

Brief Assessment Tools for Obsessive-Compulsive Disorders in Children: A Systematic Review

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OBJECTIVE: The objective of this study was to estimate the comparative performance of brief diagnostic assessment tools. abstract

METHODS: Data sources included articles from PubMed, the Cochrane Register of Clinical Trials, the Cochrane Database of Systematic Reviews, Embase, Cumulated Index in Nursing and Allied Health Literature (CINAHL), PsycINFO, and Education Resources Information Center (ERIC), as well as unpublished studies with reported results in ClinicalTrials.gov through May 15, 2024. Studies of children (up to age 21 years) with a clinical suspicion of obsessive-compulsive disorder (OCD) that evaluated the accuracy (predictive validity) of brief assessment tools for OCD, compared with a reference standard, were included. We extracted participant characteristics, scale and reference standard information, results, and risk of bias assessment. We performed random-effects diagnostic meta-analysis where feasible. We assessed strength of evidence for each scale.

RESULTS: There is moderate strength of evidence that the 8-question version of the Child Behavior Checklist-Obsessive Compulsive Subscale (CBCL-OCD/OCS) is sufficiently sensitive and specific (summary area under the curve [AUC], 0.84; 95% CI: 0.74-0.91) to prompt specialist referral for additional diagnostic assessment. Other tools may perform as well or better, but the current evidence is insufficient to justify broad conclusions about their performance. Limitations include few studies per scale, most of which were case-control studies, and that the presence of homogenous white populations may preclude generalizability of tool performance.

CONCLUSIONS: Based on the current evidence, the CBCL-OCD/OCS probably is sufficiently accurate to indicate which youth should be further evaluated for OCD, but more research is needed to establish whether the 8-question subscale can function as a stand-alone measure. The available evidence is insufficient for other brief assessment tools.



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Dr Adam conceptualized and designed the review, performed the literature search, designed data collection instruments and supervised data collection, performed data analysis and interpretation of data, drafted and revised the manuscript, and approved the final manuscript as submitted. Drs Freeman and Brannan assisted in conceptualization and design, helped categorize interventions and comparators, critically reviewed the manuscript, and approved the final manuscript as submitted. Drs Caputo and Kanaan collected data, including risk of bias assessments, critically reviewed the manuscript, and approved the final manuscript as submitted. Dr Balk assisted in conceptualization and design, collected data, including risk of bias assessments, critically reviewed the manuscript, and approved the final manuscript as submitted. Dr Trikalinos assisted meta-analyses and with supplemental analyses and interpretation of data, (Continued)

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INTRODUCTION

Obsessive-compulsive disorder (OCD) is a common, chronic, and impairing psychiatric disorder affecting about 3% of youth (ie, children and adolescents).¹ OCD is defined by 1 or both of 2 cardinal features: obsessions and compulsions. Obsessions are persistent thoughts, urges, or images that are experienced as intrusive and unwanted, generally related to 1 or more domains that can range from fear of illness or death to uncomfortable experiences of incompleteness or disgust. People with OCD exhibit a wide range of compulsive rituals, avoidance behaviors, and other strategies to neutralize or avoid distress and obsessional triggers. Early identification and treatment of OCD is important to prevent a cascade of developmental disruptions lasting into adulthood that can affect both function and quality of life, particularly in academic and social functioning.²⁻⁴

The 2012 American Academy of Child and Adolescent Psychiatry (AACAP) Practice Parameter recommends that, for children and adolescents undergoing psychiatric assessment, “The psychiatric assessment ... should routinely screen for the presence of obsessions and/or compulsions or repetitive behaviors,” even when not part of the presenting complaint, and “If screening suggests [obsessive compulsive] symptoms may be present, clinicians should fully evaluate the child.”⁵ The reference standard for an OCD diagnosis is a clinical interview by an expert assessing current *Diagnostic and Statistical Manual of Mental Disorders* (DSM) criteria, often augmented with a clinician-rated diagnostic tool.

However, because many practitioners do not have the expertise or the time to perform the full diagnostic interview, they identify only about 10% of cases of childhood OCD.⁶ Systemic barriers to accessing experts in assessing OCD may lead to late or missed diagnosis in children. Brief assessment tools have been proposed to be used by primary care providers evaluating youth with symptoms of OCD to facilitate early identification and specialty referral for a comprehensive diagnostic evaluation and early initiation of treatment. We undertook a systematic review (SR) focused on the diagnostic accuracy of brief assessment tools for OCD.

Objective

This review was undertaken in partnership with AACAP under the auspices of the Agency for Healthcare Research and Quality (AHRQ) and was funded by the Patient-Centered Outcomes Research Institute (PCORI). It summarizes the findings of the diagnostic accuracy of brief assessment tools compared with reference standard methods to identify OCD in symptomatic youth.

METHODS

The SR followed AHRQ Evidence-based Practice Center Program methodology, as laid out in its Methods Guide.^{7,8}

We refined the research questions, eligibility criteria (including outcomes of interest) and planned methods after discussions with diverse groups of clinical and methodological experts and patient representatives. We prospectively registered the SR protocol through International Prospective Register of Systematic Reviews (PROSPERO; CRD42023461212). This manuscript is based on a broader SR report for AHRQ, which also addressed psychological and pharmacological treatments of OCD.⁹ It is reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2020 statement, which is available in the additional materials section.

Data Sources

We searched for published studies in PubMed; the Cochrane Register of Clinical Trials; the Cochrane Database of Systematic Reviews; Embase; and the Cumulated Index in Nursing and Allied Health Literature (CINAHL), PsycINFO, and Education Resources Information Center (ERIC) databases; and, for unpublished studies, those with reported results in ClinicalTrials.gov. The searches were broad, including terms related to OCD, children, and relevant study designs (full search strategies for all databases are detailed in the additional materials section). We also scanned the reference lists of relevant SRs for potentially eligible studies. All searches were updated on May 15, 2024.

Study Selection

The explicit inclusion/exclusion criteria are detailed in the additional materials section. In brief, we included studies of children (up to age 21 years) with a clinical suspicion of OCD that evaluated the accuracy (ie, predictive validity) of brief assessment tools for OCD in children and adolescents compared with a reference standard (ie, clinical interview by an expert assessing current DSM criteria, possibly augmented by a semistructured interview using a validated assessment instrument).

A total of 8 investigators worked together to double-screen each title and abstract using Abstrackr (<http://abstrackr.cebm.brown.edu/>), an online program with machine-learning capabilities. We stopped double-screening abstracts when the predicted relevance score of the remaining unscreened papers was less than 0.40 and subsequently rejected at least 400 consecutive citations (this threshold is based on experience with several dozen screening projects and an analysis in preparation for publication). We rescreened (in duplicate) all accepted citations in full-text. At both stages, we resolved discrepancies through full-team discussion or consultation with a third investigator.

Data Extraction

Risk of Bias

One investigator extracted data and assessed risk of bias (RoB) for each study. A second investigator verified all

extractions. For RoB, we assessed specific elements from the Quality Assessment of Diagnostic Accuracy Studies 2 (QUADAS-2) tool.¹⁰ Overall RoB rating was determined in consensus among the group using the following heuristics: if the study was a single-arm study (with no control group) or was a case-control study that did not enroll a random or consecutive sample and did not report using a reference standard on all participants, the study was determined to have high RoB. If the study was not a case-control study and reported using a reference standard on all participants, RoB was low. If the study had a case-control design, but all other criteria were low, RoB was moderate. For each study, we also extracted details regarding the study design, the index and reference standard tests, participant demographics, and the sensitivity and specificity at all given cut-off points, along with any other accuracy-related data (eg, such as area under the curve [AUC], positive predictive value).

Data Synthesis

We created summary receiver operating characteristic (ROC) curves for tools in which there were at least 5 studies with sufficient data using the *diagmeta*¹¹ package in R version 4.4.1 (R Project for Statistical Computing),¹² which uses a hierarchical summary ROC model via restricted maximum likelihood for multiple cutoffs. The diagnostic meta-analysis models estimate the following 5 parameters: mean sensitivity, mean specificity, the SDs of the random effects of sensitivity and specificity, and the correlation between the random effects of sensitivity and specificity. For all other tools, we summarize the sensitivity and specificity of the tool at all reported cutoffs narratively and graphically.

Strength of Evidence Assessment

We assessed strength of evidence as per the AHRQ Methods Guide, considering RoB, consistency, precision, directness, and sparsity of the evidence and assigning a strength of evidence rating of high, moderate, low, or insufficient that indicate the degree of confidence that we have that the estimate lies close to the true effect.⁷ In accordance with AHRQ guidance,^{13,14} we use qualifying language regarding strength of evidence when communicating conclusions, eg, “probably” for moderate and “may” for low strength of evidence.

RESULTS

For the full review, including questions regarding OCD treatment, the literature search yielded 12 027 records after deduplication. We retrieved and screened the full-text publications for 436 citations or records. Among these, 22 studies evaluated 27 variants of 9 brief assessment tools that determine whether a child should be further evaluated for OCD and were included in the analysis.^{6,15–35}

Descriptions of the brief tools evaluated are in Table 1.

In all studies, the reference standard was a clinical diagnosis by a doctoral-level evaluator. Other study details are described in Table 2.

Most of the brief assessment tools were evaluated in only 1 or 2 studies each, except for the Child Behavior Checklist–Obsessive-Compulsive Subscales (CBCL-OCD/OCS), which was evaluated in 9 studies. Studies also had inconsistent control groups: 11 drew their participants from outpatient psychiatric clinics, 1 of which was OCD-specific; 4 drew from nonclinical populations (eg, schools); 2 drew from intervention research study populations; 1 drew from an inpatient psychiatric clinic; and 4 did not have a control group. Sensitivity and specificity results for each study are presented in Figure 1, with shapes indicating the specific tool used by each study. Several tools, including the Toronto Obsessive-Compulsive Scale (TOCS), Obsessional Compulsive Inventory–Child Self Report (ChOCI-R-S), and Spence Children’s Anxiety Scale–Obsessive Compulsive Subscale (SCAS-OCD), appear to have cutoffs with sufficiently good sensitivity and specificity (both >80%) based on 1 or 2 studies, but more research is needed to confirm these findings. Full details for the most commonly reported cutoff for each tool are included in the additional materials.

Two studies compared child vs parent reporting on the same scale (ie, Short Obsessive-Compulsive Disorder Screener [SOCS]).^{26,33} Parent reporting, compared with child reporting, had similar (76% for both reporters) or better (82% vs 55%) sensitivity and similar (83% for both reporters) or higher (88% vs 73%) specificity and AUC (0.96 vs 0.85).

A total of 9 studies evaluated variants of the CBCL-OCD/OCS, a subscale of the CBCL, in 3746 participants.^{6,17,19,20,25,28,30,36,37} Only 1 study was rated as low RoB,²⁵ 4 were rated as moderate RoB,^{6,17,19,28} and 2 were rated as high RoB.^{20,30} Individual ratings are listed with the study name in the additional materials. In all studies, the parents completed the entire CBCL, and then the researchers analyzed the subset(s) of questions pertaining to OCD.

Both Nelson et al and Geller et al reported data only by percentile; therefore, their data are not included in the figures.^{36,37} Both reported sensitivity and specificity ranging from the 40th to the 90th percentiles. Sensitivities ranged from 98% in the 40th percentile to 30% in the 90th, and specificities ranged from 41% in the 40th percentile to 100% in the 90th. A total of 6 studies evaluated the 8-question subscale developed by Nelson et al in 2001.³⁷ The other 3 evaluated subsets of these questions. The prevalence of OCD in the 9 studies ranged from 3% to 54%, with a median of 49% (IQR 33%–49%) and a mean (SD) of 39% (17%).

Meta-analysis of the 6 studies^{6,17,19,20,25,28} that evaluated Nelson et al’s 8-question subscale yielded a summary AUC of 0.84 (95% CI: 0.74–0.91). The summary ROC curve is shown in Figure 2.

TABLE 1. Brief Assessment Tools				
Tool Acronym	Tool Components/Items	Tool Description Reporter (Parent/Child)	Tool Range ^a	No. of Studies
C-FOCI ⁴⁴	25 questions addressing obsessions and compulsions that are frequent among young people with OCD.	OCD-specific, brief, focused instrument: The Symptom Checklist is a dichotomous tool that evaluates the presence/absence of obsessions (10 questions) and compulsions (10 questions). The severity checklist includes additional 5 questions to evaluate severity of symptoms (total 25 questions). Reported by parent and/or child.	Symptom checklist: 0–20 Severity scale: 0-25	2 ^{23,35}
CBCL-OCS ³⁷	8 questions addressing fears/worries, obsessions, and compulsions.	OCD-specific subscale: A subset of the full CBCL. The most common CBCL-OCD/OCS subscale consists of a subset of 8 items determined to be most predictive in an analysis by Nelson et al. ³⁷ CBCL-OCD/OCS-R contains 6 items, which are a subset of the 8 established by Nelson et al. ¹⁵ Reported by parent only.	0 to 24	9 ^{6,17,19,20,25,28,30,36,37}
ChOCI-R-S ²⁷	Questions addressing obsessions, compulsions, and impairment associated with both.	OCD-specific: Designed to assess the presence and severity of OCD in children and adolescents aged 7-17 years; derived from the CY-BOCS but intended for self-report rather than clinician rating. Reported by parent and/or child.	Total impairment: 0–48 Total symptoms: 0–40	1 ²⁷
LOI-CV ⁴⁵	44 items that assess obsessive symptoms. Short version consists of 20 items.	OCD-specific. Self-report questionnaire focused on obsessions. Reported by child only.	1–132 (full version) 1–60 (short version)	3 (1 full version, ²⁹ 3 short version) ^{18,29,31}
OCI-CV ⁴⁶	21 items addressing the following 6 domains: doubting/checking, obsessing, ordering, neutralizing, washing, and hoarding.	OCD-specific: Self-report severity scale for children aged 7–17 years. OCI-CV-R assesses all items except those related to hoarding (18 items). OCI-CV-5 assesses a 5-item subset of the OCI-CV-R. Reported by child only.	OCI-CV: 0-42 OCI-CV-R: 0-36 OCI-CV-5: 0–10	4 (2 OCI-CV ^{24,34} 1 OCI-CV-R, ¹⁵ 1 OCI-CV-5 ¹⁶)
SCAS-OCD ³³	6 items assessing obsessions and compulsions.	OCD-specific subscale: Derived from the SCAS, assesses a subset of symptoms related to OCD for children aged 8-15 years. Reported by parent and/or child.	0–24	2 ^{26,33}
SOCS ³²	7 items that address common symptoms (eg, checking, touching, cleanliness/washing, repeating, and exactness).	OCD-specific: Includes the 5 most discriminant items of the 44-item LOI. 2 additional questions were designed to gauge the associated impairment and resistance; therefore, there are total 7 questions. Reported by parent only.	0–14	2 ^{22,32}
TOCS ²¹	21-items measure of obsessive and compulsive symptoms addressing 6 subscales: counting/checking, cleaning/contamination, hoarding, symmetry/order, rumination, and superstition.	OCD-specific: Designed to measure OCD traits in the general population; designed to be administered by clinicians for children and adolescents. Reported by parent and/or child.	–63–63 ^b	1 ²¹
YSR OCD ²⁸	8 items that address obsessions and compulsions.	OCD-specific subscale: A subset of the YSR, which assesses internalizing and externalizing problems, designed for children aged 11–18 years. Reported by child only.	0–16	1 ²⁸

Abbreviations: CBCL-OCS, Child Behavior Checklist–Obsessive-Compulsive Subscales; CBCL-OCD/OCS-R, Child Behavior Checklist–Obsessive-Compulsive Subscales, revised; C-FOCI, Children's Florida Obsessive-Compulsive Inventory; ChOCI-R-S, Obsessional Compulsive Inventory-Child Self Report; CY-BOCS, Children's Yale-Brown Obsessive Compulsive Scale; DSM, *Diagnostic and Statistical Manual of Mental Disorders*; LOI-CV, Leyton Obsessional Inventory-Child Version; OCD, obsessive-compulsive disorder; OCI-CV, Obsessive Compulsive Inventory-Child Version; OCI-CV-R, Obsessive Compulsive Inventory-Child Version, revised; SCAS-OCD, Spence Children's Anxiety Scale-Obsessive Compulsive Subscale; SOCS, Short Obsessive-Compulsive Disorder Screener; TOCS, Toronto Obsessive Compulsive Scale; YSR OCD, Youth-Self Report OCD Subscale.

^a Higher scores reflect greater severity.
^b Scores for each item range from –3 (far less often) to 0 (average) to +3 (far more often).

A total of 3 studies evaluated the CBCL-OCD/OCS scale for different numbers of questions (eg, 2, 6, 8, and 11), reporting AUCs that ranged from 0.74 to 0.96. These were not included in the meta-analysis, as they were not directly comparable with the standard 8-question CBCL-OCD/OCS, but they are included in Figure 1.

DISCUSSION

In summary, the 8-question version of the CBCL-OCD/OCS may be sufficiently sensitive and specific (summary AUC,

0.84; 95% CI: 0.74-0.91) to prompt specialist referral for additional diagnostic assessment in children for whom there is clinical consideration of OCD. Other tools may perform as well or better, but, given the small numbers of studies evaluating each, the current evidence is insufficient to justify broad conclusions regarding their performance.

The diagnosis of OCD relies on expert clinical evaluation, often augmented by semistructured clinical interviews. These assessment tools do not need to have perfect diagnostic accuracy, only acceptable sensitivity and specificity

Characteristic	Range Across Studies
Sample size	50–2512 (8–489 with OCD)
Mean age range, years	9–16
Male	32%–71%
White	88%–98%
Source (OCD/control)	
Outpatient psychiatric clinics (OCD-specific clinics)	50% (5%)
Intervention research study populations	9%
Inpatient psychiatric clinic	5%
Nonclinical populations	18%
Not reported/no control group	18%

Abbreviation: OCD, obsessive-compulsive disorder.

as screens to prompt referral or further inquiry. Based on the current evidence, the CBCL-OCD/OCS has adequate performance for use. However, no study administered the 8 questions of the CBCL-OCD/OCS subscale in isolation; all evaluated the full CBCL-OCD/OCS. Therefore, more research is warranted as to whether these questions alone are predictive of OCD. If parents must complete the entire 120-question tool to get answers to the relevant questions that are sufficient to identify probable OCD, it may not qualify as a brief scale. Additionally, more studies should

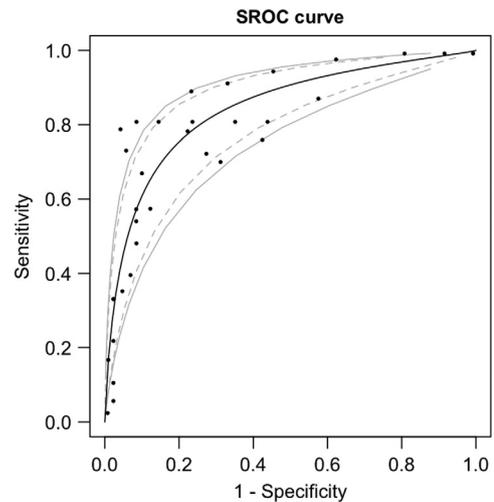


FIGURE 2. Summary ROC curve for the CBCL-OCD/OCS scale. The meta-analysis was performed only on the 8-question version of the CBCL-OCS. The solid black line is the summary ROC curve; the solid gray line demarks the 95% confidence region for sensitivity given specificity and the dashed gray line demarks the 95% confidence region for specificity given sensitivity. The dots represent the reported sensitivity and 1-specificity points from each of the 6 studies. See Supplemental Figure 1 for details on the individual studies (8-item CBCL-OCD/OCS). Abbreviations: CBCL-OCD/OCS, Child Behavior Checklist–Obsessive-Compulsive Subscales; ROC, receiver operating characteristic.

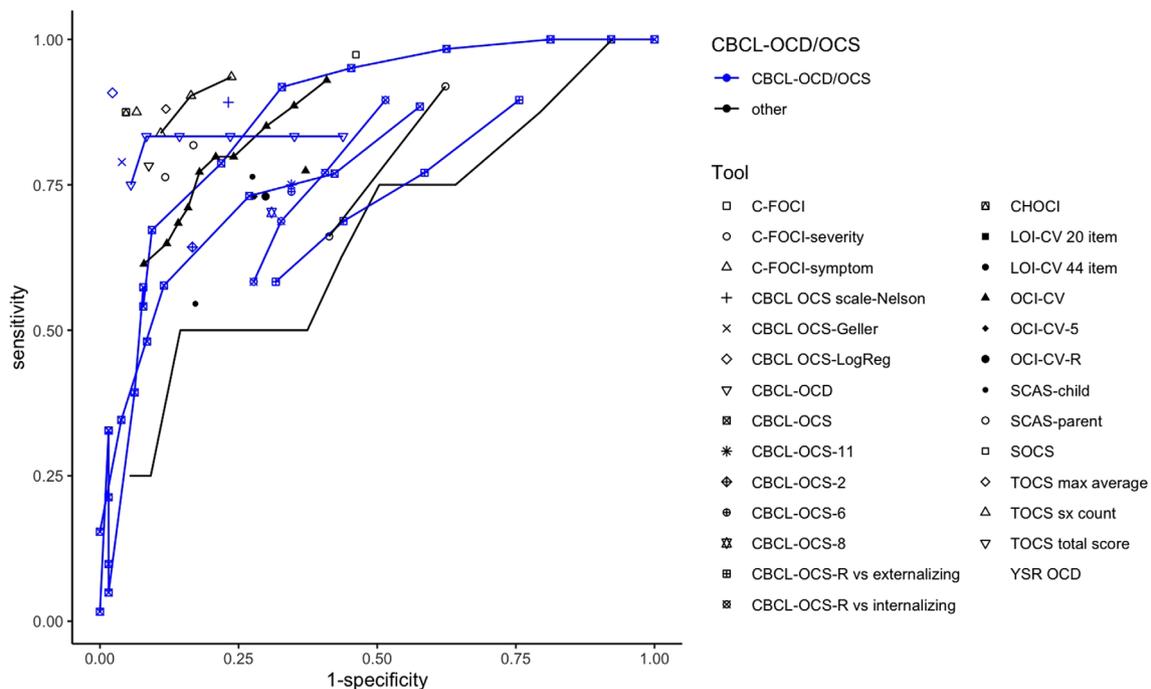


FIGURE 1. Observed ROC curves for all tools. Datapoints connected by lines are from the same studies. Studies that did not provide specificity data are omitted. Studies in blue contributed to the meta-analysis. Abbreviations: CBCL-OCD/OCS, Child Behavior Checklist–Obsessive-Compulsive Subscales; C-FOCI, Children’s Florida Obsessive-Compulsive Inventory; ChOCI-R-S, Obsessional Compulsive Inventory-Child Self Report; OCD, obsessive-compulsive disorder; OCI-CV, Obsessive Compulsive Inventory – Child Version; SCAS-OCD, Spence Children’s Anxiety Scale-Obsessive Compulsive Subscale; ROC, receiver operating characteristic; SOCS, Short Obsessive-Compulsive Disorder Screener; TOCS, Toronto Obsessive-Compulsive Scale; YSR OCD, Youth Self-Report OCD Subscale.

be done on the other 8 scales that have been evaluated to verify their usefulness.

Future studies should ideally include prospective cohorts, enrolling a consecutive sample of patients for whom there is clinical concern for OCD. Studies should aim to directly compare 2 or more index tests in the same study, rather than across studies.^{38,39} In addition, the studies enrolled primarily white, middle-class, socially advantaged participants (on average, where reported, nearly 90% of study participants were white). Future studies should evaluate diagnostic accuracy across important potential effect modifiers, such as ethnicity, socioeconomic status, and comorbidity status, as well as the impact of parent vs child report by age group.

The same reference standard should be applied to all patients, ideally using a Longitudinal Expert All Data (LEAD) process that incorporates an expert clinical assessment, semistructured interviews (eg, K-SADS-PL, ADIS-C), multiple informants, assessment of level of impairment (eg, Children's Yale-Brown Obsessive Compulsive Scale [CY-BOCS], CY-BOCS-II), and longitudinal response to treatment.^{28,40} Diagnostic evaluations should include assessment for common comorbid diagnoses (eg, autism spectrum disorders, tic disorders, and presentations that raise concern for Pediatric Acute-onset Neuropsychiatric Syndrome/Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections [PANS/PANDAS]). Once reliable tools are developed and validated, trials that evaluate the impact diagnostic strategies on clinical outcomes, such as time to treatment and improved functional outcomes, should be performed.

Limitations

Multiple scales (with multiple informants) have been developed that have face validity as brief assessment tools, providing an opportunity for future research. However, although we found 22 studies that evaluated the diagnostic accuracy of brief assessment tools, most used a case-control design, comparing a known group of children with OCD with a control group of either clinical control individuals or a mix of clinical and nonclinical control individuals, or had other critical methodologic limitations such as inclusion of only patients with OCD and inclusion of nonclinical control individuals, potentially overestimating both sensitivity and specificity due to spectrum effects.^{41,42} Few tools were assessed by more than 2 or 3 studies, and we found no studies designed to evaluate potential clinical effects, such as resource use or time to treatment, or potential effect modifiers, such as ethnicity or comorbidity status. Finally, the reference standard is based on clinical criteria, which can be differentially applied by experts. However, all studies used the same DSM criteria, and any differences in the application of the reference standard likely increase between-study heterogeneity in our statistical modeling.⁴³

Studies performed in the United States enrolled primarily white, middle-class, socially advantaged participants (approximately 90% of study participants were white, approximately two-thirds had their parents living together, and about two-thirds had college-educated parents), with a major underrepresentation of marginalized or socially disadvantaged youth.

CONCLUSIONS

The diagnosis of OCD relies on expert clinical evaluation, often augmented by semistructured clinical interviews. Brief assessment tools have been proposed for use by primary care providers evaluating youth with symptoms of OCD to facilitate early identification and specialty referral for a comprehensive diagnostic evaluation and early initiation of treatment. The CBCL-OCD/OCS may be sufficiently accurate to indicate which youth should be further evaluated for OCD, but more research is needed to establish whether the 8-question subscale can function as a stand-alone measure. The available evidence is insufficient for other brief assessment tools.

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ABBREVIATIONS

AACAP:	American Academy of Child and Adolescent Psychiatry
ADIS-C:	Anxiety Disorders Interview Schedule for Children
AHRQ:	Agency for Healthcare Research and Quality
CBCL-OCD/OCS:	Child Behavior Checklist–Obsessive-Compulsive Subscales
C-FOCI:	Children's Florida Obsessive-Compulsive Inventory
ChOCI-R-S:	Obsessional Compulsive Inventory-Child Self Report
CINAHL:	Cumulated Index in Nursing and Allied Health Literature
CY-BOCS:	Children's Yale-Brown Obsessive Compulsive Scale
K-SADS-PL:	Kiddie Schedule for Affective Disorders and Schizophrenia - Present and Lifetime
LEAD:	Longitudinal Expert All Data

LOI-CV: Leyton Obsessional Inventory-Child Version
OCD: obsessive-compulsive disorder
OCI-CV: Obsessive Compulsive Inventory-Child Version
PAN/PANDAS: Pediatric Acute-onset Neuropsychiatric Syndrome/Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections
PCORI: Patient-Centered Outcomes Research Institute
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analysis
PROSPERO: International Prospective Register of Systematic Reviews

QUADAS-2: Quality Assessment of Diagnostic Accuracy Studies 2
RoB: risk of bias
ROC: receiver operating characteristic
SCAS-OCD: Spence Children's Anxiety Scale-Obsessive Compulsive Subscale
SOCS: Short Obsessive-Compulsive Disorder Screener
SR: systematic review
TOCS: Toronto Obsessive-Compulsive Scale
YSR OCD: Youth Self-Report OCD Subscale

critically reviewed and revised the manuscript, and approved the final manuscript as submitted. Dr Steele conceptualized and designed the review, participated in data collection and interpretation of data, critically reviewed the manuscript, and approved the final manuscript as submitted. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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