

Factors Associated With Treatment Non-Completion Among Adolescents and Young People With Substance Use Disorders in Low- and Middle-Income Countries: A Systematic Review

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Systematic Review

Keywords: adolescents, young people, substance use disorder, treatment dropout, treatment retention, low- and middle-income countries, systematic review

Posted Date: October 14th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11321098/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Treatment non-completion is common among young people receiving care for substance use disorders (SUDs), but evidence from low- and middle-income countries (LMICs) remains limited and may vary across developmental, clinical, and service contexts.

Objective

To synthesize factors associated with treatment dropout or non-completion among adolescents and young people with SUDs in LMICs, and to identify geographic and methodological gaps in the evidence.

Methods

A systematic review was conducted using PubMed/MEDLINE, PsychInfo, Embase, Global Index Medicus, and African Journals Online, supplemented by citation chaining and targeted searches. The registered protocol targeted ages 10–25 years. Two reviewers independently screened records, and risk of bias was assessed jointly using design-appropriate Joanna Briggs Institute (JBI) critical appraisal checklists. Findings were synthesized narratively because of heterogeneity in populations, treatment settings, outcome definitions, and study designs.

Results

Five studies from Brazil ($n = 3$), Mexico ($n = 1$), and Türkiye ($n = 1$), comprising 430 participants in the age-relevant samples, were included. Reported non-completion or attrition was 64.4% in one Brazilian adolescent sample and 77.3% in a Turkish adolescent inpatient sample; a Brazilian qualitative study described six of 14 adolescents as having dropped out. In a Brazilian women-specific outpatient cohort, only 13% of emerging adults remained in treatment at 104 weeks. School engagement and family involvement or support were associated with or described as facilitating retention in several studies. Cocaine/crack use was associated with higher dropout risk in two Brazilian studies. Evidence regarding psychiatric comorbidity and other substances was sparse or inconsistent. No eligible study specifically examined informal or community-based treatment, and no eligible study was identified from Sub-Saharan Africa or South Asia.

Conclusions

The evidence base for treatment retention among adolescents and young people with SUDs in LMICs is small and geographically concentrated. Educational engagement and family involvement appear to be candidate retention factors, but the evidence is observational and heterogeneous. Future studies should use age-disaggregated reporting, prospective designs, multivariable analyses, standardized definitions of treatment non-completion, and broader coverage of LMIC settings, particularly Sub-Saharan Africa and South Asia.

1. Introduction

Substance use disorders (SUDs) that emerge during adolescence or early adulthood can affect educational participation, social functioning, physical health, and later substance-related morbidity. Treatment during this developmental period therefore has implications beyond symptom reduction, including continued engagement with education, family and social relationships, and longer-term recovery.

Retention is an important component of treatment delivery because participants who discontinue treatment before the planned endpoint may receive less of the intervention than intended. However, treatment dropout should not be interpreted automatically as treatment failure, and associations between completion and later outcomes may partly reflect baseline differences in motivation, severity, social support, or treatment access.

Previous reviews have identified several factors associated with dropout among people receiving treatment for substance-related problems. Brorson et al. (2013), for example, identified younger age, personality disorder, cognitive impairment, and weaker therapeutic alliance among recurring correlates of dropout across a broad literature. More recently, Wells et al. (2024) synthesized evidence specifically among young people and reported variation in treatment completion across study designs and treatment modalities. Their findings indicate that retention is influenced by both individual and treatment characteristics, including the structure and type of intervention.

Evidence from LMICs requires separate consideration. Health systems, treatment availability, family structures, educational disruption, criminal-justice involvement, and informal or community-based care can differ substantially from the settings represented in high-income-country research. A review of substance-use treatment outcomes in Africa by Biribawa et al. (2025) illustrates the limited age-specific evidence available from the region: studies have examined treatment outcomes across broad age ranges, making it difficult to determine whether findings apply specifically to adolescents or young adults.

Developmental stage is also important. Adolescents may depend heavily on parents or other caregivers for transport, finances, consent, and treatment decisions, whereas young adults may have greater autonomy but face competing demands related to education, employment, relationships, or independent living. Educational engagement and family involvement may therefore operate differently across age groups and treatment settings.

Treatment in LMICs may also occur outside specialist services, including through community, faith-based, peer-led, or other non-specialist pathways. Such services are potentially important to understanding retention but may be less visible in bibliographic databases. A systematic review that searches only conventional clinical literature may therefore underestimate the range of treatment experiences available to young people.

The present review examines factors associated with treatment dropout or non-completion among adolescents and young people aged 10–25 years receiving treatment for SUDs in LMICs. Specifically, it asks: (1) what individual, clinical, social, and treatment-related factors are associated with non-completion; (2) which factors recur across studies; (3) what evidence exists regarding psychiatric comorbidity and specific substances; (4) what treatment characteristics are associated with retention; and (5) where are the major geographic and methodological gaps in the evidence?

2. Methods

2.1 Review design and reporting

The registered protocol specified an age range of 10–25 years.

2.2 Eligibility criteria

Eligibility was structured using a modified PECOS framework. Population: adolescents and young people with a substance use disorder. The registered protocol targeted the adolescent/young-adult population; during eligibility adjudication, studies were retained when the reported sample substantially represented this developmental population, including emerging-adult studies defining the group as 18–25 years. Wider age ranges were eligible where the target age group could reasonably be identified from the reported sample. Condition: SUD diagnosed or clinically identified using DSM or ICD criteria, a recognized clinical assessment, or a clearly described locally validated diagnostic approach. Studies using informal terminology were considered only where the treatment population and substance-related condition were sufficiently clear. Outcome: treatment dropout, attrition, premature discontinuation, non-completion, or failure to remain in treatment to the study-defined endpoint. Studies were eligible if they reported a dropout/non-completion rate or examined factors associated with retention or discontinuation. Study designs: observational quantitative studies and qualitative studies. Settings: specialist/formal services and community or non-specialist services. Geography: countries classified as low- or middle-income by the World Bank during the relevant study period.

Protocol deviations and eligibility adjudication. The registered population was aged 10–25 years. All included studies fell within the registered age range. However, Diaz’s study used the age range 8–17.

2.3 Information sources and search strategy

The available screening record indicates approximately 78 records were identified initially, 34 remained after deduplication, 19 full-text reports were assessed, and five studies were included. Because the underlying database export and search log do not contain the exact database-level counts, dates, filters, or complete strings in the current manuscript record, these details are flagged for insertion from the original search history rather than reconstructed or invented.

The original strategy used population, substance-use, treatment-dropout, and geographic concepts. The LMIC component was refined to avoid reliance solely on generic terms such as “developing country” or “resource-limited,” because eligible papers may name a country without using an LMIC descriptor. The final search appendix should document the country-name approach or validated country filter and the World Bank classification version and date used.

Scopus and CINAHL were not searched because of access or technical constraints. This limitation may have reduced retrieval of psychology, psychiatry, nursing, and multidisciplinary studies and should be stated explicitly.

2.4 Study selection

Records were imported into Rayyan and screened by two reviewers, O.A.F. and S.O.A., independently at title/abstract and full-text stages. Disagreements were resolved through discussion and consensus. No third reviewer served as an arbiter. The final manuscript should report the exact record counts and full-text exclusion reasons in the PRISMA flow diagram.

2.5 Data extraction

Data were extracted by O.A.F. and independently checked by S.O.A. Extracted variables included author and year, country, sample size, age range, sex distribution, treatment setting, study design, diagnostic approach, treatment characteristics, definition and rate of non-completion, follow-up period, factors associated with dropout or completion, effect estimates where available, and relevant methodological limitations.

2.6 Risk of bias

Risk of bias was assessed jointly by O.A.F. and S.O.A. using design-appropriate Joanna Briggs Institute (JBI) critical appraisal checklists. Andretta et al. (2014) was appraised with the JBI Analytical Cross-Sectional Studies checklist; Borges et al. (2026), Díaz Domínguez (2011), and Çelebi et al. (2026) with the JBI Cohort Studies checklist; and Vasters and Pilon (2011) with the JBI Qualitative Research checklist. Each item was judged as Yes, No, Unclear, or Not Applicable according to the information available in the full text. The reviewers discussed each item and agreed on the final judgment. JBI checklists do not prescribe a universal numerical threshold for overall risk of bias; therefore, the review reports item-level judgments and summarizes methodological strengths and limitations without converting them into an arbitrary score.

2.7 Synthesis

A narrative synthesis was undertaken. Meta-analysis was not performed because the included studies differed in participant age, sex composition, treatment setting, treatment duration, definition of completion/non-completion, follow-up period, and analytical approach. Findings were grouped into educational and individual factors, family and social factors, substance-related and clinical factors, and treatment/service characteristics. Associations are described as associations rather than causal or definitively protective effects.

3. Results

3.1 Study selection

The search identified approximately 78 records, of which 34 remained after deduplication and 19 were assessed in full text. Five studies met the final inclusion criteria. Exact record counts and full-text exclusion reasons should be reconciled against the final exported search history and PRISMA flow diagram before submission.

3.2 Characteristics of included studies

Study	Country	N	Age	Design	Setting	Outcome	Key findings
Andretta et al. (2014)	Brazil	135	12–19	Cross-sectional, correlational	Treatment linked to open juvenile-justice measures	Dropout	64.4% dropped out; not being in school, school expulsion/suspension, earlier alcohol initiation and cocaine use were associated with dropout.
Borges et al. (2026)	Brazil	125*	18–25	Retrospective observational cohort	Women-specific outpatient SUD service	Treatment dropout/retention	Among emerging adults, only 13% remained in treatment at 104 weeks; tertiary education was associated with lower dropout risk (HR 0.65), while cocaine/crack use was associated with higher dropout risk (HR 1.57).
Díaz Domínguez (2011)	Mexico	46	8–17	Prospective follow-up	Psychiatric hospital	Dropout	78% dropped out; parental SUD history and disengaged family cohesion were associated with dropout, although reported associations were not statistically significant.
Vasters & Pilon (2011)	Brazil	14	14–19	Qualitative	Specialized adolescent substance-use service	Adherence/dropout experiences	Six participants were described as having dropped out; family support, peer context, staff relationship, programme relevance and practical accessibility influenced engagement.
Çelebi et al. (2026)	Türkiye	110	14–18	Observational inpatient study	Prospective observational cohort	Completion	22.7% completed and 77.3% did not; completion was associated in bivariate analyses with open high-school enrolment, paternal education, family history of criminal charges/substance use, heroin use, parental attitude scores, family social support, and ADHD.

*Borges et al. (2026) included 756 women overall; 125 were in the emerging-adult subgroup used in this review.

The five studies were heterogeneous. Andretta et al. examined adolescents referred through a justice-related pathway; Borges et al. examined women aged 18–25 receiving outpatient SUD treatment; Díaz Domínguez examined adolescent boys in a psychiatric hospital; Vasters and Pilon used qualitative interviews in a specialist adolescent service; and Çelebi et al. studied adolescents receiving inpatient treatment. These differences limit direct comparison of dropout and completion rates.

3.3 Risk of bias and methodological limitations

The JBI appraisal identified a mixed methodological profile (Supplementary Table 3). Andretta et al. (2014) provided clear descriptions of the adolescent sample, setting, clinical measures, and outcome analysis, but did not report a clear strategy for identifying or controlling confounding. Borges et al. (2026) provided the strongest analytical control among the quantitative studies, using a theoretical DAG to identify potential confounders, multivariable Cox regression, and multiple imputation for missing covariates; however, the emerging-adult subgroup was drawn from a women-specific tertiary service, limiting generalizability. Díaz Domínguez (2011) used prospective follow-up and reported reasons for dropout, but important aspects of confounding control and handling of incomplete follow-up were insufficiently reported. Vasters and Pilon (2011) provided useful qualitative accounts of treatment engagement and reported ethical approval and participant perspectives, but did not clearly state a philosophical

perspective or researcher reflexivity. Çelebi et al. (2026) clearly described recruitment, measurement, treatment exposure, follow-up, and statistical procedures, but did not report a formal strategy for confounding control and did not clearly explain how incomplete follow-up was handled. Overall, the appraisal supports cautious interpretation of the findings, particularly because most quantitative evidence was observational and several studies relied on single-site or highly selected samples.

3.4 Factors associated with non-completion

Educational engagement emerged as one of the more consistent correlates. In Andretta et al., not being in school and having been expelled or suspended were associated with treatment dropout. In Borges et al., tertiary education was associated with lower dropout risk among emerging adults. These findings suggest that educational engagement may be relevant to retention, although they do not establish that educational participation itself causes treatment completion.

Family involvement or support was described as relevant to retention in the qualitative Brazilian study, and involved or democratic parenting was associated with completion in the Turkish inpatient study. These findings support considering family involvement as a candidate retention factor rather than an established protective intervention. The available evidence is limited because no included study experimentally tested a family-focused retention intervention.

Cocaine or crack use was associated with higher dropout risk in the Brazilian studies by Andretta et al. and Borges et al. Evidence regarding other substances was inconsistent. In the Turkish inpatient study, heroin use was unexpectedly more common among treatment completers, while ADHD was also associated with completion. These findings should not be interpreted as evidence that heroin use or ADHD improves retention; they may reflect the structured inpatient context, sample composition, treatment matching, or uncontrolled confounding.

Treatment-level evidence was sparse. The included studies differed in treatment setting and structure, and the qualitative study highlighted programme relevance, staff warmth, peer context, and practical accessibility as influences on engagement. The available evidence is insufficient to identify a specific treatment model as superior for retention.

3.5 Geographic and service gaps

The five studies were conducted in Brazil (three studies), Mexico (one), and Türkiye (one). No eligible study was identified from Sub-Saharan Africa or South Asia. This should not be interpreted as evidence that relevant research does not exist in those regions. The finding may reflect limited age-disaggregated reporting, indexing limitations, differences in terminology, or the specific treatment-dropout outcome used in this review.

No included study specifically examined informal, faith-based, traditional, peer-led, or other community/non-specialist treatment. The absence of such evidence is notable because these forms of support may constitute important routes into care in some LMIC settings.

4. Discussion

4.1 Principal findings

This systematic review identified a small and heterogeneous evidence base concerning treatment non-completion among adolescents and young people with SUDs in LMICs. Five studies comprising 430 age-relevant participants were included. Educational engagement and family involvement emerged repeatedly as factors associated with retention, while cocaine/crack use was associated with higher dropout risk in two Brazilian studies. However, the small number of studies, different treatment settings and outcome definitions, and predominantly observational designs prevent firm conclusions about causal determinants of dropout.

The inclusion of Borges et al. and Díaz Domínguez broadens the evidence base but also illustrates the importance of transparent age eligibility. Borges et al. reported 125 emerging adults aged 18–25 within a larger cohort of 756 women; the review uses the 125-person emerging-adult subgroup rather than the full cohort because the remaining participants were outside the target developmental population. Díaz Domínguez reported 46 male patients aged 8–17. Including both studies increases developmental coverage but also introduces modest boundary differences that should be reported as limitations and, where applicable, as deviations from the registered protocol.

4.2 Comparison with previous reviews

The findings are broadly consistent with wider literature showing that retention among young people is influenced by multiple interacting individual, social, and treatment characteristics. Wells et al. (2024) synthesized a substantially larger international literature and reported a pooled treatment-completion estimate across young people, while also identifying differences by treatment modality and study design. The present review differs by restricting the evidence base to LMIC settings and focusing specifically on factors associated with treatment non-completion.

The geographic concentration also contrasts with broader African treatment-outcome literature. Biribawa et al. (2025) synthesized SUD treatment outcomes across African settings but included broader age groups. The absence of eligible youth-specific studies in the present review therefore highlights a potential age-reporting and evidence-generation gap rather than demonstrating that treatment-retention research is absent from Africa.

4.3 Interpretation of family and educational factors

Family involvement and educational engagement are plausible retention targets because treatment participation may depend on practical support, transportation, communication with services, school attendance, and the ability to maintain ordinary developmental roles. Nevertheless, the present evidence cannot establish the direction or causality of these relationships. For example, adolescents who remain engaged in school may differ systematically from those who are expelled, suspended, or otherwise disengaged in ways that also affect treatment retention.

Future studies should test family-inclusive and education-coordinated retention strategies rather than assuming that associations observed in observational studies translate directly into effective interventions.

4.4 Clinical and policy implications

Clinicians working with adolescents and young people with SUDs may consider assessing educational disruption and family support as part of retention planning. Treatment teams may also benefit from coordinating, where feasible, with schools or other educational services. These implications should be understood as practice considerations supported by limited observational evidence, not as established causal recommendations.

For research and policy, age-disaggregated reporting is particularly important. Reporting outcomes separately for adolescents and young adults would allow existing studies to contribute to developmental evidence syntheses without requiring new data collection. Future LMIC research should also report treatment setting, planned treatment duration, operational definitions of completion, reasons for discontinuation, and follow-up periods in sufficient detail to permit comparison across studies.

4.5 Strengths and limitations

Strengths include a focused developmental population, inclusion of both quantitative and qualitative evidence, independent dual-reviewer screening, and searches that included regional sources such as Global Index Medicus, PsychInfo, Embase and AJOL. The review also explicitly considered community and non-specialist treatment settings rather than assuming that specialist services represent the entire LMIC treatment system.

Several limitations should be considered. First, only five studies were identified, and the evidence base remains small. Second, Scopus, and CINAHL were not searched, increasing the possibility of missed studies. Third, the geographic search component was not fully validated against a comprehensive country-name strategy. Fourth, risk-of-bias judgments were reached jointly by the two reviewers; the item-level appraisal record should be retained as supplementary material for transparency. Fifth, the included studies used different definitions and follow-up periods for dropout or completion, making direct comparison difficult. Finally, the evidence was geographically concentrated and did not include eligible studies from Sub-Saharan Africa or South Asia.

4.6 Research priorities

- Use prospective cohort designs that measure baseline severity, motivation, family support, educational engagement, comorbidity, and treatment characteristics.
- Report age-specific outcomes, particularly for adolescents and young adults, rather than combining broad age ranges.

- Use multivariable analyses to distinguish independent correlates from factors that simply co-occur with dropout.
- Define treatment completion and dropout consistently and report both the planned treatment endpoint and the observed time to discontinuation.
- Record reasons for discontinuation where ethically and practically possible.
- Evaluate family-inclusive, school-coordinated, and developmentally tailored retention strategies in controlled studies.
- Expand research to Sub-Saharan Africa, South Asia, and other underrepresented LMIC regions.
- Study community, faith-based, peer-led, traditional, and other non-specialist treatment pathways alongside specialist services.

5. Conclusion

The evidence on treatment non-completion among adolescents and young people with SUDs in LMICs remains limited. Across five studies, educational engagement and family involvement recurred as factors associated with retention, while cocaine/crack use was associated with higher dropout risk in two Brazilian studies. These findings are informative but not sufficient to establish causal or universally applicable predictors. The principal evidence gaps concern geography, age-disaggregated reporting, methodological rigor, standardized outcome definitions, and non-specialist treatment settings. Strengthening these areas would make future evidence more useful for designing and evaluating retention strategies in LMIC health systems.

Judgments were reconstructed from the full texts available to the review team and agreed jointly by the two reviewers. “Unclear” indicates that the article did not provide sufficient information to support a Yes or No judgment. These judgments are presented as the review team’s appraisal and are not claimed to reproduce any original author-provided risk-of-bias ratings.

Declarations

Ethics approval and consent to participate: Not applicable. This study is a systematic review of previously published literature and did not involve the collection of primary data from human participants.

Consent for publication: Not applicable.

Competing interests: The author declares that there are no competing interests.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Availability of data and materials: The datasets analysed during the current review are derived from previously published studies, all of which are cited within the manuscript and its reference list. The data extraction table generated during this review is available from the corresponding author upon reasonable request.

Acknowledgements: Not applicable.

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Authors' contributions: O.F and S.A both wrote the manuscript and were responsible for the conception and design of the review, literature search, study selection, data extraction. They were also in charge of risk of bias assessment, data synthesis, and drafting, editing and the revision of the manuscript. O.F. read and approved the final manuscript.

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Appendix

Stage		Records/studies		Status		
Records identified		≈78		Documented in current manuscript; exact source-level counts pending reconciliation		
After deduplication		34		Documented		
Full-text reports assessed		19		Documented		
Studies included in review		5		Documented		
Full-text reports excluded		14		Calculated from 19 assessed minus 5 included; individual reasons not present in current record		
Study	Country	Sample/age	Sex	Setting/design	Non-completion measure	Main reported factors
Andretta et al. (2014)	Brazil	N=135; 12–19	Not stated in current extraction	Justice-related treatment; cross-sectional correlational	64.4% (87/135) did not complete	Not being in school, expulsion/suspension, earlier alcohol initiation, cocaine use
Borges et al. (2026)	Brazil	n=125 emerging adults; 18–25; from cohort of 756 women	Female	Women-specific outpatient SUD service; retrospective cohort	13% remained at 104 weeks	Tertiary education HR 0.65; cocaine/crack HR 1.57
Díaz Domínguez (2011)	Mexico	N=46; 8–17	Male	Psychiatric hospital; prospective follow-up	78% dropped out	Parental SUD history and disengaged family cohesion; reported associations not statistically significant
Vasters & Pillon (2011)	Brazil	N=14; 14–19	Mostly male	Specialized adolescent service; qualitative	6 participants described as having dropped out	Family support, peer context, staff relationship, programme relevance, practical accessibility
Çelebi et al. (2026)	Türkiye	N=110; 14–18	84 male, 26 female	Prospective observational cohort; inpatient SUD treatment	22.7% completed; 77.3% did not	22.7% completed; 77.3% did not. Significant bivariate associations included education, family criminal/substance-use history, heroin use, parental attitudes, family support, and ADHD.
Study	Design		Appropriate appraisal		Current status	
Andretta et al. (2014)	Analytical cross-sectional		JBI Analytical Cross-Sectional Studies checklist		Joint appraisal completed; item-level judgments should be reproduced in Supplementary Table 3 from the original appraisal record	
Borges et al. (2026)	Retrospective cohort		JBI Cohort Studies checklist		Joint appraisal completed; item-level judgments should be reproduced in Supplementary Table 3 from the original appraisal record	
Díaz Domínguez (2011)	Prospective follow-up		JBI Cohort Studies checklist		Joint appraisal completed; item-level judgments should be reproduced in Supplementary Table 3 from the original appraisal record	
Vasters & Pillon (2011)	Qualitative		JBI Qualitative Research checklist		Joint appraisal completed; item-level judgments should be reproduced in Supplementary Table 3 from the original appraisal record	
Çelebi et al. (2026)	Observational cross-sectional/analytical		JBI Analytical Cross-Sectional Studies checklist		Joint appraisal completed; item-level judgments should be reproduced in	

PRISMA item	Location in manuscript	Final page
Title / abstract	Title; Abstract	1
Introduction: rationale / objectives	Section 1	2
Eligibility criteria	Section 2.2	3
Information sources / search	Section 2.3 + Supplementary File 1	4
Selection process	Section 2.4 + PRISMA flow	4
Data collection / items	Sections 2.5–2.6	4
Synthesis methods	Section 2.7	5
Study selection / characteristics	Sections 3.1–3.2	4
Risk of bias	Section 3.3 + Supplementary Table 3	4
Results / synthesis	Sections 3.4–3.5	5
Discussion / limitations	Sections 4.1–4.6	9
Registration / protocol deviations	Methods + PROSPERO statement	Update after final pagination
Funding / conflicts / availability	Declarations	Update after final pagination

Supplementary Table

Supplementary Table 3. Item-level JBI critical appraisal judgments

Study	JBI design	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11
Andretta et al. (2014)	Analytical cross-sectional	Yes	Yes	Yes	Yes	No	No	Yes	Yes			
Borges et al. (2026)	Cohort	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Díaz Domínguez (2011)	Cohort	Unclear	Yes	Unclear	Unclear	No	Yes	Yes	Yes	Unclear	No	Unclear
Çelebi et al. (2026)	Cohort	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Unclear	No	Yes

JBI Qualitative Research checklist: 1 congruity between philosophical perspective and methodology; 2 methodology and research question/objectives; 3 methodology and data collection; 4 methodology and data analysis/representation; 5 methodology and interpretation; 6 researcher culturally/theoretically located; 7 researcher influence addressed; 8 participants and voices adequately represented; 9 ethical approval; 10 conclusions supported by analysis/interpretation.

JBI Cohort Studies checklist: 1 groups similar/recruited from same population; 2 exposure measured similarly and reliably; 3 exposure measured validly and reliably; 4 confounding factors identified; 5 strategies to deal with confounding stated; 6 participants free of outcome at start; 7 outcomes measured validly and reliably; 8 follow-up time reported and sufficient; 9 follow-up complete or losses/reasons described; 10 strategies to address incomplete follow-up; 11 appropriate statistical analysis.

For Çelebi et al. (2026), the cohort checklist was used because the article explicitly describes a prospective observational cohort design with prospective treatment follow-up.

JBİ Analytical Cross-Sectional Studies checklist: 1 inclusion criteria clearly defined; 2 subjects and setting described in detail; 3 exposure measured validly and reliably; 4 objective, standard criteria used for measurement of condition; 5 confounding factors identified; 6 strategies to deal with confounding stated; 7 outcomes measured validly and reliably; 8 appropriate statistical analysis used.

Interpretation: The appraisal was used to identify methodological limitations and inform confidence in the narrative synthesis. It was not used to exclude studies after inclusion, and no numerical JBİ cutoff was applied.