	(guideline* or standards or consensus* or recommendat*).ca.
29	or/14–28
30	13 and 29

2.4. Information Sources

Three databases were searched, including Medline, Embase, and CINAHL. The gray literature was systematically searched in five guideline-specific databases, including the Canadian Medical Association Infobase, National Institute for Health and Care Excellence, Guideline Central, Turning Research Into Practice (TRIP), and Emergency Care Research Institute (ECRI) Guidelines Trust. These sources were included based on the librarian's expert recommendation. Gray literature search terms included "HIV antiretroviral therapy" or "HIV". For OECD countries not represented by clinical guidelines in the search results, a targeted search in English and French was conducted using Google to locate at least one government or health organization website. Search terms included "HIV clinical guidelines" with the name of the omitted country. If government or health organization websites did not readily contain the clinical guideline, emails were sent to each respective country's government or health organizations to inquire about guideline availability; a follow-up email was sent one week later if there was no response.

2.5. Inclusion and Exclusion Criteria

This scoping review included HIV clinical guidelines focusing on oral antiretroviral therapy and documents describing relevant guideline updates. Conference abstracts, primary studies, opinion pieces or commentaries, and protocols were excluded. The literature search was limited to guidelines published in English or French to ensure comprehension of the texts without relying on third-party translations, thereby minimizing the risk of misinterpretation. International guidelines were included because they were applicable to OECD countries, developed by multinational expert panels, which included representatives from non-English- and non-French-speaking countries. Additionally, these guidelines were published in various languages and as such were available for use within non-English- and non-French-speaking countries. Those that exclusively focused on long-acting ART, pre-exposure and post-exposure prophylaxis, or HIV testing were excluded.

2.6. Data Selection

Data selection and removal of duplicates were performed using EndNote 20 [23]. Two reviewers tested the eligibility criteria for refinement. During testing, one reviewer screened all records and full texts, while a second reviewer assessed 20% of the records and texts to determine Cohen's Kappa for interrater reliability. A third reviewer was included to resolve disagreements, if necessary. A PRISMA flowchart (Figure 1) displays each stage of the document selection process [24].

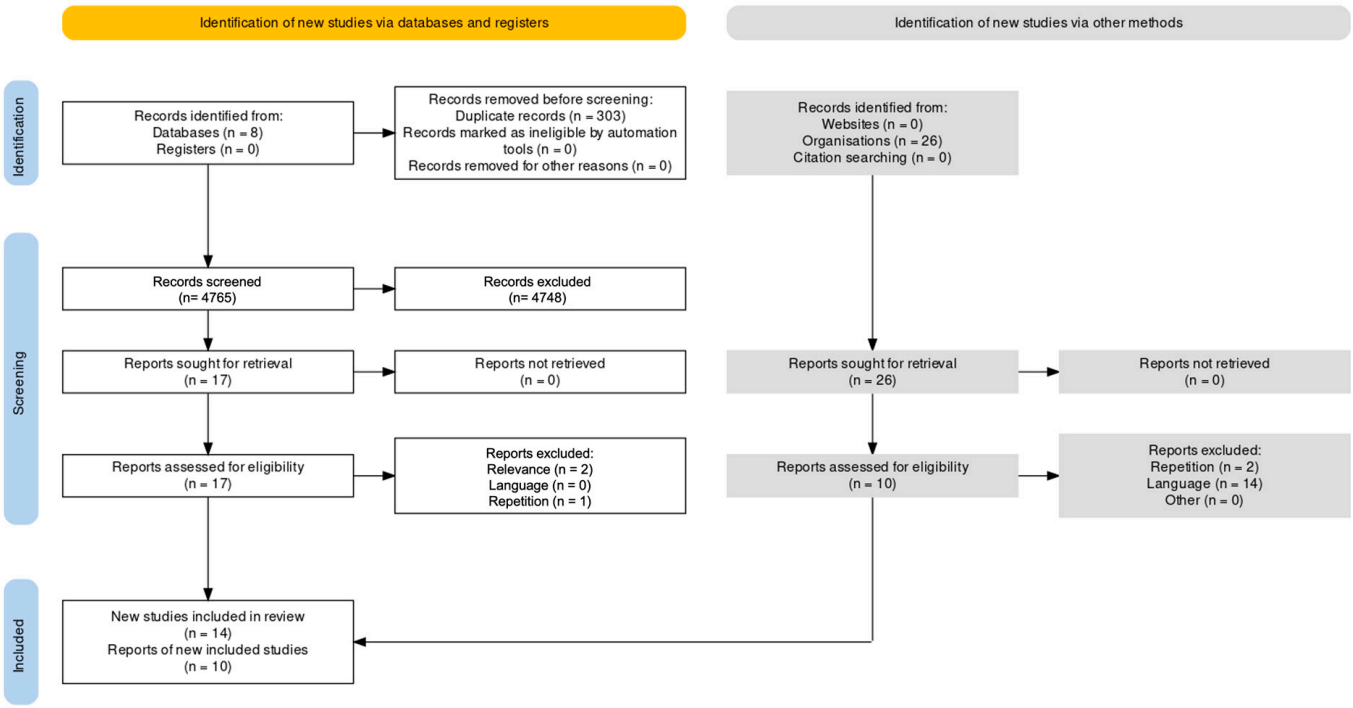


Figure 1. PRISMA flowchart.

2.7. Data Charting

Charting of the data included title, author(s), date of publication, and country/organization of origin. Data regarding adherence to ART (i.e., definitions of adherence, acceptable adherence thresholds, monitoring ART adherence, frequency of assessing adherence, barriers to adherence, interventions for barriers, and subpopulations targeted by the interventions) were also extracted.

Data extraction began with a pilot testing phase involving two reviewers for three guidelines to ensure consistent data collection. Of the remaining 21 guidelines, extraction

proceeded independently; DC extracted data from 18 guidelines, while JI extracted data from the remaining guidelines. Texts were inductively–deductively coded with qualitative analysis software (NVivo 14) [25]. Coding was assessed for correctness by a second reviewer for all included documents and data; any disagreements were resolved with a third reviewer.

2.8. Synthesis of Data

A synthesis of extracted data using content analysis [26] was produced, based on this study's objectives. Categories (i.e., definitions of adherence, adherence thresholds, monitoring ART adherence, frequency of assessing adherence, and interventions for adherence) were conceptualized in alignment with the study objectives. Subcategories and codes for these broader categories were derived inductively from patterns that emerged directly from the data. Inductive–deductive coding was performed to identify barriers to adherence, based on categories derived from a prior study [27]. Subcategories and codes were conceptualized with a moderate level of abstraction and low interpretation to remain close to the data [28].

The findings were described using frequencies and percentages, as well as tables and figures.

3. Results

3.1. The Literature Search

The main search in three databases and the gray literature search in five databases returned 4765 records after 303 duplicates were removed, of which 4748 were excluded based on the title and abstract of each record. For the 20% of records dually screened, a Cohen's Kappa of 0.77 (interpreted as substantial agreement) was obtained. Of the 17 records reviewed for full-text eligibility, 3 were excluded based on relevance (n = 2) and repetition (n = 1). A total of 14 documents from the main search and the gray literature search were included. The targeted search for omitted OECD countries found 26 documents to retrieve. These were assessed for full-text eligibility, of which 16 were excluded. Exclusion was based on repetition (n = 2) and language (n = 14), including guidelines from Australia, Austria, Chile, Colombia, Germany, the Czech Republic, Hungary, Italy, Israel, Japan, Mexico, South Korea, Poland, the United Kingdom (n = 2), and Turkey. Dual review of 20% (n = 9) of all full texts (n = 43) indicated full agreement (100%). Ten documents from the targeted search were included.

A grand total of 24 guidelines were identified (Table 2). Guidelines were from the WHO (n = 6), USA (n = 5), UK (n = 3), Canada (n = 3), France (n = 3), Europe (European AIDS Clinical Society, n = 1), Belgium (n = 1), Sweden (n = 1), and Korea (n = 1) (Table 2). Of these guidelines, sixteen focused on general HIV ART treatment; two on pregnancy; two on service delivery; one on HIV and coinfections; one on patient-centered care; one on HIV-2; and one on opportunistic infections. Twenty documents were presented as full guidelines, while four were updates. Publication years included one in 2017, two in 2018, five in 2019, two in 2020, five in 2021, seven in 2022, and two in 2023.

Table 2. A list of all included HIV clinical guidelines with the author, origin, and year of publication.

Title	Author (Abbreviated Citation)	Origin	Year of Publication
Therapeutic Guidelines for Antiretroviral (ARV) Treatment of Adult HIV Infection [29]	The Committee for Drug Evaluation and Therapy, British Columbia Centre for Excellence in HIV/AIDS (BC, 2020)	British Columbia, Canada	2020
Clinical Care Guidelines for Adults and Adolescents Living with HIV in Ontario, Canada [30]	Ontario Clinical Care Guidelines (ON)	Ontario, Canada	N/A
La thérapie antirétrovirale pour les adultes infectés par le VIH [31]	Gouvernement du Québec (QC, 2021)	Québec, Canada	2021
GPC sur la prise en charge des patients vivant avec le VIH [32]	Mokrane S., et al. (Bel, 2022)	Belgium	2022
EACS Guidelines version 11.1, October 2022 [33]	European AIDS Clinical Society (EACS) (EACS, 2022)	Europe	2022
Initiation d'un premier traitement antirétroviral [34]	Conseil national du sida et des hépatites virales et Agence nationale de la recherche (Fr, 2018a)	France	2018
Prise en charge des comorbidités au cours de l'infection par le VIH [35]	Conseil national du sida et des hépatites virales et Agence nationale de la recherche (Fr, 2019)	France	2019
Suivi de l'adulte vivant avec le VIH et organisation des soins [36]	Conseil national du sida et des hépatites virales et Agence nationale de la recherche (Fr, 2018b)	France	2018
The 2018 Clinical Guidelines for the Diagnosis and Treatment of HIV/AIDS in HIV-Infected Koreans [37]	The Korean Society for AIDS (Kr, 2019)	Korea	2019
Antiretroviral treatment for HIV infection: Swedish recommendations 2019 [38]	Eriksen J. et al. (Swe, 2019)	Sweden	2019
BHIVA guidelines on antiretroviral treatment for adults living with HIV-1 2022 [39]	British HIV Association (UK, 2022)	United Kingdom	2022
British HIV Association guidelines for the management of HIV in pregnancy and postpartum 2018 (2019 s interim update) [40]	British HIV Association (UK, 2019)	United Kingdom	2019
British HIV Association guidelines for the management of HIV-2 2021 [41]	Reeves I., et al. (UK, 2021)	United Kingdom	2021
Antiretroviral Drugs for Treatment and Prevention of HIV Infection in Adults 2022 Recommendations of the International Antiviral Society–USA Panel [42]	Gandhi R. T. et al. (US, 2022a)	USA	2022

Table 2. *Cont.*

Title	Author (Abbreviated Citation)	Origin	Year of Publication
Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV [7]	Panel on Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV (US, 2023a)	USA	2023
Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents with HIV [43]	Panel on Antiretroviral Guidelines for Adults and Adolescents, Department of Health and Human Services (US, 2022b)	USA	2022
Primary Care Guidance for Persons With Human Immunodeficiency Virus: 2020 Update by the HIV Medicine Association of the Infectious Diseases Society of America [44]	Thompson M.A., et al. (US, 2021)	USA	2021
Recommendations for the Use of Antiretroviral Drugs During Pregnancy and Interventions to Reduce Perinatal HIV Transmission in the United States [45]	Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission (US, 2023b)	USA	2023
Consolidated guidelines on HIV prevention, testing, treatment, service delivery and monitoring: recommendations for a public health approach [46]	World Health Organization (WHO, 2021a)	Geneva, Switzerland	2021
Consolidated guidelines on HIV, viral hepatitis and STI prevention, diagnosis, treatment and care for key populations [47]	World Health Organization (WHO, 2022)	Geneva, Switzerland	2022
Consolidated guidelines on person-centred HIV patient monitoring and case surveillance [48]	World Health Organization (WHO, 2017)	Geneva, Switzerland	2017
Consolidated HIV strategic information guidelines: Driving impact through programme monitoring and management [49]	World Health Organization (WHO, 2020)	Geneva, Switzerland	2020
Update of recommendations on first- and second-line antiretroviral regimens [50]	World Health Organization (WHO, 2019)	Geneva, Switzerland	2019
Updated recommendations on service delivery for the treatment and care of people living with HIV [51]	World Health Organization (WHO, 2021b)	Geneva, Switzerland	2021

3.2. The Synthesis

A summary of all scoping review categories is shown in Figure 2, and details regarding the categories, subcategories, and codes reported in each guideline are shown in Table 3. A summary matrix (Table 4) illustrates how guidelines from various countries and international health organizations recommend adherence measurement methods, frequencies,

and interventions to address barriers. Grouping by country or organization facilitated comparison between groups.

Table 3. The number of guidelines (n = 24) that reported each category, subcategory, and code.

Guideline	BC (2020)	ON	QC (2021)	Bel (2022)	EACS (2022)	Fr (2018a)	Fr (2019)	Fr (2018b)	Kr (2019)	Swe (2019)	UK (2022)	UK (2019)	UK (2021)	US (2022a)	US (2023a)	US (2022b)	US (2021)	US (2023b)	WHO (2021a)	WHO (2022)	WHO (2017)	WHO (2020)	WHO (2019)	WHO (2021b)	Total
Definition																.			.						2
Threshold																.									1
Interventions																									
Enhance knowledge and skills																									
Education	.	.	.		.	.		.		.	.		.			.	.	.	.		.	.		.	16
Provider training			.													.	.	.	.					.	6
Optimize treatment or care																									
Optimized ART	.	.	.		.			.			.	.	.	.	.	.	.	.	.				.		15
Mobile care														.		.			.						3
Support psychosocial or daily needs																									
General support		.		.	.	.					.	.	.	.	.	.		.	.		.			.	14
Mental health		.	.	.	.						.	.			.	.	.	.	.	.	.			.	14
Finance support		.			.	.										.			.						5
Harm reduction																.	.	.	.						4
Promote adherence behaviors																									
Electronic reminders		.		.				.						.		.			.	.					7
Physical reminder		.								.						.			.						4
Tailored, multidisciplinary approaches																									
Multidisciplinary		.	.		.			.			.	.				.	.	.							9
Tailored support		.						.			.					.	.		.	.					7
Targeting barriers				.							.			.		.			.						5
Barriers																									
Lifestyle factors																									
Lifestyle or activities	.	.	.		.		.	.			.			.		.		.	.		.				11
Cognitive and emotional aspects																									
Mental health	.	.		.	.		.	.			.					.		.						.	11
Beliefs and health literacy				.		.					.	.				.									5
Characteristics of ART																									
Medications	.		.		.	.				.	.	.				.			.		.	.			11
Healthcare services and system																									
Health system	.	.	.	.							.			.		.	.		.					.	10
Healthcare provider		.	.					.				.	.				.	.						.	8
Health experience and state																									
Demographic group	.			.				.			.	.				.	.	.	.						9
Co-morbidities	.		.	.			.				.				.	.		.	.						9
Social and material context																									
Social		.		.				.			.	.				.	.	.	.					.	10
Financial	.	.		.							.					.	.								6
Cultural or language				.				.								.									3

Table 3. *Cont.*

Guideline	BC (2020)	ON	QC (2021)	Bel (2022)	EACS (2022)	Fr (2018a)	Fr (2019)	Fr (2018b)	Kr (2019)	Swe (2019)	UK (2022)	UK (2019)	UK (2021)	US (2022a)	US (2023a)	US (2022b)	US (2021)	US (2023b)	WHO (2021a)	WHO (2022)	WHO (2017)	WHO (2020)	WHO (2019)	WHO (2021b)	Total
Methods																									
Clinical evaluation																									
Clinical assessment		.	.		.		.	.			.	.	.		.	.						.		.	12
Self-report			.	.			.			.									.					.	6
Tailored assessment																			.		.			.	3
Lab-based monitoring																									
Viral load/CD4 monitoring		.	.		.	.				.		.				.		.	.	.	.	.		.	13
Drug monitoring	.	.	.		.					.	.					.									7
Mutation or resistance tests		.			.						.				.										4
Medication supply and monitoring tools																									
Pharmacy records or pill count		.	.	.												.			.		.			.	7
Electronic measures								.								.									2
Frequency																									
Routine or scheduled monitoring																									
Specific intervals	.			.	.	.				.	.			.		.	.	.	.		.			.	13
Every visit	.			.						.						.		.	.						6
Context-driven monitoring																									
Suspected virologic failure	.		.		.			.		.		.				.		.							8
Pregnancy					.							.						.			.				4
Opportunistic infection															.										1

Guideline origins are abbreviated: Bel (Belgium); BC (British Columbia, Canada); ON (Ontario, Canada); QC (Quebec, Canada); EACS (European AIDS Clinical Society); Fr (France); Kr (Korea); Swe (Sweden); UK (United Kingdom); US (United States); WHO (World Health Organization). Each dot represents a code a guideline has reported, while empty boxes refer to codes that have not been reported. ART: antiretroviral therapy.

Table 4. Summary matrix of recommendations by country or international health organization. Abbreviations for each guideline are listed in Table 1.

	Frequency for Measuring Adherence	Methods for Monitoring Adherence	Interventions for Addressing Barriers to Adherence
Canada	• Each visit (BC, 2020) • Suspected or observed drug resistance or virologic failure (if >200 copies/mL BC, 2020; if 50–200 copies/mL QC, 2021)	• Clinical assessment and patient (ON, QC, 2021) • Self-report (QC, 2021) • Patient-reported outcome measures (QC, 2021) • Therapeutic drug monitoring (BC, 2020, ON, QC, 2021) • Pharmacy records or pill count (ON, QC, 2021) • Viral load and CD4 monitoring (ON) • Drug resistance testing (including pregnancy) (ON)	• Group or individual education (BC, 2020, ON, QC, 2021) • Counseling with nurses (including transgender people) (ON, QC, 2021) • Multidisciplinary teams (ON, QC, 2021) • Lower pill burden or switching therapy (BC, 2020, ON, QC, 2021) • Electronic reminders (text) (ON) • Physical reminders (verbal, pill boxes, diaries, alarms) (ON) • Support services (family support, peer support, preventative health programs) (ON) • Mental health (ON) • Provider training (ON) • Combined education and counseling via texting and peer support (ON) • Address barriers (ON)

Table 4. *Cont.*

	Frequency for Measuring Adherence	Methods for Monitoring Adherence	Interventions for Addressing Barriers to Adherence
Belgium	• Each visit	• Self-report • Pill count	• Motivational counseling • Address structural or individual barriers to ART • Electronic reminders (text messaging), telemedicine • Support services (HIV reference center, self-help groups) • Psychosocial support, peer support
European AIDS Clinical Society (EACS)	• 3–6 months after initiation, or 1–2 months in pregnancy • Suspected or observed drug resistance or virologic failure	• Therapeutic drug monitoring • Clinical assessment • HIV mutation or resistance tests • Viral load monitoring	• Group or individual education • Lower pill burden or switching therapy • Multidisciplinary teams • Support services (social) • Mental health and addiction support
France	• Every 3 months, or more if viral load 200–500 copies/mL (Fr, 2018b) • At 1, 3, 6 months following initiation (Fr, 2018a)	• Clinical assessment (Fr, 2018b, 2019) • Self-report (Fr, 2019) • ART toxicity, absorption, and interaction monitoring (Fr, 2018b) • Annual questionnaire for cognitive complaints (Fr, 2019) • Viral load monitoring (Fr, 2018a)	• Group or individual education (Fr, 2018a, 2018b) • Lower pill burden or switching therapies (Fr, 2018b) • Electronic reminders (messaging system) (Fr, 2018b) • Multidisciplinary team (Fr, 2018b) • Support groups (Fr, 2018a) • Financial support (Fr, 2018a)
Korea	• NA	• NA	• NA
Sweden	• Every visit • Suspected or observed drug resistance or virologic failure	• Questionnaire (InfCare, annual health survey) • Therapeutic drug monitoring • Self-report • Viral load monitoring	• Group or individual education • Physical reminders (pill boxes, diaries, or alarms)
United Kingdom	• At initiation (including pregnancy) (UK, 2022) • Suspected or observed drug resistance or virologic failure (UK, 2019) • If >50 HIV RNA or 50–399 at two weeks after initiation (UK, 2019)	• Clinical assessment (UK, 2019, 2021, 2022) • Therapeutic drug monitoring (UK, 2022) • Mutation or resistance testing (UK, 2022) • Viral load monitoring (UK, 2019, 2022)	• Education (UK, 2021, 2022) • Counseling, motivational interviewing (UK, 2022) • Lower pill burden or switching therapy (UK, 2019, 2021, 2022) • Needs assessment and tailored interventions (UK, 2022) • Multidisciplinary teams (UK, 2022) • Mental health support (UK, 2019, 2022) • Support services (peer support, peer navigation, community support, particularly with pregnant or transgender people) (UK, 2019, 2021, 2022) • Tailored towards needs (UK, 2022) • Address barriers (UK, 2022)
United States	• Every visit (US, 2022b, 2023b) • Within 6 weeks of initiation (US, 2022a) • At initiation (US, 2021, 2022b, 2023b) • In pregnancy, every 3 months; post-partum, every 2–4 weeks (US, 2023b) • Post-partum (US, 2022b) • Presence of opportunistic infections (US, 2023a) • Suspected or observed drug resistance or virologic failure (US, 2022a, 2022b, 2023b)	• Clinical assessment (US, 2022b, 2023a, 2023b) • Self-report (US, 2023a) • HIV mutation or resistance tests (US, 2023a) • Therapeutic drug monitoring (US, 2022a, 2022b) • Pharmacy records, pill count (US, 2022b) • Viral load monitoring (US, 2022b)	• Group or individual education (US, 2021, 2022b, 2023b) • Counseling or motivational interviewing (US, 2021, 2022b, 2023a, 2023b) • Combined approaches, like motivational interviewing with cognitive behavioral therapy (US, 2022b) • Lower pill burden, tailored ART, or switching therapy (US, 2021, 2022a, 2022b, 2023a, 2023b) • Healthcare provider training: cultural safety, gender-affirmative care model (US, 2021, 2022b, 2023b) • Physical reminder, pill box or calendar (US, 2022b) • Electronic reminders or virtual interventions (US, 2022a, 2022b) • Support services, including family, peer, and community (US, 2022a, 2022b, 2023a, 2023b) • Mental health (US, 2022b, 2023b) • Support for transgender and pregnant people (US, 2022b, 2023b) • Mobile clinics, home visits, or medication delivery (US, 2022a, 2022b) • Address structural or individual barriers (US, 2022a, 2022b) • Needs assessment and tailored interventions (US, 2021, 2022b) • Financial rewards, assessing, and minimizing costs (US, 2022b) • Multidisciplinary teams (US, 2021, 2022b, 2023b)

Table 4. *Cont.*

	Frequency for Measuring Adherence	Methods for Monitoring Adherence	Interventions for Addressing Barriers to Adherence
World Health Organization (WHO)	• Every visit (WHO, 2021a, 2021b) • At initiation (WHO, 2021a, 2021b) • 1–3 months after initiation and then every 3–6 months (WHO, 2021a) • 6 months after initiation (WHO, 2017) • 3–6 months in pregnancy (WHO, 2017) • Suspected or observed drug resistance or virologic failure (WHO, 2021a)	• Clinical assessment (WHO, 2021b) • Self-report (WHO, 2021b) • Pharmacy records or pill count (WHO, 2017, 2019, 2021a, 2021b) • Viral load monitoring (WHO, 2017, 2020, 2021a, 2021b) • Monitoring adherence with community health workers (WHO, 2017) • Tailored approach with a combination of methods (WHO, 2017, 2021a, 2021b) • ART toxicity, drug absorption, and interaction monitoring (WHO, 2017, 2019, 2020, 2021b)	• Group or individual education (WHO, 2017, 2021a, 2021b) • Counseling or motivational interviewing (WHO, 2017) • Behavioral skills training (WHO, 2021a) • Lower pill burden or switching therapy (WHO, 2019, 2021a) • Healthcare provider sensitivity or safe environment training (WHO, 2019, 2021a, 2021b) • Harm reduction (WHO, 2021a) • Address structural or individual barriers (WHO, 2021a) • Short treatments with opportunistic infections (WHO, 2021a) • Needs assessment and tailored interventions (WHO, 2021a) • Electronic reminders or virtual interventions (WHO, 2021a, 2022) • Financial support (food cost subsidy, food vouchers, cash transfer) (WHO, 2021a) • Support services (family, community-based groups, adherence clubs, peer support, opportunistic infection support, pregnancy and post-partum support, ART refill groups, client-led ART delivery) (WHO, 2017, 2021a, 2021b, 2022) • Psychosocial support (WHO, 2021a, 2021b) • Mobile clinics, visiting nurse, or medication delivery (WHO, 2021a, 2021b)

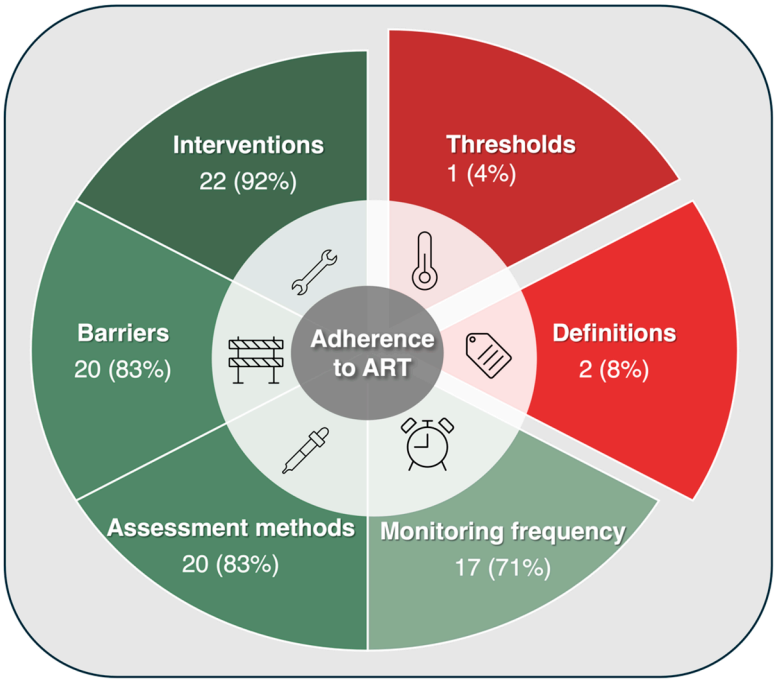


Figure 2. The number of guidelines (n = 24) that reported each category.

3.3. Definitions of Adherence: A Rarity Across Guidelines

Only two guidelines (8%) provided a definition of adherence. These included (1) "No missing dose of ART in the prior three days" [43], and (2) "The extent to which a person's behaviour—such as taking medication [. . .] corresponds with agreed recommendations from a health-care provider" [46].

3.4. Thresholds of Adherence: Missing in Action

Only one guideline document (4%) discussed thresholds for ART adherence, which mentioned that the "minimum level has not been determined, may vary according to ART regimen" [43]. Hence, no adherence threshold was proposed.

3.5. Interventions for Improving Adherence: Almost Always Present, Yet Extremely Varied

A total of 22 guidelines (92%) suggested a plethora of multifaceted adherence interventions, grouped into five subcategories. These sought to enhance knowledge and skills (*n* = 16, 67%); optimize treatment or care delivery (*n* = 15, 63%); support psychosocial and daily needs (*n* = 17, 71%); promote adherence behaviors (*n* = 8, 33%); and included tailored, multidisciplinary approaches (*n* = 13, 54%) (Table 5). On average, each guideline suggested five specific interventions (codes).

Table 5. Cross-tabulations of interventions recommended for the general population and subpopulations.

	General Population	Pregnant Women	Transgender People	People Who Use Substances
Enhance knowledge and skills *	☑	☑		☑
Optimize treatment or care delivery †	☑			
Support psychosocial or daily needs ‡	☑	☑	☑	☑
Promote adherence behaviors §	☑			☑
Tailored, multi-disciplinary approaches ~	☑			☑

* Includes education, provider training. † Includes optimizing ART, targeting adherence barriers, mobile care. ‡ Includes general support, mental health, financial support, harm reduction. § Includes electronic reminders, physical reminders. ~ Includes tailored or combined approaches, targeting barriers, and multidisciplinary support.

3.5.1. Enhance Knowledge and Skills

Education (16, 67%) referred to any individual or group instruction or training. Topics included potential side effects of ART (*n* = 6), the importance of ART (*n* = 5), interactions (*n* = 1), integrating ART into one's lifestyle (*n* = 1), behavioral skills training (*n* = 1), and how to take ART (*n* = 1). Non-specific education was advised by 11 guidelines. Further, individually adapted education was proposed by two guidelines. Education to address pregnancy-associated adherence challenges was also recommended (*n* = 2).

Provider training (6, 25%) was the delivery of training or feedback to providers that helped to ensure culturally safe care, optimal ART regimens, and service quality. Training to create a culturally safe environment (*n* = 4) included the provision of stigma-free care, gender-affirmative care, linguistically or culturally appropriate care, and a patient-centered experience. Training providers for optimal care was reported by three guidelines. Receiving feedback on service quality (*n* = 1) included patient concerns and evaluation of service quality through community score cards or surveys.

3.5.2. Optimize Treatment or Care

Optimizing ART (15, 63%) referred to prescribing a low pill burden regimen and adjusting ART to improve clinical outcomes. These include the initiation with or reduction to a low pill burden regimen (*n* = 8) as well as adjusting ART when people living with HIV are experiencing resistance mutations (*n* = 8), unresponsive to the current treatment (*n* = 6), or unable to tolerate the medication (*n* = 6).

Mobile care (3, 13%) involved the integration of visiting nurses (n = 2), mobile clinics (n = 1), and pharmacy delivery services (n = 1) to facilitate care.

3.5.3. Support Psychosocial or Daily Needs

General support (14, 58%) included any form of adherence support, including peer support (n = 10), community support (n = 7), or family-based support (n = 3). Further, enhanced non-specific adherence support was suggested by three guidelines for transgender people living with HIV, while two guidelines highlighted this need for pregnant women living with HIV.

Mental health (14, 58%) referred to tools to address emotional, psychological, and social well-being. These included various forms of counseling (n = 11), psychosocial support (n = 5), screening for or treating depression (n = 4), and cognitive behavioral therapy (telephone or in-person) (n = 3). Counseling topics included but were not limited to substance use, alcohol use, and social barriers. Types of counseling included general adherence counseling (n = 5), motivational interviewing (n = 3), peer counseling (n = 2), and nurse-led counseling (n = 1).

Financial support (5, 21%) referred to providing resources or treatment options to limit financial burden. These included minimizing out-of-pocket ART-related expenses for people living with HIV (n = 2), incentives (n = 1), decreasing the use of tests with limited clinical value (n = 1), subsidies for food-insecure settings (n = 1), and finding or providing financial support (n = 1).

Harm reduction (4, 17%) described approaches to reduce substance use. This can include opioid substitution therapy with methadone or buprenorphine (n = 2) and directly observed therapy (n = 1).

3.5.4. Promote Adherence Behaviors

Electronic reminders (7, 29%) referred to devices that reminded people living with HIV to take ART, which included phone or text messages (n = 3), reminder devices (n = 3), and online platforms (i.e., websites or applications) (n = 3). Reminder devices included alarms, electronic diaries, and phone calls.

Physical reminders (4, 17%) referred to any non-electronic ART reminder aids, such as pill box organizers (n = 3) and calendars (n = 1).

3.5.5. Tailored, Multidisciplinary Approaches

Multidisciplinary support (9, 38%) involved the integration of multiple healthcare providers in HIV care to address various adherence barriers. One guideline recommended a multidisciplinary team, which included clinicians, nurses, nurse practitioners, social workers, pharmacists, physician assistants, mental health professionals, health educators, nutritionists, and patient navigators. Another (n = 1) included nurses, pharmacy, and social work, while others (n = 7) did not specify the types of healthcare providers that should be involved.

Tailored or combined approaches (7, 29%) included any single intervention or combination of interventions that addressed the specific beliefs, concerns, or needs of each person living with HIV. Four guidelines reported tailoring ART to needs and barriers, one highlighted tailoring adherence assessments to optimize ART prescribing, and one described targeted advertisements or information (social networking apps, websites). Combined interventions included education and/or counseling with text messages and peer support for general adherence support (n = 1); another suggested motivational interviewing with cognitive behavioral therapy to address substance use or risky sexual behavior (n = 1).

Targeting barriers (5, 21%) included identifying any personal, interpersonal, or structural barriers to adherence. Three guidelines reported the need to address structural

barriers, such as the social, legal, and political environment that contributed towards HIV transmission and factors that limit ART access or receipt. Addressing individual barriers related to co-morbidities or ART-related barriers (n = 2) and interpersonal barriers (n = 1) was also recommended.

3.6. Barriers to Taking ART: A Spectrum Across Guidelines

A wide array of barriers to taking ART was reported by 20 guidelines (83%), spanning six subcategories: lifestyle factors (n = 11, 46%), cognitive and emotional aspects (n = 12, 50%), characteristics of ART (n = 11, 46%), healthcare services and systems (n = 14, 58%), health experience and state (n = 12, 50%), and social and material context (n = 11, 46%).

3.6.1. Lifestyle Factors

Lifestyle or activities (11, 46%) described individuals' behaviors, routines, and choices. This includes alcohol or substance use (n = 8), forgetting (n = 1), being away from home (n = 1), and routine or schedule (n = 2).

3.6.2. Cognitive and Emotional Aspects

Mental health (11, 46%) included illnesses or symptoms related to emotional or psychological well-being, such as depression (n = 11), general mental health issues (n = 7), anxiety (n = 3), and stress (n = 2).

Beliefs and health literacy (5, 21%) related to negative thoughts about ART or HIV. These included negative beliefs regarding ART's importance (n = 3), limited health literacy regarding ART (n = 2), and negative beliefs about their HIV diagnosis (n = 1).

3.6.3. Characteristics of ART

Medications (11, 46%) were ART-related barriers. These included side effects (n = 8), pill burden or polypharmacy (n = 4), and drug–drug/drug–food interactions (n = 3).

3.6.4. Healthcare Services and Systems

Health system (10, 42%) referred to any structural barriers of the healthcare system that prevent access to ART. These included unspecified structural barriers (n = 6) but also distance to the clinic or lack of transportation (n = 2), lack of drug coverage or insurance (n = 2), and pharmacy stock-outs or limited pharmacy hours (n = 2).

Healthcare provider (8, 33%) was related to the quality of HIV provider care. These barriers included a poor clinician–patient relationship (n = 7), a lack of shared decision-making (n = 2), a lack of gender-affirming care (n = 2), and a negative attitude towards medical pluralism or alternative medicine (n = 1).

3.6.5. Health Experience and State

Demographics (9, 38%) described any subpopulation of people living with HIV at greater risk of non-adherence to ART compared to general people living with HIV. Subpopulations mentioned included women (n = 8), transgender persons (n = 3), people experiencing homelessness (n = 1), people involved with the criminal justice system (n = 1), and other vulnerable groups (n = 1).

Co-morbidities (9, 38%) referred to health conditions other than HIV that can impede adherence, including opportunistic infections (i.e., tuberculosis, HCV) (n = 8), neurocognitive disorders (n = 3), and menopausal symptoms (n = 1).

3.6.6. Social and Material Context

Social (10, 42%) included interactions, norms, or social structures, such as HIV status disclosure (n = 6), lack of social support (n = 6), stigma (n = 5), privacy and confidentiality

(*n* = 3), gender roles (*n* = 3), intimate partner violence (*n* = 2), and issues related to social identity (*n* = 2).

Finances (6, 25%) concerned a lack of economic resources. These encompassed housing insecurity (*n* = 6), food insecurity (*n* = 5), general financial hardship (*n* = 5), and medication costs (*n* = 2).

Culture or language (3, 13%) referred to any cultural or language barriers between people living with HIV and healthcare providers.

3.7. Methods for Assessing Adherence: Common, Yet Unstandardized

Twenty guidelines (83%) recommended diverse methods to assess adherence, classed within three subcategories. They ranged from clinical evaluation (*n* = 15, 63%), lab-based monitoring (*n* = 16, 67%), and medication supply and monitoring tools (*n* = 8, 33%). On average, each guideline recommended three specific methods for assessing adherence.

3.7.1. Clinical Evaluation

The clinical assessment (12, 50%) of adherence encompassed evaluating adherence (i.e., asking people living with HIV to name their medications, disclose lapses in adherence, and estimate adherence) (*n* = 7), ART toxicity, absorption, and interactions (*n* = 4), and adherence barriers (*n* = 2).

Self-report (6, 25%) referred to a structured adherence assessment via questionnaire (including patient-reported outcome measures or PROMs) or interview. Three guidelines presented self-report as a simple and feasible tool in clinical practice, while PROMs were suggested in two. One guideline mentioned a PROM developed in Québec, Canada, that gauged adherence at 3, 7, and 30 days and explores reasons for non-adherence. Another guideline proposed the InfCare HIV, an annual PROM and patient-reported experience measure (PREM) that should be interpreted alongside biomarkers.

A combination of tailored approaches (3, 13%) for assessing adherence was also recommended. These included self-report with pill counts (*n* = 1), a combination based on human and financial resource capacity (*n* = 1), and non-specific tailored approaches (*n* = 2).

3.7.2. Lab-Based Monitoring

HIV viral load or CD4 T-cell monitoring (13, 54%) involved laboratory-based monitoring of viral load and CD4 cells. Eight guidelines suggested the use of HIV viral load measurements, and one reported CD4 counts with viral load. In pregnancy, viral load was recommended in three guidelines, while CD4 count measurement with viral load was suggested in one.

Therapeutic drug monitoring (*TDM*) (7, 29%) included laboratory-based monitoring of ART drug levels. However, four guidelines proposed that this method should not be utilized routinely. Exceptional cases allowing for this form of monitoring may be considered in the context of suspected low adherence to ART (*n* = 4), children (*n* = 2), pregnant women (*n* = 2), malabsorption (*n* = 1), or drug interactions (*n* = 1). One set of guidelines suggested that if TDM is utilized, it should be integrated with other outcomes, including reported adherence, viral load, and HIV resistance or mutations (*n* = 1), while another recommended that TDM should be used in a collaborative manner with people living with HIV (*n* = 1).

HIV mutation or resistance tests (4, 17%) included laboratory testing of HIV genetics and phenotypes. One guideline advised that it can be used in conjunction with therapeutic drug monitoring, while another guideline highlighted resistance testing for pregnant women who acquired HIV perinatally to optimize ART.

3.7.3. Medication Supply and Monitoring Tools

Pharmacy refills or pill counts (7, 29%) gauged adherence by tracking medication pickups over time and tallying pills in medication containers, respectively. Pharmacy refill records were proposed by six guidelines, while pill counts were advised by five guidelines.

Electronic measures (2, 8%) included electronic devices used to assess adherence; however, it was noted that this is generally used in a research setting.

3.8. Frequency and Timing for Assessing Adherence: Context-Driven and Varied

A total of 17 guidelines (71%) recommended two subcategories of adherence assessments, namely, routine or scheduled monitoring (n = 13, 54%) and context-driven monitoring (n = 10, 42%). On average, each guideline recommended one frequency or timing for assessing adherence.

3.8.1. Routine or Scheduled Monitoring

Specific intervals (13, 54%) referred to a specific period for assessing adherence. Two suggested before initiation, six recommended assessments at ART initiation or renewal. Following initiation, intervals included every 3–6 months (n = 2) and 4–6 weeks (n = 1), 6 weeks (n = 1), at 1–3 months (n = 1), at 1, 3, and 6 months (n = 1), and every 6 months (n = 1).

Every visit was proposed by six (25%) guidelines, which referred to an adherence assessment at each in-person clinic appointment.

3.8.2. Context-Driven Monitoring

Suspected or observed virologic failure (8, 33%) was defined as a raised HIV viral load while on an ART regimen. Thresholds for virologic failure or drug resistance varied. Guidelines specified adherence assessment thresholds of 20–50 copies/mL (n = 1), 50–200 copies/mL (n = 3), >200 copies/mL (n = 1), and 1000 copies/mL (n = 1). Three guidelines advised assessment in the context of suspected failure to ART. One guideline suggested assessments at every 3 months for CD4 counts <200/mL or every 6 months or more frequently if the viral load is between 200 and 500 copies/mL (n = 1). Monitoring every 6 months or more frequently was also proposed if there were concerns for resistance or non-adherence (n = 1).

Pregnancy or post-partum (4, 17%) referred to adherence assessments during and after pregnancy. The following frequencies were recommended: every 1–2 months (n = 1), at 3 and 6 months (n = 1), every 3 months (for women on ART for <2 years, CD4 <300 cells/mm^3, and inconsistent adherence prior to pregnancy) (n = 1), and when viral load is >50 HIV RNA copies/mL (n = 1). For post-partum women, one guideline document proposed assessment after 2–4 weeks for those struggling with adherence.

Lastly, opportunistic infections (1, 4%) referred to adherence assessments being conducted in the presence of any opportunistic infection.

4. Discussion

This scoping review of clinical guidelines within OECD countries and international health organizations aimed to synthesize guidance on ART adherence and its management. A search was conducted of three bibliographic databases and five guideline-specific gray literature databases, supplemented by a targeted search for omitted OECD countries. A total of 24 guidelines were included and reviewed.

4.1. A Lack of Definitions for ART Adherence and Its Thresholds

Importantly, this review noted only two guidelines defined adherence to ART. The lack of definitions within clinical guidelines echoed the results of two prior systematic reviews, which stressed the need for a universal definition of adherence [52,53]. Having a consistent definition can enable comparisons of improvements in ART adherence across studies and synthesizing research [52,53]. However, the literature presents a range of definitions of adherence to ART [54], which has led to challenges when comparing study results. Hence, this review suggests that the lack of consensus around defining adherence is present within both research and the HIV clinical guidelines.

Similarly, none of the guidelines reviewed provided a formal adherence threshold, which may be due to the ongoing debate and the evolving literature on this topic. Indeed, the perception of adherence thresholds may have changed with the emergence of more effective and simpler regimens that can accommodate lower adherence. For example, two large trials showed non-inferiority for 5 days on ART, 2 days off (using efavirenz-based ART with two nucleoside reverse transcriptase inhibitors) [55], and 4 days on ART, 3 days off (based on mostly non-nucleoside reverse transcriptase inhibitors and integrase strand transfer inhibitors) compared to continuous ART regimens when examining virologic failure as a primary outcome [56]. As such, thresholds may be lower than what have been previously recommended (e.g., 95%) and may be dependent on the ART regimen. Further clouding definitions and thresholds of ART adherence, one study defined non-adherence as a 4-day treatment interruption [57], as this was considered (across multiple drug classes) to be the maximum number of days with no ART intake to maintain therapeutic coverage [58]. Despite advances in ART efficacy, the absence of standardized adherence thresholds may result from difficulties with objectively measuring adherence. The wide range of assessment methods and lack of a gold standard make it challenging to define and apply thresholds in practice [59].

Moreover, long-acting (LA) ART further complicates the identification of a threshold. LA regimens were excluded from this study because injectable cabotegravir and rilpivirine were only recently indicated for practice in March 2024 by the International Antiviral Society (IAS)-USA recommendations for people living with HIV with viremia due to ART adherence barriers [60]. Nevertheless, these advances suggest that sufficient ART adherence may be a moving target.

4.2. A Great Variety of Interventions Recommended

Most guidelines (92%) suggested interventions for adherence barriers, most commonly education, optimizing ART, and general support. There was great diversity within each type of intervention listed. For example, there were various topics within ART education, different forms of counseling, and multiple forms of adherence support. Such variation may be an attempt to meet the myriad distinct needs of people with HIV, but also because no individual adherence intervention has been shown to be more effective at addressing adherence than others [61]. As such, presenting multiple options within guidelines may allow healthcare providers to tailor interventions and target specific adherence barriers. Interestingly, few guidelines discussed tailored approaches in this study (7, 25%), despite evidence suggesting that they are more effective than a one-size-fits-all approach [62].

Additionally, few guidelines (2, 8%) recommended a combination of interventions, although this approach was supported by a separate review, which found 7 of 11 randomized controlled trials favored the feasibility and efficacy of multicomponent interventions for adherence [63]. A lack of representation of combined interventions in the guidelines reviewed may be a result of incongruent results across studies [63].

4.3. Reported Barriers to Adherence: Consistent with the Literature

Barriers to adherence were noted by most (20, 83%) clinical guidelines. Several barriers reported in this review were also acknowledged in a prior systematic review and meta-analysis [64]. It shows that the barriers commonly affecting people living with HIV include forgetting (affecting 41% of adults), change to daily routines (28%), alcohol/substance misuse (13%), depression (16%), stigma (14%), distance to the clinic (18%), stock-outs (16%), and lack of food (13%) [64]. Furthermore, providers play a significant role in influencing ART adherence, especially through factors such as trust and satisfaction [65]. These barriers are like those identified by this review, as the most mentioned barriers by guidelines included lifestyle and activities, mental health, social barriers, health system barriers, and medication-related barriers. However, financial barriers were less commonly addressed.

4.4. A Diversity of Methods and Frequencies for Assessing Adherence

Twenty guidelines (83%) recommended methods to assess ART adherence in clinical practice, most commonly clinical assessment and HIV viral load or CD4 monitoring. Despite being commonly recommended in this work, clinical assessments have been shown in the literature to have limited accuracy, as people living with HIV may be reluctant to disclose non-adherence [66], and providers can incorrectly estimate their patients' adherence [67].

Within the literature, two reviews of ART adherence assessment found that self-report (with questionnaires and visual analogue scales) was most commonly used within research settings (71% and 86% of all studies included) [59,68], with other common methods including electronic monitoring, pill counts, and pharmacy refill data [59]. The emphasis on self-report in research contrasts with its relative underrepresentation in this review (7, 29%). The reasons for this may be due to self-report being shown to overestimate adherence levels and not provide an objective measure, which may limit its uptake by clinical guidelines [59]. The relative convenience of clinical assessment compared to a more structured self-report may also explain its limited integration. Overall, this review and the existing literature do not establish a clear gold standard [59].

A total of seventeen (71%) guidelines reported a frequency for assessing adherence, most often providing a specific interval or proposing assessment in the context of suspected or observed virologic failure. No more than eight guidelines agreed on a specific frequency, whether at suspected or observed virologic failure (8, 33%), each visit (6, 25%), or specific interval (at initiation (n = 6), every 3–6 months (n = 2)). This is supported by a review on randomized HIV clinical trials that noted no optimal frequency for measuring adherence has been established [59]. The choice of a frequency has important implications. For instance, frequent assessment may lead to stigmatization of people living with HIV, while infrequent assessment may result in missed detection of non-adherence [59]. Furthermore, adherence assessment only upon suspected or confirmed virologic failure offers no opportunity to prevent failure. Further research examining the effectiveness and acceptability of various frequencies and methods to monitor ART adherence in care may be needed.

4.5. A Need for a Consensus in Addressing Adherence

This review calls for greater consensus on a definition for ART adherence and its thresholds. Agreement regarding the methods and frequency for adherence assessment is also encouraged. Although, due to the complexity of HIV care, goals of HIV therapy, diverse needs, and preferences of people living with HIV, various ART regimens, and differences between countries in HIV management, a simple consensus may not be straightforward. Importantly, this heterogeneity poses a challenge for health systems, which rely on guidance from clinical guidelines to implement effective adherence support. As such,

greater collaboration between health systems leaders, such as decision-makers, guideline developers, clinicians, and researchers, is needed to determine the next steps in research and clinical care.

To inform this process, discussions with HIV guideline developers and experts in ART adherence could explore how adherence is perceived, prioritized, and applied in practice, particularly its definitions and thresholds. A deeper understanding is also needed of how these guidelines are interpreted and implemented by clinicians, and how they shape clinical decision-making. Furthermore, formal consensus development methods, including Delphi studies or nominal group techniques, could be applied to reach agreement [69].

4.6. Considerations of Novel Assessment Tools for Future Guidelines

Future guidelines may include validated tools to assess or predict ART adherence. For example, use of a validated PROM, such as the I-Score, could allow for a comprehensive assessment of barriers [27]. In parallel, risk stratification models could help identify those who are more at risk of experiencing adherence challenges based on sociodemographic [70] or pre-existing barriers [71]. Together, these approaches could support the development of more targeted adherence assessment tools, enabling providers to prioritize those at greatest risk of non-adherence.

5. Limitations

This scoping review is limited by its inclusion of only English and French documents, which excludes OECD guidelines in other languages. Consequently, this review may not fully reflect the global consensus on addressing ART adherence, including updates of adherence interventions published in other languages, such as Spanish [72]. However, this limitation is partly mitigated by the inclusion of international guidelines, like the WHO and EACS, which integrate perspectives from multiple non-English- and non-French-speaking countries and are available in multiple languages. Additionally, targeted search for omitted OECD countries also depended on a Google search and the responsiveness of health organizations and government contacts. Finally, this study also recognizes that newer and updated versions of HIV clinical guidelines may have been published since May 2023.

6. Conclusions

This review highlights a health systems challenge, including a lack of consensus around adherence to ART and its management. Few guidelines defined adherence, none provided a threshold, and there was little agreement on how to gauge adherence. Policy makers, healthcare providers, and researchers must place a greater emphasis on systematic approaches to monitoring and addressing adherence. Continued efforts to reach consensus on a definition of adherence, its thresholds, and methods of assessment, as well as on preventing and addressing adherence barriers, are needed to optimally support individuals' adherence to ART in HIV care.

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