Critical Appraisal Systems for Scientific Evidence

J.Sales-Llopis

Neurosurgery Department, General University Hospital Alicante, Spain

---

Definition

Critical appraisal refers to the systematic evaluation of clinical research evidence to assess its validity, results, and relevance before applying it to decision-making in healthcare.

Joanna Briggs Institute (JBI) Critical Appraisal Tools

- **Purpose**: Evaluate methodological quality across various study types (RCTs, cohort studies, case series, qualitative research, etc.).
- **Strengths**: Detailed checklists tailored to each design; transparent criteria.
- **Limitations**: Time-consuming; less commonly used in some medical specialties.

GRADE (Grading of Recommendations Assessment, Development and Evaluation)

- **Purpose**: Rates certainty of evidence and strength of clinical recommendations.
- **Strengths**: Widely endorsed by WHO, Cochrane, and others; integrates evidence with values/preferences.
- **Limitations**: Complex for non-specialists; primarily designed for guideline development.

CASP (Critical Appraisal Skills Programme)

- **Purpose**: Provides structured checklists for evaluating studies, especially qualitative and RCTs.
- **Strengths**: Easy to use; ideal for teaching; widely adopted in nursing and public health.
- **Limitations**: May oversimplify complex methodological issues.

AMSTAR (A MeaSurement Tool to Assess systematic Reviews)

- **Purpose**: Assesses the quality of systematic reviews.
- **Strengths**: Validated tool; helps distinguish high- from low-quality reviews.
- **Limitations**: Not applicable to primary studies; requires familiarity with systematic review standards.

SIGN (Scottish Intercollegiate Guidelines Network) Checklists

- **Purpose**: Appraise study quality for use in clinical guideline development.
- **Strengths**: Emphasizes study design hierarchy and methodological rigor.
- **Limitations**: More focused on clinical questions; less adaptable for broader research areas.

Comparative Summary Table

System	Best For	Key Features	Complexity	Widely Used
JBI	Methodological quality	Design-specific checklists	Medium	✓✓
GRADE	Clinical guideline development	Certainty + recommendation strength	High	✓✓✓
CASP	Education and training	User-friendly checklists	Low	✓✓
AMSTAR	Systematic reviews	16-point validated tool	Medium	✓✓
SIGN	Evidence for guidelines	Evidence level + quality rating	Medium	✓✓

Best Prompts for Critical Appraisal Systems for Scientific Evidence

□ General Critical Appraisal

- Critically appraise the following article using the most appropriate checklist based on its study design. Provide strengths, weaknesses, and a summary judgment on its reliability.

[Paste full abstract or article details here]

- What critical appraisal tool should I use for this type of study? It's a [randomized controlled trial / systematic review / qualitative study / cohort study].
- Explain step-by-step how to critically appraise a scientific article, and show how to apply that process to this paper:

[Paste citation or summary]

□ Joanna Briggs Institute (JBI)

- Use the Joanna Briggs Institute (JBI) checklist to assess the methodological quality of the following [type of study]:

[Insert abstract or key information]

- Generate a completed JBI critical appraisal checklist for a [cohort study / qualitative research / case series] using the following article:

[Insert article]

□ GRADE (Grading of Recommendations Assessment, Development and Evaluation)

- Summarize the strength of the evidence in this article using GRADE criteria: risk of bias, inconsistency, indirectness, imprecision, and publication bias.

[Insert abstract or results section]

- Using the GRADE framework, classify the quality of evidence and strength of recommendation for the following clinical practice guideline:

[Insert guideline or summary]

□ CASP (Critical Appraisal Skills Programme)

- Apply the CASP checklist to this randomized controlled trial and summarize the results of each question.

[Insert study citation or abstract]

- Give a teaching-friendly explanation of how to use the CASP checklist for evaluating a qualitative study. Include examples if possible.

□ AMSTAR (A MeaSurement Tool to Assess Systematic Reviews)

- Apply the AMSTAR 2 checklist to this systematic review and determine if it is high, moderate, low, or critically low quality.

[Insert systematic review details]

- Explain each domain of the AMSTAR 2 tool in simple terms and show how it is applied in practice.

⚖ SIGN (Scottish Intercollegiate Guidelines Network)

- Use the SIGN methodology to critically evaluate the following clinical trial for its inclusion in guideline development:

[Insert article summary or results]

- Explain how SIGN levels of evidence differ from GRADE, and when each should be used.

Meta Appraisal (Advanced)

- Compare the appraisal of the same study using JBI, CASP, and GRADE frameworks. Identify key differences in focus, scoring, and conclusions.

[Insert article]

Tip: These prompts can be used directly in ChatGPT or GPT-4 to train students, conduct systematic reviews, or evaluate clinical articles in your daily practice.