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Satisfaction with HIV/AIDS treatment and care services and its associated factors among adult people receiving antiretroviral therapy in Ethiopia: a systematic review and meta-analysis

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ABSTRACT

Objective To make healthcare programmes more patient-centred and efficient in light of limited resources, it is crucial to ensure patient satisfaction. There is limited information on the overall level of satisfaction with Human Immunodeficiency Virus/ Acquired Immune deficiency syndromes (HIV/AIDS) treatment and care services in Ethiopia. This meta-analysis aimed to generate a nationwide pooled estimate of the level of satisfaction with HIV/AIDS and associated factors by combining data from primary studies to provide a general overview of the effect across the country, aiming to informed policy decisions.

Design Systematic review and meta-analysis.

Data source PubMed, Scopus, Hinari, African journals online and Google Scholar were used to locate published studies.

Eligibility criteria Observational studies assessing the level of satisfaction with HIV/AIDS care and treatment services and its associated factors among adult people living with HIV/AIDS receiving antiretroviral therapy in Ethiopia were included.

Data extraction and synthesis Two authors extracted the data using a pre-established data extraction format and exported it to Stata V.17 for analysis. The Cochran-Q and I^2 test statistics were used to measure the statistical heterogeneity among included studies. A random-effects meta-analysis model with the Der Simonian-Laird method was used to estimate the pooled effect size of satisfaction with HIV/AIDS care and treatment services with its 95% CI. Small study effects were assessed using Egger's regression test at a 5% level of significance. A meta-regression analysis and a leave-one-out sensitivity analysis were also conducted.

Results 24 studies were included. The pooled level of satisfaction with HIV/AIDS treatment and care services in Ethiopia was 69.7% (95% CI 63.8, 75.5%) with a significant level of heterogeneity (I^2=98.0%; p<0.01). Addis Ababa city administration has the highest (83.9%; 95% CI: 79.9%, 87.9%) level of satisfaction and Southern Ethiopia has the lowest (64.5%; 95% CI: 51.3%, 77.8%). Even though variables were measured differently across primary studies and challenged to pool the effect estimates, most of the reviewed studies revealed satisfaction with HIV/AIDS care and treatment services was related to waiting times and the duration of receiving HIV/AIDS care. Moreover, this meta-analysis found gender (OR=1.11, 95% CI: 0.73, 1.69) and residence (OR=1.10, 95% CI: 0.72, 1.69) had no significant association with satisfaction with HIV/AIDS care and treatment services.

Conclusions More than two-thirds were satisfied with HIV/AIDS treatment and care services in Ethiopia. The findings showed the presence of regional differences in satisfaction with HIV/AIDS treatment and care services. The finding suggested that policy-makers and healthcare administrators should focus on empowering patients to make treatment decisions, pay attention to areas of service provision that affect HIV/AIDS care and treatment services and make strategic plans for effective and better-quality services.

PROSPERO registration number CRD42023438589.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This systematic review and meta-analysis was registered in the International Prospective Register of Systematic Reviews.
⇒ This systematic review and meta-analysis followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines to describe the rationale and aims of this study, the methods that were used in identifying studies and compose the report.
⇒ The study provided up-to-date and comprehensive evidence on adult level of satisfaction with HIV/AIDS care and treatment services in Ethiopia, offering valuable insights for improving healthcare facilities' quality of care.
⇒ The systematic review concentrated on observational studies, primarily cross-sectional, which do not establish a real cause-and-effect relationship between the factors and outcome variables.
⇒ Due to the absence of data in some regions of Ethiopia, including Afar, Benishangul-Gumuz, Gambella and Somali region, the study's pooled prevalence estimates could not be an accurate representation of the conditions in those regions.

INTRODUCTION

The HIV, which has killed 40.4 million people worldwide, continues to be a serious global public health problem. The WHO estimates that at the end of 2022, about 39.0 million people living with HIV/AIDS (PLWHA) worldwide, with 25.6 million of them living in the WHO African Region.[1] The number of patients receiving antiretroviral therapy (ART) increased from 7.7 million in 2010 to 29.8 million by the end of December 2022. Globally, the use of ART has demonstrated impressive results, with a reduction in HIV/AIDS-related deaths and new infections of 45% and 23%, respectively, over the previous 10 years.[2]

In December 2020, the Joint United Nations Programme on HIV/AIDS (UNAIDS) released a new set of ambitious targets that require 95% of all individuals living with HIV to be aware of their status, 95% of all individuals receiving ART to be receiving treatment, and 95% of all individuals receiving treatment to have viral suppression by 2025.[3] Furthermore, UNAIDS set a global goal to end the AIDS epidemic as a threat to public health by 2030, with the three zeros vision: zero deaths, zero new infections and zero discrimination.[3–5] Despite these international initiatives, low-income and middle-income countries still have difficulties ensuring treatment success, adherence to HIV treatment, retention in care and optimal patient satisfaction.[6–8]

In response to the HIV/AIDS epidemic, the Ethiopian government took action as early as 1985. As a result, the Federal Ministry of Health of Ethiopia (FMOH) has been executing a sector-wide reform to raise the standard and accessibility of ART care services in medical facilities across the nation.[9] According to the FMOH, ART programme's rapid expansion in Ethiopia has dramatically decreased the number of AIDS-related deaths, with a 52% decrease in AIDS deaths in 2019 compared with the level in 2010. Similarly, of the total 79% of estimated PLHIVs that knew their status during 2019, 90% of them were taking ART of which 91% of them had viral suppression.[9 10] Thus, the ART programme's rapid expansion offered a once-in-a-lifetime chance to quickly scale up HIV/AIDS prevention, care and treatment services. The expansion of ART access has received much attention, and adherence to treatment plans[11] and virological suppression[12 13] are important factors that determine ART effectiveness.

Patient satisfaction, which has been widely described as the 'cognitive and emotional response to the elements of care delivery and service,[14]' is a sign of the quality of medical services and a significant predictor of overall health outcomes.[15–17] In the medical sector, a key performance and outcome assessment is patient satisfaction with healthcare services. To make healthcare programmes more patient-centred and efficient in light of limited resources, it may be helpful to assess how patients rate their care. This will allow for the identification of problems and the development of solutions.[18 19] To make effective use of the healthcare system's limited resources, it is crucial to ensure patient satisfaction and high-quality care[19]; this is because patient satisfaction reflects the discrepancy between what is expected and received from the services provided.[18]

Patient satisfaction is vital for HIV management as it boosts hospital visits, drug adherence, follow-up visits and reduces disease rates. Satisfied patients adhere better to treatment plans and appointment to follow-up and seek further advice; evidence shows patient satisfaction has a strong relationship with HIV care retention[8 20 21] the quality of health services,[22] ART adherence,[20 22] better health outcome and recommendations of the service to others.[15] However, dissatisfied patients may experience non-compliance, opportunistic infections, medication resistance and negative information, potentially discouraging others from seeking healthcare.[23] Moreover, studies revealed that satisfaction with HIV/AIDS treatment and care services was affected by waiting time to see healthcare providers,[24 25] the quality of reception services,[26] time to reach health facility,[27] the interpersonal and technical abilities of providers,[25 26] problems with accessibility, lack of laboratory services, unclean health restrooms,[28] total time spent at health facility and confidentiality.[25]

Even so, there are a few studies that assessed the level of satisfaction and associated variables with HIV/AIDS treatment and care services among PLWHA in Ethiopia; these studies were restricted to a single institution, reported inconsistent and inconclusive findings, and demonstrated significant variation across various periods and geographical locations. The level of satisfaction varies across individual studies in Ethiopia, ranging from 46% in a study conducted in the health facilities of East Showa, Oromia, to 90.8% in studies conducted in Hawassa and Yirgalem.[9 28–32] Moreover, there is limited evidence that provides a comprehensive understanding of the overall level of satisfaction with HIV/AIDS treatment and care services and its associated factors among PLWHA in Ethiopia. Therefore, this study aimed to generate a nationwide pooled estimate of the level of satisfaction with HIV/AIDS and associated factors by combining data from primary studies to provide a general overview of the effect across the country, aiming to inform policy decisions. It is crucial to discuss how regional differences impact the validity and applicability of this estimate, as it could serve as a baseline for targeted studies or interventions, and the findings might aid healthcare professionals in enhancing service provision and overall health services.

MATERIALS AND METHODS

Study settings and design

This study was carried out in Ethiopia, a country in north-eastern Africa also referred to as the Horn of Africa, bordered by Kenya, South Sudan, Sudan, Djibouti, Eritrea and Somalia. Based on the most recent United Nations figures, Ethiopia's population is predicted to be 123 415 729 as of 16 July 2023, placing it second in Africa behind Nigeria.[33] As of August 2023, Ethiopia has 2 administrative cities (Addis Ababa and Dire Dawa) and 12 regional states. The 12 regional governments

are Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, Gambella, Harari, Sidama, South West Ethiopia Peoples and South Ethiopia Region. The last three regions, Sidama, South West Ethiopia Peoples' and South Ethiopia Region, were formerly included in the Southern Nations, Nationalities and Peoples Region (online supplemental figure 1). A systematic review and meta-analysis of observational studies was conducted on satisfaction with HIV/AIDS treatment and care services and its associated factors among adult people receiving ART in Ethiopia.

Protocol registration and reporting

The protocol for this systematic review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) with a registration number of CRD42023438589 on 16 July 2023. The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines were used to guide the protocol of this review to ensure our procedure is reproducible and transparent.[34] The PRISMA-Protocol 2020 guidelines were also used to describe the rationale and aims of our SRMA, the methods that were used in identifying studies (eg, inclusion criteria) and analytical details.[35]

Searching strategy and source of information

Several primary studies on the prevalence of patient satisfaction with HIV/AIDS treatment and care services provided among Ethiopian healthcare facilities were searched and discovered using international online databases (PubMed, Scopus, Hinari and African journals online) and Google Scholar was manually searched using reference lists of individual studies. No restrictions on the year of publication were applied when searching for published research.

The "AND" and "OR" Boolean operators were used to create the search query individually or in combination using the following keywords: prevalence, patient satisfaction, ART, health facilities and Ethiopia. Medical Subject Headings (MeSH) and pertinent keywords related to the research topic were used with other search strategies.

We used search terms "HIV," "AIDS," "HIV/AIDS care and treatment", ''ART", "Patient Satisfaction," "Determinants" and "Ethiopia" and their synonyms. These were verbalised as per the databases (online supplemental table 1). Two independent authors identified the appropriate studies, while the other researchers settled any disputes. To locate, arrange and remove duplicate records from the studies found using the search approach, EndNote V.X7 software was used.

Study selection and process

The CoCoPop mnemonics were used to establish inclusion and exclusion criteria for prevalence studies.[36] CoCoPop is composed of condition (the illness, symptom, prevalence or associated factors); Context refers to environmental factors, such as the geographical location, region or time period, that affect the condition's incidence or prevalence; population is a description of the characteristics that define the population. Two researchers independently examined each article in three steps to determine which ones were included: titles, abstracts and full texts of the remaining articles. The articles that fulfilled the screening were compiled together by two researchers, and disagreements were settled by consensus with the help of the other reviewers. The articles included in this systematic review and meta-analysis, which looked at the proportion of patient satisfaction with HIV/AIDS treatment and care services and its associated factors in Ethiopian health facilities, were chosen based on the criteria listed below.

Inclusion criteria

Outcomes of interest (condition)

Articles that reported on the level of patient satisfaction with the HIV/AIDS treatment and care services and its associated factors provided by the healthcare facility.

Population

Adults (people aged 18 years old or older) living with HIV/AIDS receiving ART.

Study settings (context)

Studies conducted only in Ethiopia.

Study design

All types of observational studies (cross-sectional, case–control and cohort) were included.

Language

The review included only English-language studies.

Publication status

Only published (journal articles) articles without restriction of date of publication were included.

Exclusion criteria

Articles that fail to report the main outcome of interest are excluded. Systematic reviews, brief communications, letters to the editor, comments, full qualitative research, articles that were difficult to access in full (after contacting the authors in question via email to request the complete texts), studies that do not fulfil the eligibility criteria and duplicate articles were also excluded.

Outcome measurement

For this systematic review and meta-analysis, two primary outcomes were considered. The first outcome was the pooled prevalence of patient satisfaction with HIV/AIDS treatment and care services provided by health facilities in Ethiopia, which was calculated by dividing the number of PLWHA satisfied with HIV/AIDS treatment and care services by the total PLWHA and, then multiplied by 100. The pooled OR with 95% CI was used to quantify the extent of the relationship between satisfaction with HIV/AIDS treatment and care services and the factors associated with PLWHA's satisfaction with HIV/AIDS treatment and care services, which was the second outcome. Moreover, a narrative review was done for variables with

difficulty in pooling their effect on satisfaction with HIV/AIDS care and treatment services.

Data extraction process

All the relevant data were separately gathered by two authors from the primary articles. The data were extracted using a defined data extraction format that was created as a summary table in a Microsoft Excel spreadsheet. The data extraction from each abstract and/or full text of the article that was considered eligible includes the name of the first author followed by initials, region, study area, publication year, study design, study setting, sample size, response rate and the outcome of interest (prevalence of patient's satisfaction with HIV/AIDS treatment and care services and its associated factors). The log OR for every variable was computed using the primary study findings, and data were gathered in the form of a two-by-two table for the second outcome.

Assessment of the quality of the individual studies

The Newcastle-Ottawa Scale (NOS) was used to assess the quality of the included studies in this systematic review and meta-analysis.[37] As recommended by the NOS, we evaluated the included research using the following domains: Domain 1: Selection (five stars) included the following factors: representativeness of the sample (one star), sampling technique (one star), response rate (one star) and ascertainment of exposure (two stars); domain II: Comparability (two stars) included confounding control (data/results adjusted for relevant predictors/risk factors/confounders (two stars); domain III: Outcome (three stars) included outcome assessment (two stars) and statistical tests (one star). Following the addition of all stars in each of the three NOS domains for each primary study, studies with fewer than 5 scores were considered as poor quality, those with 5–7 scores as moderate quality, and those with more than 7 scores as high quality.[38 39] Regarding the comparability domains of NOS, studies must adjust for potential confounding factors ((eg, multivariable regression models, matching or stratification techniques) that affect the level of satisfaction with HIV/AIDS treatment and care services to receive at least a 'moderate' score and be considered in the meta-analysis.[40]

An adequate sample size, power analysis and generalisability are among the sample size requirements in NOS. Sufficient statistical power and accurate estimations are made possible by an adequate sample size.[41] As a result, the sample size of almost all included studies was justified and sufficient.

For this systematic review and meta-analysis, studies having a quality score of moderate or higher were taken into consideration. On the other hand, studies classified as poor were excluded from the study because they were deemed to be of poor quality.

The quality of the primary studies was evaluated independently by the two authors. Any disagreements that might have arisen between the two authors while evaluating the quality of individual studies were resolved through conversation and with the assistance of the other authors.

Data processing and analysis

The data were exported into STATA/SE V.17 statistical software for analysis after being extracted using a Microsoft Excel spreadsheet. Heterogeneity was assessed using the p value result of the I^2 statistic and the Cochrane Q-test.[42] A $p<0.10$ denotes statistically significant heterogeneity, and values of 25%, 50% and 75% were used to categorise the heterogeneity result as low, medium and high, respectively.[43 44] Therefore, Der Simonian and Laird's pooled effect was calculated using a random effects meta-analysis model. With a 95% CI, the estimated pooled prevalence of patient satisfaction with HIV/AIDS treatment and care services was determined. To investigate differences in the prevalence across studies in the primary pooled analysis, a subgroup analysis was carried out by publication year, study setting, sample size and study regions.

To statistically evaluate publication bias, the Egger weighted regression and Begg's rank correlation test methods were used (a two-sided $p\leq0.05$ was regarded as suggestive of statistically significant publication bias), and the funnel plot was also used graphically (visually) to represent the presence of publication bias,[45] based on the presumption that, in the absence of publication bias, the effect sizes of all the studies are normally distributed about the middle of a funnel plot, the trim-and-fill analysis was also performed to evaluate for and correct any publication bias.[46] Univariate meta-regression was used for mapping the potential source of heterogeneity and sensitivity analysis was carried out to evaluate the impact of a single study on the total pooled estimate.

Regarding the second outcome, an analysis was conducted using OR with 95% CI to assess the relationship between factors linked to HIV/AIDS treatment and care services satisfaction and the first outcome. A p value of less than or equal to 0.05 was used to declare the association as statistically significant at 95% CI. Graphs, tables, texts and a forest plot were employed to display the anticipated pooled level of satisfaction with HIV/AIDS treatment and care services and its associated factors.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

RESULTS

Study selection and identification

We located a total of 9076 articles using electronic searches, which included 1176 articles from databases and 7900 studies from Google Scholar searches. Of the 1176 articles in the database, 283 were left for screening after 893 were eliminated because they were duplicates. Out of 283 articles from database searches, 209 studies

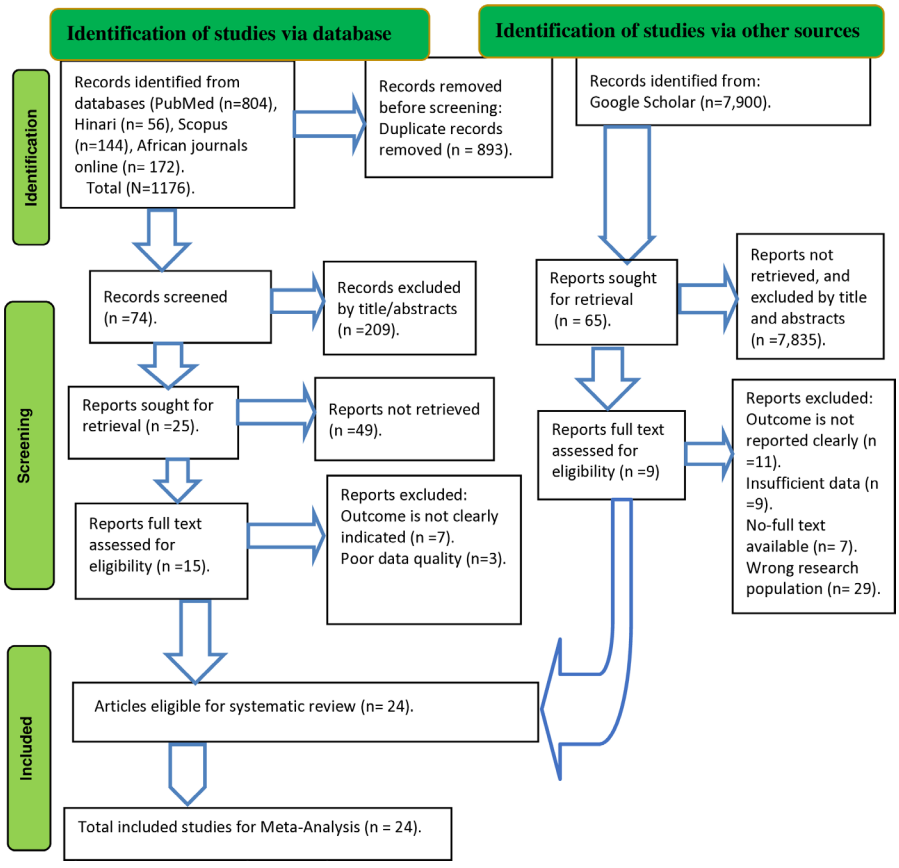

Figure 1 PRISMA flow chart of the study selection and identification process on Satisfaction with HIV/AIDS treatment and care services and its associated factors among adult people receiving antiretroviral therapy in Ethiopia. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

were excluded by looking at their titles and abstracts, 49 studies were excluded for not being able to retrieve and 10 were also excluded due to the outcome not being indicated and poor data quality. Moreover, out of 7900 articles, 7835 were excluded due to not being retrieved and excluded by title and abstracts from additional sources (Google Scholar), and after the remaining 65 articles were reviewed, 56 articles were excluded due to the outcome not being reported clearly, insufficient data, no full text available and wrong research population. Finally, 24 eligible studies have been considered in this meta-analysis and systematic review (figure 1).

Characteristics of the included studies

The 24 articles that were included were all facility-based cross-sectional studies, and they were all published. The number of participants in the included studies ranged from a low of 261 in one study in Dire Dawa, eastern Ethiopia,[47] to a maximum of 721 in a study done in the Tigray region.[28] This systematic meta-analysis included 8940 individuals who were 18 years of age or older. In various parts of the nation, the primary studies were published between 2012 and 2024. Two city administrations (Addis Ababa and Dire Dawa) and five regions of Ethiopia were included in this review.

This systematic review and meta-analysis included three studies from Addis Ababa city administration,[32 48 49] five from the Amhara region,[9 50–53] one from Dire Dawa city administration,[47] one from Harari Region,[54] five from the Oromia region,[29 55–58] seven from southern Ethiopia (by combining studies from Sidama, southeast Ethiopia and south Ethiopia regional state[11 30 31 59–62] and two from Tigray regional state.[28 63] There were no studies reviewed from Afar, Benishangul Gumuz, Gambella and Somali regional states of Ethiopia. A study conducted in the Hawassa and Yirgalem hospitals revealed the highest prevalence of satisfaction with HIV/AIDS treatment and care services (90.8%),[31] and a study conducted in the East Shoa zone revealed the lowest prevalence (46.2%).[29] While the majority of the research focused on HIV/AIDS care and treatment in general, three studies focused explicitly on ART laboratory services,[31 32 53] and three studies on ART pharmacy services.[9 49 51] When analysing the study based on the facility in which it was conducted, we found that 14 were from hospitals,[9 31 32 47–49 52–54 56 60–63] 7 were from both hospitals and health centres[11 30 51 55 57–59] and 3 were from health centres.[28 29 50]

Nearly, all studies had a high response rate (>91.6%), which might be due to the use of an interviewer-administered questionnaire for data collection. It is also important to note that almost all included studies used interview-administered structured

Table 1 Characteristics of the studies included in the systematic review and meta-analysis to show the prevalence of patient satisfaction with HIV/AIDS treatment and care services in Ethiopia

Author name	Publication year	Study area	Study region	Study setting	Sample size	Response rate (%)	Prevalence (95% CI)	Quality Score
Abdissa *et al*[57]	2024	Woliso town	Oromia	Both	361	100	54.6	8
Abebe *et al*[9]	2022	Gondar university	Amhara	Hospital	291	98.3	54.7	8
Addisu *et al*[50]	2020	Gondar town	Amhara	Health Centre	663	100	75.4	10
Atsebeha and Chercos[63]	2018	Shire–Endaslassie	Tigray	Hospital	422	99.5	75.2	10
Badacho *et al*[59]	2023	Wolaita zone	Southern Ethiopia	Both	615	98.4	70.7	10
Belay *et al*[31]	2013	Hawassa and Yirgalem	Southern Ethiopia	Hospital	422	100	90.8	7
Belete *et al*[51]	2023	Dembia district	Amhara	Both	308	100	76.95	9
Doyore and Moges[11]	2016	Hossana Town	Southern Ethiopia	Both	301	100	70.1	7
Eshetu *et al*[47]	2013	Dire Dawa	Dire Dawa	Hospital	261	91.6	54.6	6
Gezahegn *et al*[55]	2021	Jimma Town	Oromia	Both	383	100	85.5	9
Girmay *et al*[49]	2020	Addis Ababa	Addis Ababa	Hospital	285	100	78.9	9
Habtamu *et al*[56]	2017	Western Wollega Zone	Oromia	Hospital	266	95.8	57.6	8
Halili *et al*[62]	2024	Hadiya Zone	Southern Ethiopia	Hospital	422	100	53.1	10
Mekonnen *et al*[54]	2021	Harar town	Harari	Hospital	413	98	76.9	10
Mindaye and Taye *et al*[32]	2012	Addis Ababa	Addis Ababa	Hospital	422	96.2	85.5	9
Nigussie *et al*[60]	2020	MizanTepi University	Southern Ethiopia	Hospital	356	97.7	55.2	9
Yimer Tawiye *et al*[52]	2021	Dessie	Amhara	Hospital	375	96.5	64.1	10
Tebeje *et al*[53]	2020	Bahirdar	Amhara	Hospital	422	100	53.3	9
Tessema and Adane[28]	2015	In five zones of Tigray region	Tigray	Health Centre	721	99.03	89.6	9
Tiruneh and Woldeyohannes[48]	2021	Addis Ababa	Addis Ababa	Hospital	420	100	86.4	8
Haile Uma and Tesfaye[58]	2024	Woliso Town	Oromia	Both	334	100	81.4	10
Worku *et al*[61]	2020	Dilla town	Southern Ethiopia	Hospital	270	100	65.2	8
Yakob and Purity Ncama[30]	2016	Wolaita Zone	Southern Ethiopia	Both	485	99.5	46.4	9
Yilma *et al*[29]	2021	East Shoa Zone	Oromia	Health Centre	398	100	46.2	10

questionnaires.[9 11 28–32 47 49–57 59–61 63] While few studies used a mixed method to collect the data (ie, both document review and interview),[48 58 62] most used exit interviews to assess the level of satisfaction (table 1). Studies that rely highly on exit interviews might have an impact on the outcome variables due to the social desirability bias and need to be interpreted with caution. Therefore, assessing the level of satisfaction of patients on their last experience might result in the outcome variables being overestimated or underestimated.

Regarding the quality assessment, we have used NOS. Based on the quality assessment NOS score, we found that all research included in this systematic review and meta-analysis had reliable methodological quality, with scores ranging from 6 to 10 out of a possible 10 NOS points (online supplemental table 2).

META-ANALYSIS

Level of satisfaction with HIV/AIDS treatment and care services

The level of satisfaction with HIV/AIDS treatment and care services varied significantly across studies, as evidenced by the high and significant heterogeneity among the included studies (I^2=98.1%, Q=1175.4, df=23, p<0.01).

To estimate the pooled level of satisfaction with HIV/AIDS treatment and care services among PLWHA receiving ART in Ethiopia, a random-effect analysis model was employed. The pooled level of satisfaction with HIV/AIDS treatment and care services in Ethiopia was 68.7% (95% CI: 62.8%, 74.6%) (figure 2).

Publication bias

Begg's and Egger's regression tests were used to declare the presence of publication bias objectively,

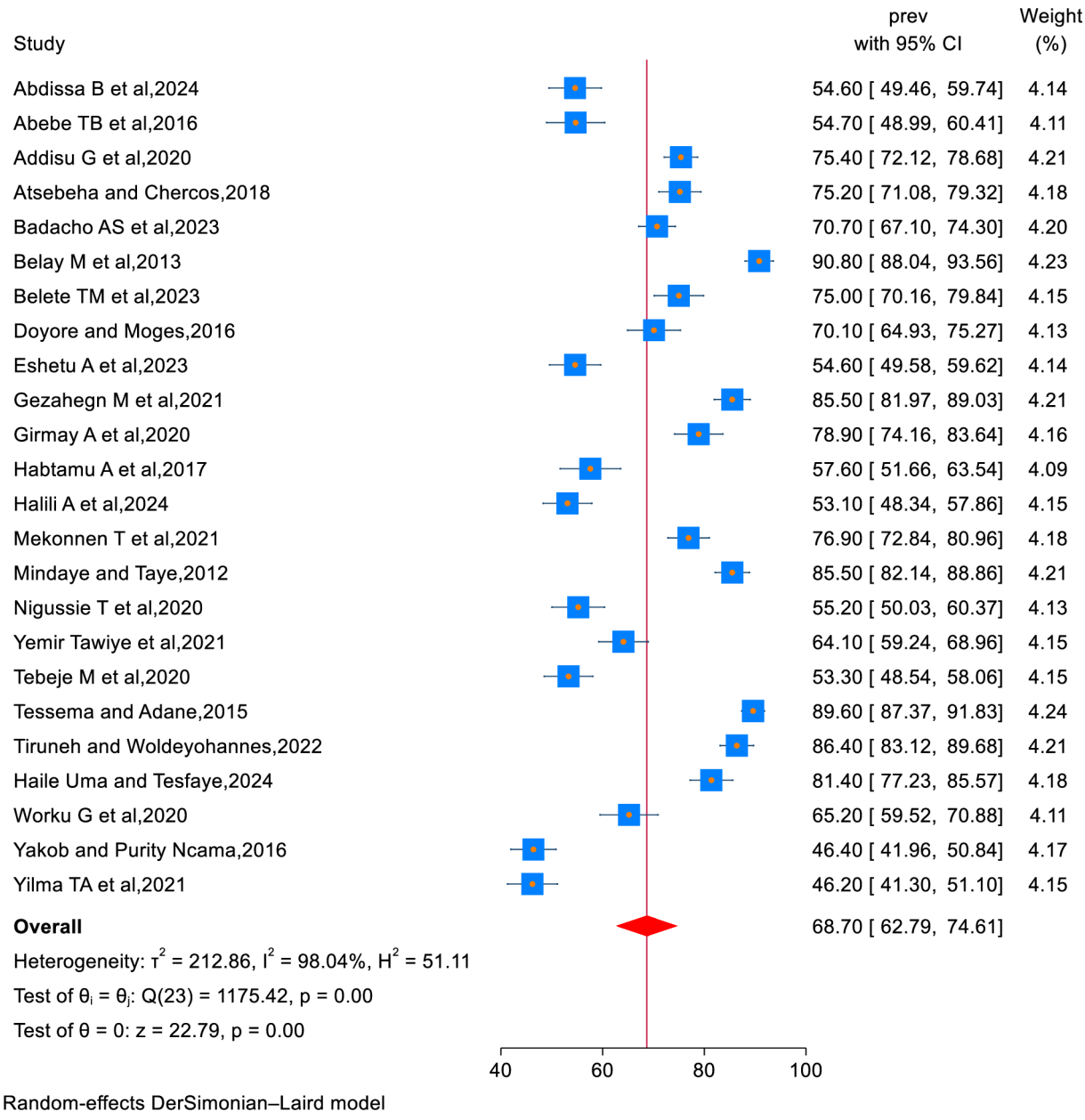

Figure 2 A forest plot showing the pooled prevalence of satisfaction with HIV/AIDS treatment and care services and its associated factors among adult people receiving antiretroviral therapy in Ethiopia.

while the presence of possible small study effects was checked by using a funnel plot by visual inspection. The Egger's tests (p<0.01) and Begg's tests (p<0.01) revealed significant publication bias among the included studies. The asymmetrical distribution in a funnel also indicated there are a small-study effects (figure 3). Thus, to account for this publication, bias trim-and-fill analysis was employed.

Trim-and-fill analysis

The non-parametric trim-and-fill analysis was employed to estimate the potential number of missing studies by minimising and correcting the publication bias in the studies. Only one study was imputed for missing study during the analysis, and the estimated pooled level of satisfaction with HIV/AIDS treatment and care services among PLWHA in Ethiopia appeared to be 69.7% (95% CI: 63.8%, 75.5%) after accounting for publication bias. This value slightly differs from the unadjusted pooled prevalence of patient satisfaction with HIV/AIDS treatment and care services in the random effect model (online supplemental figure 2).

Subgroup analysis

Subgroup analyses were conducted by study region, and year of publication, and included sample size to identify the potential source of study heterogeneity (table 2). The subgroup analysis by region revealed that the highest pooled proportions of patient satisfaction with HIV/AIDS treatment and care services were found in the Addis Ababa city administration (83.9%, 95% CI: 79.9%, 87.9%;

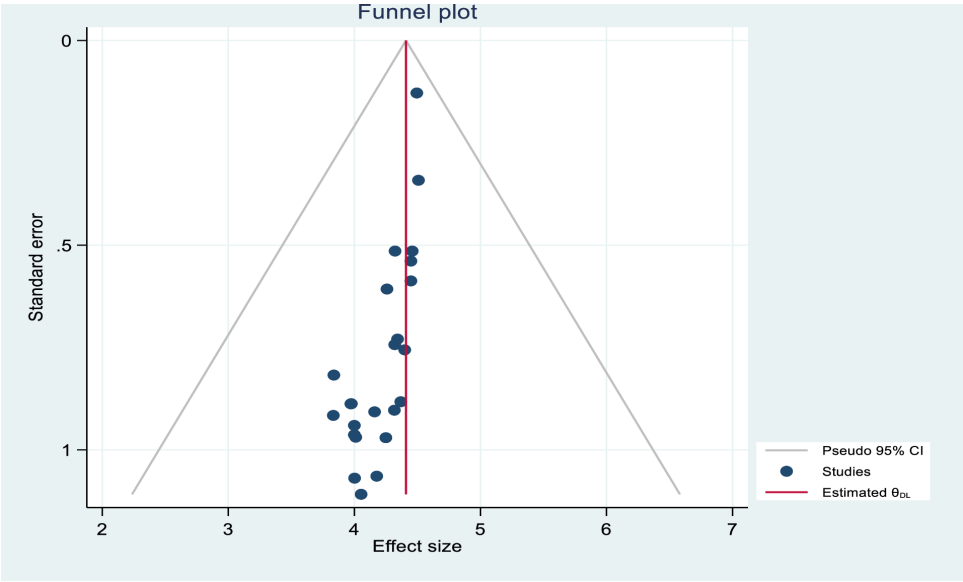

Figure 3 Funnel plot displaying the publication bias of studies reporting the pooled prevalence of satisfaction with HIV/AIDS treatment and care services and its associated factors among adult people receiving antiretroviral therapy in Ethiopia.

I^2=71.4%, p=0.03) and Tigray regional states (82.5%, 95% CI: 68.4%, 96.6%; I^2=97.3%, p<0.01), while the least was found in Southern Ethiopia (64.5%, 95% CI: 51.3%, 77.8%; I^2=98.5%, p<0.01) (online supplemental figure 3).

A subgroup analysis based on the year of publication was also conducted to ascertain whether patient satisfaction with ART services varied from year to year. We classified the years of publication before 2021 and after 2021 based on the HIV/AIDS national strategic plan for Ethiopia 2021–2025.[64] Therefore, before and in 2021, the pooled proportion of patients who were satisfied with HIV/AIDS treatment and care services was found to be 68.9% (95% CI: 61.7%, 76.3%; I^2=98.2%, p<0.01), the finding showed that the satisfaction level was roughly the same for each category of the year (online supplemental figure 4).

According to the health facility where the included studies were conducted, the pooled level of satisfaction with HIV/AIDS treatment and care services among studies conducted at the health centre was (70.5%, 95% CI: 48.7%, 92.26%, I^2=99.2%; p<0.01), even though there was significant heterogeneity among health facilities, the pooled level of satisfaction result did not change due to the confidence intervals overlap (online supplemental figure 5).

In this meta-analysis, subgroup analysis was done by sample size. After confirming that the data was approximately normally distributed, without significant outliers and not skewed, we used the mean to categorise the sample size into two groups. Consequently, among studies with sample sizes larger than 372, the prevalence

Table 2 The pooled estimate of satisfaction with HIV/AIDS treatment and care services among people living with HIV/AIDS, 95% CI and heterogeneity estimate with a p value for the subgroup analysis

Variables	Categories	Included studies	Pooled estimates (95% CI)	Heterogeneity (I^2, p value)
By region	Addis Ababa	3	83.9 (79.9, 87.9)	71.4%, 0.03
	Amhara	5	64.6 (55.1, 74.1)	95.4%, <0.01
	Eastern Ethiopia	2	65.8 (43.9, 87.6)	97.8%, <0.01
	Oromia	5	65.1 (49.1, 81.2)	98.4%, <0.01
	Southern Ethiopia	7	64.5 (51.3, 77.8)	98.5%, <0.01
	Tigray	2	82.5 (68.4, 96.6)	97.2%, <0.01
By publication year	≤2021	17	68.9 (62.8, 76.3)	98.2%, <0.01
	>2021	7	68.0 (57.7, 78.4)	97.6, <0.01
By study setting	Hospital	14	68.1 (64.2, 75.9)	97.8, <0.01
	Health centre	3	70.5 (48.7, 92.3)	99.2. <0.01
	Both	7	69.14 (58.7, 79.6)	97.6, <0.01
By sample size	≤372	15	65.7 (59.1, 72.4)	94.1%, <0.01
	>372	5	70.8 (62.71, 78.9)	98.6%, <0.01

of satisfaction with HIV/AIDS treatment and care services was 70.8% (95% CI: 62.7%, 78.9%; I^2=98.7%, p<0.01) (online supplemental figure 6).

Meta-regression

In order to identify the specific reasons for the observed differences among studies, a meta-regression analysis was conducted. Sample size, quality of study, response rate and publication year were all included as a covariate in the meta-regression analysis. However, the meta-regression analysis result showed that there was no statistically significant heterogeneity among included studies (online supplemental table 3).

Sensitivity analysis

The random effects model revealed no single study significantly impacted patient satisfaction with ART services, with no point estimates exceeding the 95% CI (online supplemental figure 7).

Factors associated with satisfaction with HIV/AIDS treatment and care services

This section qualitatively examined the majority of the variables related to satisfaction with HIV/AIDS care and treatment services in Ethiopia. Overall, we found that most of the studies varied in their degree of adjustment for potential confounding variables that influence the likelihood of satisfaction with HIV/AIDS care and treatment services. Moreover, there was variability in the assessment of the relationship between factors and satisfaction with HIV/AIDS care and treatment services (ie, factors were measured differently across studies as potential factors for satisfaction with HIV/AIDS care and treatment services). Because of this, it was challenging to pool and present the pooled effects of the majority of the variables linked to satisfaction with HIV/AIDS care and treatment services in Ethiopia.

Sociodemographic factors

Nearly, every included study evaluates and analyses sociodemographic aspects; depending on each factor, we attempt to qualitatively review and quantitatively analyse those studies. 11 Ethiopian studies that were part of this systematic review and meta-analysis examined the relationship between marital status and satisfaction with HIV/AIDS care and treatment services. The association between marital status and satisfaction with HIV/AIDS care and treatment services was statistically non-significant in seven out of eleven studies.[29 49–52 55 59] Despite using different reference groups, four studies indicated a statistically significant relationship between marital status and satisfaction with HIV/AIDS care and treatment services.[28 53 61 63] The study's findings indicated that married participants were more likely to be satisfied with the HIV/AIDS care and treatment services than unmarried participants.[53 61 63] Nonetheless, one study found that single participants were more likely to be satisfied with HIV/AIDS care and treatment services than widowed participants.[28] The association between gender and satisfaction with HIV/AIDS care and treatment services was evaluated in eight included studies; six of these studies found no significant relationship between gender and satisfaction[28 29 49 50 52 59]; only two studies[61 62] found a statistically significant relationship between gender and satisfaction with HIV/AIDS care and treatment services. Significant heterogeneity between studies was found using the random effects model estimate. According to the random effect model estimate, there is no significant association between gender and satisfaction with HIV/

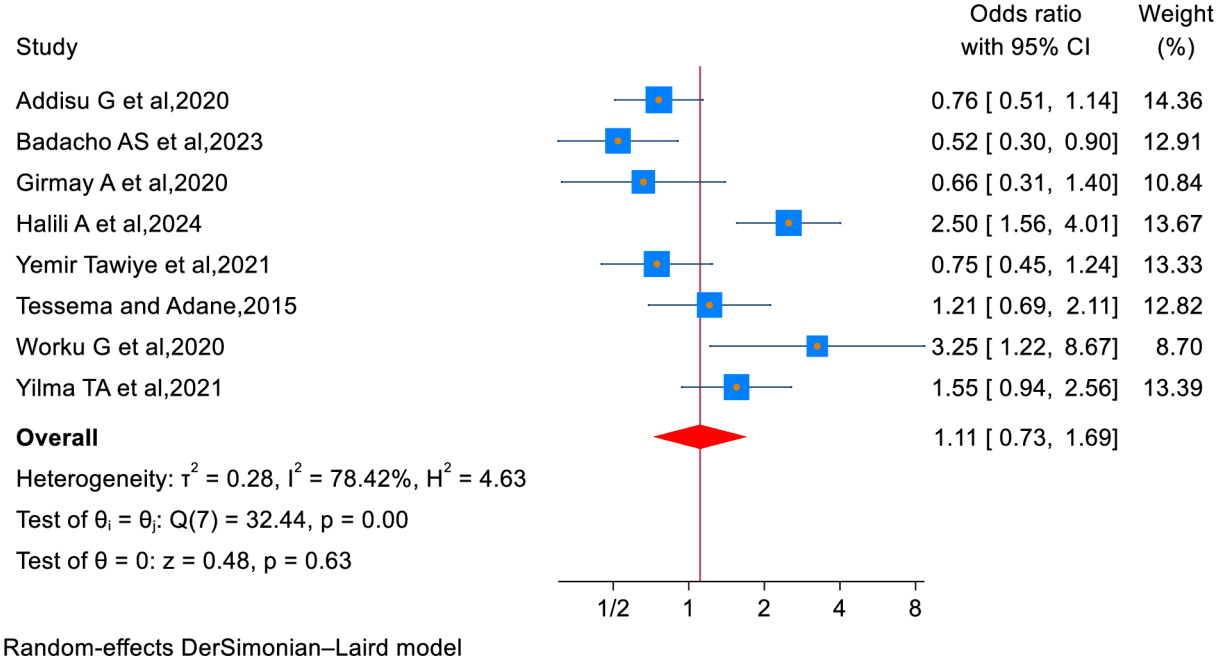

Figure 4 The association between gender and Satisfaction with HIV/AIDS care and treatment services

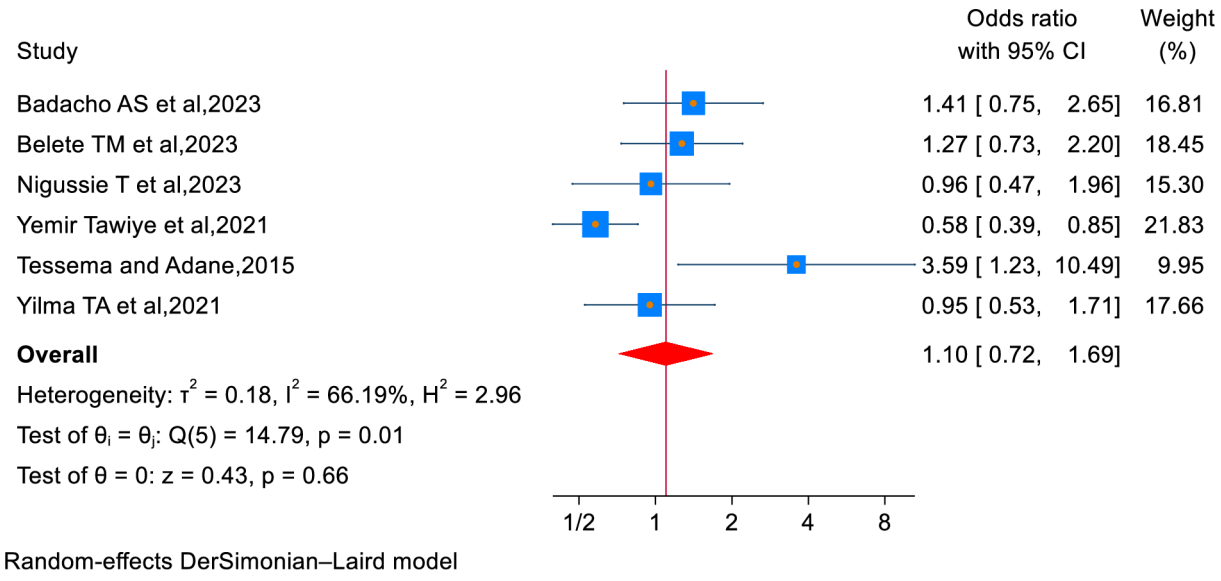

Figure 5 The association between residence and Satisfaction with HIV/AIDS care and treatment services.

AIDS care and treatment services (OR=1.11, 95% CI: 0.73, 1.69; I^2=78.4%, p<0.01) (figure 4).

12 studies examined the relationship between age and satisfaction with HIV/AIDS care and treatment services; 8 of these studies found no significant relationship between age and satisfaction with these services,[28 29 49 51 55 59–61] while 4 studies found a significant relationship between age and satisfaction.[48 50 52 63] Results from the research[63] indicated that the 36–45 age group is more likely to be satisfied than the 18–25 age group. This is consistent with findings from studies,[48 50 52] which also showed that patients over 35 years old were linked to higher levels of satisfaction with HIV/AIDS care and treatment services. Six studies evaluated the association between place of residence and satisfaction with HIV/AIDS care and treatment services; two of these studies[28 52] found a statistically significant relationship, while four of the studies found no significant relationship. The pooled effect of these six studies showed residence of the participants had no significant association with satisfaction with HIV/AIDS care and treatment services (OR=1.10, 95% CI: 0.72, 1.69; I^2=66.2%, p<0.01) (figure 5).

In Ethiopia, 15 included studies evaluated the relationship between educational status and satisfaction with HIV/AIDS care and treatment services. Of these, seven studies' results explained the non-significant relationship between educational status and satisfaction with HIV/AIDS care and treatment services,[29 48–51 55 59] and eight studies explained the significant relationship between educational status and satisfaction with HIV/AIDS care and treatment services.[11 28 52–54 57 60 61] Even though the predictor variables came in different categories, five studies[11 52 57 60 61] found that individuals who had completed primary school, and more were more satisfied with HIV/AIDS care and treatment services than those who had no education, were illiterate or were unable to read and write. The remaining three studies,[28 53 54] however, found that those who were illiterate, no formal education or did not read and write were more satisfied with HIV/AIDS care and treatment services than those who were literate, college-educated or above.

Length of stay with ART treatment and satisfaction with HIV/AIDS treatment and care services

Six of the 24 included studies examined the relationship between the duration of ART treatment and satisfaction with HIV/AIDS care and treatment. Despite varying levels of variable categories, four studies found a statistically significant relationship between satisfaction with HVI/AIDS care and treatment and the length of ART treatment. In one study, participants who had been on ART for more than 4 years reported higher levels of satisfaction with HIV/AIDS care and treatment.[54] According to one study, participants who had been on ART for more than 4 years were less likely to be satisfied with the care and treatment they received for HIV/AIDS.[55] According to two studies, individuals with HIV/AIDS who had been receiving ART for longer than 2 years were more likely to be satisfied with the care and treatment they received.[48 60] However, the other two studies reported a statistically non-significant relationship between satisfaction with HVI/AIDS care and treatment and the length of ART treatment.[29 50]

Waiting time and satisfaction with HIV/AIDS treatment and care services

To determine whether waiting time and satisfaction with HIV/AIDS treatment and care services are associated, six included studies were reviewed. There is no statistically significant relationship between waiting time and satisfaction with HIV/AIDS treatment and care services, according to one study,[56] while five[49 52 54 55 57] of the six studies found a statistically significant association between waiting time and satisfaction that have different levels of waiting time categories. Based on the results of those studies, one study indicated that those who had to

wait 30–60 min to receive treatments were less likely to be satisfied with HIV/AIDS treatment and care services than people who had to wait less than 15 min.[55] Similarly, three studies[52 54 57] found that waiting times under 30 min were more likely to result in satisfaction with HIV/AIDS treatment and care services than waiting times over 30 min. Additionally, another study found that shorter waiting times were associated with the highest likelihood of satisfaction with HIV/AIDS treatment and care services.[49]

DISCUSSION

Patient satisfaction plays a crucial role in assessing the level of service quality provided by healthcare professionals.[65 66] Assessment of patient satisfaction can also help identify unmet patient needs and targeted interventions, improve the performance of health services, and predict adherence[20 22] and treatment outcomes.[17]

In this systematic review and meta-analysis, the pooled level of satisfaction with HIV/AIDS treatment and care services among adult PLWHA in Ethiopia among studies published between 2012 and 2024 was 68.7% (95% CI: 62.8%, 74.6%) with a significant level of heterogeneity (I^2=98.0%; p<0.01). However, the estimated level of satisfaction was changed to 69.7% (95% CI: 63.8%, 75.5%) following modification with the trim-and-fill analysis due to publication bias. This result was consistent with previous studies carried out in Nigeria, where about 67.5%–77.0% of participants were satisfied with HIV/AIDS treatment and care services[8 67–69]; Uganda, where 64.2%[70]; Spain, where 71.9%[71] and China, where 67.1% of participants were satisfied with the HIV care service.[72]

The finding of this systematic review and meta-analysis was higher compared with the results of studies conducted in Vietnam, where 42.4% of patients were satisfied with all elements of their HIV/AIDS care[17]; studies carried out at various Nigerian health facilities revealed that patient satisfaction with ART services ranged from 46.9% to 52%[73 74]; a study conducted in Ukraine reported about 55.6% of the patients were satisfied with their HIV/AIDS care[75]; and studies in Pakistan showed 57.7% of PLWHA attending the HIV/AIDS clinic were satisfied with the healthcare services.[1576]

Moreover, the finding of this systematic review and meta-analysis was lower than a study done in India (92.6%),[24] a study done in Brazil where patient satisfaction with HIV/AIDS health services was 81% and 86% in hospitals and health units, respectively,[22] with another Brazilian study in which 96.7% of individuals satisfied with healthcare services after 3 months of initiation of ART,[77] and with study conducted in Russia, where 86% of the sample reported a high degree of satisfaction with HIV care delivery.[78] This finding was also lower than a prospective observational study conducted at PEPFAR-supported clinics in four African countries, in which 89.6% of PLWHIV reported being satisfied with their care,[79] with a study done in Tanzania (92.3%),[80] with a study done in South Africa (98%)[81] and Cameroon (91.2%).[82]

The possible justification for the difference in the level of satisfaction with HIV/AIDS care in this review as compared with previous studies might be due to differences in the study design, sample size, variations in the patient's clinical, sociodemographic or psychological characteristics, and the lack of a globally accepted definition of patient satisfaction or measuring methodology, health services provision, service quality, communication, information dissemination, work environment arrangements and integration of mental health services into HIV care services. Furthermore, the utilisation of different data collection methods may be the reason for the potential discrepancy between previous studies in which the current study findings might be affected by primary studies' use of interview-administered data collection methods, mainly exit interviews, which may result in biased results due to patients' recent experiences and the pressure to give positive feedback from healthcare professionals, potentially increasing satisfaction scores.[83] Assessing patient satisfaction with medical treatments is crucial for identifying unmet client needs. Therefore, strengthening support networks and enhancing the quality of care can increase patient satisfaction with HIV/AIDS treatment and care services.[84]

The primary studies included in this systematic review and meta-analysis showed statistically significant heterogeneity. As a result, a subgroup analysis was conducted. The subgroup analysis by region revealed differences in patient satisfaction with HIV/AIDS care and treatment services. The results showed that the Addis Ababa city administration 83.9% (95% CI: 79.9%, 87.9%) and the Tigray region at 82.5% (95% CI: 68.4%, 96.6%), respectively, had the highest level of patient satisfaction with HIV/AIDS treatment and care services. At the same time, the lowest were in Oromia and Southern Ethiopia, at 65.8% (95% CI: 49.1%, 81.2%) and 64.5% (95% CI: 51.3%, 77.8%), respectively. Differences in diagnostic facilities, service provision, the availability and accessibility of free medications, availability of support services, the establishment of feedback mechanism, implementation of health policy and governance, community engagement, the number of qualified and sufficient health professionals, and the integration of services may all contribute to regional variations in the level of satisfaction with HIV/AIDS treatment and care services.[85] In addition, variations in the study quality, confounding and differences in the methods used to measure the level of satisfaction with HIV/AIDS treatment and care services in the primary studies (ie, no widely accepted definition of patient satisfaction) or measurement methodology,[15] the difference in the data collection methods, and analysis techniques; might all lead to varied pooled estimates and a source of high heterogeneity. Therefore, the substantial heterogeneity in study results due to differences in outcome measures highlights the need for more precise definitions of the level of satisfaction with HIV/AIDS care and treatment services in future research, and recognising high heterogeneity can also highlight gaps in the

literature and suggest areas for further investigation. Variations in patient satisfaction with HIV/AIDS care and treatment services across regions indicate the need for context-appropriate health service delivery. Systematic interventions at the regional level to increase patient satisfaction and outcomes in HIV/AIDS care, including community engagement and policy reform, are essential in improving quality care and equal access to patients.

Besides sociodemographic characteristics, satisfaction with HIV/AIDS care and treatment services was related to waiting times and the duration of receiving HIV/AIDS care. Even though those variables were measured differently across primary studies, it was challenging to pool the effect estimates, and according to a narrative review, PLWHA were more likely to be satisfied with HIV/AIDS care and treatment services if they had received care and treatment for a longer duration and shorter waiting times. A literature review on patient satisfaction with antiretroviral treatment services supported these findings.[86] A possible explanation for the reason why patients who have been on ART for a longer time may be more satisfied with HIV/AIDS treatment and care services might be due to having had more opportunities to interact with peer support groups and counselling, which can help them develop better-coping mechanisms and mental health. Additionally, longer ART engagement denotes constant care, which promotes stability and dependability within the healthcare system.[87 88] Short waiting times for HIV/AIDS treatment and care services lead to increased patient satisfaction, reduced anxiety, improved efficiency, better continuity of care, enhanced engagement and better time management.[89] Consistent with studies that revealed that time spent in a medical facility is a significant factor in patient satisfaction.[90 91] The findings highlight the importance of wait time reduction as a top priority in the healthcare facility because long wait times might hinder patients from keeping appointments, which can result in default and nonadherence to treatments.[91]

Strength and limitation of the study

The strength of this systematic review and meta-analysis was it was registered in the PROSPERO, followed PRISMA guidelines to compose the report, and provided up-to-date and comprehensive evidence on adult level of satisfaction with HIV/AIDS care and treatment services in Ethiopia, offering valuable insights for improving healthcare facilities' quality of care.

There may be some limitations to this study which are due to the absence of data in some regions of Ethiopia, including Afar, Benishangul-Gumuz, Gambella and Somali region, the study's pooled prevalence estimates could not be an accurate representation of the conditions in those regions. Due to the high sensitivity of Cochran's Q test to the small number of studies included in the meta-analysis, our overall estimations revealed significant heterogeneity among studies, which may indicate that careful interpretation of the results is essential. One limitation of this meta-analysis is that there is no widely accepted definition of patient satisfaction or measurement methodology, as most of the included studies used a Likert scale to assess satisfaction, but they varied by categorisation to produce binary outcomes; some used mean/median, while others used percentage scores; these differences may explain the high heterogeneity of the study estimate. Not every possible aspect that could have affected satisfaction was covered in the included articles. The systematic review concentrated on observational studies, primarily cross-sectional, which do not establish a real cause-and-effect relationship between the factors and outcome variables. Despite being an issue in any meta-analysis, publication bias was found in the pooled estimates. Moreover, NOS does not assess publication bias or statistical power; even after controlling for all pertinent confounding variables, bias may still exist due to differential missing data, incorrect exposure classifications and inaccurate confounding factor measurement,[92] and this systematic review and meta-analysis's decision to include high-quality studies and exclude lower-quality studies may affect the final results and conclusions derived from the synthesis of findings; that all included studies were high-quality suggests that the assessment tool was not sensitive enough, as the tool cannot filter results if all studies are of the same quality.

Practical implications of the study

The following are some of the practical implications of the study on the level patient satisfaction and its associated factors with HIV/AIDS treatment and care services in Ethiopia: Identifying factors that impact patient satisfaction might help policy-makers and healthcare providers to identify gaps in the provision of ART services, which includes improving the quality of services, reducing the waiting time and ensuring the facilities have adequate stocks of the drugs. Achieving patient adherence to ART is critical to viral load suppression and health outcomes, and healthcare systems can improve adherence by resolving the issues of patient dissatisfaction. The findings can help develop better patient-centred care approaches. The evidence can help policy-makers in identifying areas that require patient satisfaction interventions, resource allocation and arguing for additional funding for the HIV/AIDS programmes. The research could underscore the importance of engaging patients and community members in making decisions related to their care. The findings will be helpful when conducting further research on some areas of HIV/AIDS management that satisfy the patient's needs. Furthermore, the evidence obtained from this study can not only be useful in the Ethiopian region but also for cross-cultural and cross-national comparisons of the level of patient satisfaction and its related factors in low-income and middle-income countries. Finally, there is potential for improving the quality of care and the measured health outcomes necessary to enhance the global response to HIV/AIDS.

CONCLUSION AND RECOMMENDATIONS

More than two-thirds (69.7%) of the PLWHA in this systematic review and meta-analysis were satisfied with

HIV/AIDS treatment and care services provided in Ethiopia. There were regional differences in patient satisfaction with ART services, with the Addis Ababa city administration having the highest rates and the Oromia region having the lowest. The review's sociodemographic characteristics were the most varied. There was inconsistency in the measurement of variables that related to the level of satisfaction with HIV/AIDS treatment and care services. Even though variables were measured differently across primary studies and challenged to pool the effect estimates, most of the reviewed studies revealed satisfaction with HIV/AIDS care and treatment services was related to waiting times and the duration of receiving HIV/AIDS care. Moreover, gender and residence of the participants were not significantly associated with the level of satisfaction with HIV/AIDS care and treatment services.

Therefore, the findings allow healthcare providers to identify service factors that are necessary to improve patient satisfaction in HIV/AIDS treatment and care. These factors include improving the physical environment, giving patients more control over their treatment, increasing access to medical personnel, equipment and laboratory services, and overall contributing to improved quality of life among PLWHA, adherence to ART and retention in HIV care services. Addressing regional disparities through focused interventions and community involvement can enhance HIV/AIDS care outcome and overall patient satisfaction.

To reduce HIV-related mortality, it is advised that in addition to increasing the number of patients receiving treatment, policy-makers and healthcare organisations should pay attention to aspects of service provision that may have an impact on patient satisfaction, and to make strategic plan for effective and better-quality services. It was suggested that waiting periods be reduced in order to create an environment that improves patient–physician interactions and promotes good treatment outcomes. Furthermore, due to the factors influencing patient satisfaction with HIV/AIDS care and treatment being multifaceted, more research is needed to identify additional factors, especially from the perspective of the patient, and investigate facility-specific strategies to improve the quality of HIV/AIDS care. Future studies ought to consider using mixed methods or triangulating data collection approaches to provide a more thorough understanding of patient satisfaction with ART services in Ethiopia so that policies and practices can be improved.

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