Review

Implicit Bias in Health Professionals: A Scoping Review

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Posted Date: 10 March 2026

doi: 10.20944/preprints202603.0751.v1

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 doi:10.20944/preprints202603.0751.v1

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Implicit Bias in Health Professionals: A Scoping Review

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Highlights:

Public health relevance—How does this work relate to a public health issue?

- Implicit bias in healthcare professionals contributes to inequities in clinical communication, diagnostic pathways, and treatment decisions, which can accumulate into measurable population-level disparities.
- This scoping review maps how implicit bias is being assessed across professions, settings, and bias targets, helping to identify where evidence exists (and where it is missing) to address inequities in health systems.

Public health significance—Why is this work of significance to public health?

- The review highlights major methodological heterogeneity (tools, administration, scoring, and reporting) that limits comparability and weakens the evidence base needed to design and scale effective equity interventions.
- By synthesizing constructs, targets, and contexts of bias measurement, the study supports surveillance and evaluation strategies that are essential for monitoring progress toward equitable care at the system level.

Public health implications—What are the key implications or messages for practitioners, policy makers and/or researchers in public health?

- Practitioners and educators should prioritize standardized, evidence-based administration and reporting of implicit measures and integrate bias mitigation as a longitudinal competency rather than a single-session training activity.

Researchers and policy makers should invest in developing and validating measurement approaches that better capture truly automatic, context-robust responses and link bias metrics to patient-centered and equity-relevant outcomes.

Abstract

Implicit bias, automatic attitudes or stereotypes outside conscious awareness, may influence clinicians' communication, diagnosis, and treatment decisions, contributing to inequities in care. We conducted a scoping review to map measurement strategies used to assess implicit bias among health professionals and students in healthcare and training settings. Using Joanna Briggs Institute guidance and PRISMA-ScR, we searched PubMed, Embase, BVS, Google Scholar, and institutional repositories for studies to November 2025; two reviewers independently screened and charted data (protocol was developed a priori but submitted internal in organization, and then uploaded in OSF). Of 1,864 records, 93 studies from 28 countries were included. We identified 57 bias domains, most often race/ethnicity, weight, and sexual orientation. Across studies, 42 unique instruments were reported; the Implicit Association Test was most common, while psychometric validation and administration

 doi:10.20944/preprints202603.0751.v1

details were frequently limited, constraining comparability and interpretation. Evidence gap mapping showed concentration in academic and hospital settings, with fewer studies in primary care or community contexts and limited attention to age, disability, and intersectionality-related biases. The evidence base is growing but fragmented; future work should prioritize standardized administration and reporting, stronger validation, and tools that better capture automatic responding across diverse identities and care settings to support education and equity-oriented interventions.

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1. Introduction

The Implicit bias refers to automatic associations or evaluations toward social groups that can be activated without conscious awareness and that may influence perception, judgment, and behavior [1–4]. These associations are shaped by social structures, cultural norms, and historical contexts, and may persist even when individuals explicitly endorse egalitarian values[5–8].Within cognitive and social psychology, implicit bias has been conceptualized as a form of mental representation, often involving stereotypes or prejudicial associations, that operates rapidly and without deliberate intent [4,9–11].

Implicit and explicit biases are related but conceptually distinct constructs. Explicit bias reflects attitudes and beliefs that individuals can consciously recognize and report, typically assessed through self-report questionnaires. In contrast, implicit bias captures more automatic, often non-conscious associations that may not align with stated beliefs. Because explicit measures are susceptible to social desirability and self-presentation, particularly in professional and socially regulated environments, implicit measures have been increasingly used as a complementary approach to examine attitudes that may influence decision-making under conditions of time pressure, cognitive load, or uncertainty [3,12,13].

The automated nature of implicit bias means that individuals who hold such associations may not critically reflect on them or even recognize their presence.[14] As a result, implicit biases can be difficult to access, acknowledge, and measure, posing a methodological challenge for both research and applied settings[14–16]. This challenge is especially relevant in healthcare, where clinical interactions are embedded within institutional cultures and broader social contexts that may reinforce existing power structures and inequities [7,17,18].

In healthcare settings, implicit bias has been associated with differences in communication, clinical judgment, and treatment decisions, with potential downstream effects on patient experiences and outcomes [19–23]. These effects are particularly concerning given evidence that implicit biases may contribute to the persistence and reinforcement of health disparities, disproportionately affecting marginalized populations [22–24]. For example, the Medical Student Cognitive Habits and Growth Evaluation Study (CHANGES) found that a substantial proportion of U.S. medical students exhibited both implicit and explicit weight bias, with levels of implicit weight bias comparable to those observed for racial bias in the same cohort [25,26].

Considerable effort has been devoted to measuring and mitigating implicit bias in healthcare; however, evidence of sustained effectiveness remains limited, as reflected in the continued presence of bias and its consequences [7,8,26]. One proposed explanation for these mixed results relates to challenges in measurement, including variability in how implicit bias is operationalized, assessed, and interpreted [27–30]. Measurement tools may differ in their sensitivity to conscious control, contextual influences, and task familiarity, which can affect the validity and comparability of findings across studies.

A wide range of methods has been used to operationalize and measure implicit bias. Reaction-time paradigms, most notably the Implicit Association Test (IAT), are among the most widely used approaches in health-professions research, alongside variants such as the Brief IAT and Single-

 doi:10.20944/preprints202603.0751.v1

Category IAT, as well as other paradigms including the Go/No-Go Association Task, evaluative priming, and the Affect Misattribution Procedure[31–37]. IAT results are commonly summarized using the D-score, a standardized metric derived from differences in response latencies between congruent and incongruent pairing blocks, with larger absolute values indicating stronger automatic associations [15]. Despite their widespread use, studies vary substantially in how these tools are implemented, scored, and reported, including inconsistent reporting of psychometric properties such as reliability and validity.

Importantly, implicit bias in healthcare can target multiple domains (or bias targets), including race/ethnicity, gender, weight, disability, age, mental health status, socioeconomic position, and sexual orientation or gender identity[29,38]. These domains may operate differently across clinical contexts and professional roles, and measurement tools are often developed to assess specific targets or settings[29]. As a result, the existing evidence base may overrepresent certain forms of bias while leaving others underexplored [30].

Given the breadth of constructs (e.g., attitudes, stereotypes, cognition), bias domains, and healthcare settings in which implicit bias has been studied, a scoping review is well suited to map the literature, clarify how implicit bias is operationalized, and identify gaps in measurement and reporting. Therefore, this scoping review aimed to: (1) catalog the instruments and approaches used to assess implicit bias among health professionals and healthcare students; (2) describe which constructs, bias domains, and settings these tools address; and (3) summarize how studies report scoring and psychometric properties of these measures.

2. Materials and Methods

2.1. Protocol and Registration

We conducted a scoping review to systematically map the existing literature on implicit bias among healthcare professionals. This review followed the methodological guidance outlined by the Joanna Briggs Institute (JBI) for scoping reviews[39] and adhered to the PRISMA Extension for Scoping Reviews (PRISMA-ScR)[40] checklist. The review protocol was developed a priori but submitted internally in organization with the project (See Institutional Review Board Statement), and then uploaded in OSF.

2.2. Eligibility Criteria

We defined eligibility criteria using the Population–Concept–Context (PCC) framework:

- Population: Health professionals including physicians, nurses, allied health workers, and healthcare students.
- Concept: Implicit bias (e.g., unconscious stereotypes, attitudes, or perceptions) measured through validated or adapted tools.
- Context: Healthcare-related settings, including clinical practice, educational environments, and training programs.
- Types of sources: We included primary research studies (quantitative, qualitative, and mixed methods), as well as instrument development and validation studies. Editorials, commentaries, and conference abstracts were excluded unless they contained original data

Excluded references: Studies without an instrument, studies measuring only explicit biases, or those that did not address the research question.

2.3. Information Sources and Search

We conducted a systematic literature search across the following electronic databases: PubMed, Embase and BVS. Grey literature was retrieved through Google Scholar and institutional repositories. The search included studies published up to November 2025. The complete search strategies for each database are provided in **Supplementary File 1, Table S1-S4**.

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2.4. Selection of Sources of Evidence

All identified references were imported into Rayyan for deduplication and screening (AMRG, KCA). Two blinded reviewers, working in pairs (AMRG, KCA, AMC, JACM, YFR, ABR), independently screened titles and abstracts, followed by full-text review. Any disagreements were resolved by discussion or third-party adjudication (AMRG, KCA). Reasons for exclusion at the full-text stage were documented. The study selection process is illustrated using a PRISMA-ScR flow diagram **(Figure S1)**.

2.5. Data Charting Process

A standardized data charting form was developed and piloted collaboratively by the review team. Data extraction was conducted by two reviewers independently and included the following variables: Reference (author, year, country); Study population and setting; Type of bias assessed; Instrument used, Methodological characteristics and constructs evaluated; Key findings related to implicit bias; Instrument subscales, operational performance, and psychometric properties.

For studies using the IAT, we extracted the reported D-score, a standardized scoring metric derived from differences in response latencies between congruent and incongruent pairing blocks. In general, the sign and magnitude of the D-score indicate the relative strength of automatic associations (e.g., stronger association of one social group with "good" versus "bad"), with larger absolute values reflecting stronger associations.

2.6. Synthesis of Results

We conducted a descriptive and thematic synthesis of the extracted data. Quantitative findings were summarized using frequencies and tabular presentations. Thematic categories were generated inductively to describe patterns in instruments used, constructs evaluated, and populations studied. Results are presented narratively and supported by summary tables and illustrative quotes where applicable. Evidence maps were generated using R version 4.4.2.

Language editing support was provided by an AI language model (ChatGPT, OpenAI) to improve grammar, clarity, and fluency. The final content was reviewed and approved by the authors.

3. Results

3.1. Selection of Sources

A total of 1,864 records were retrieved through database searching. After removal of duplicates (n = 225), 1,639 titles and abstracts were screened. Of these, 317 full-text reports were sought for retrieval, and 104 could not be accessed. A total of 213 full-text reports were assessed for eligibility, of which 120 were excluded for reasons such as irrelevance to the study topic (n = 74), wrong intervention or outcomes (n = 28), or ineligible populations or settings (n = 15). An overview of these excluded publications is presented in the **Supplementary File, Table S5**. Finally, 93 references were included in the final review. The full PRISMA 2020 flow diagram is shown in **Figure S1.**

3.2. Characteristics of Sources of Evidence

The included studies were published between 2007 and 2025. Most studies were conducted in the United States (n = 52; 55.9%), followed by Canada (n = 9; 9.7%) and the United Kingdom (n = 6; 6.5%); the remaining studies were distributed across other countries **(Table 1)**.

Populations studied included physicians, nurses, therapists, residents, students, and a wide range of healthcare professionals working in emergency, primary care, hospital-based, or academic settings. A detailed list of included studies and their key characteristics is provided in **Supplementary File 1, Table S6**.

A wide diversity of biases were explored. Among the 57 types of bias or target domains identified, the most common included **(Table 1)**:

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- Race/ethnicity-related bias
- Bias toward patients with specific diseases (e.g., mental illness, HIV, chronic pain)
- Weight-related stigma
- Sexual orientation and gender identity
- Disability-related bias
- Age

The most frequently used instrument was the Implicit Association Test (IAT) (Table 3), reported in over one-third of studies. In total, 42 unique instruments were identified across the included sources, including the Health Care Provider HIV/AIDS Stigma Scale (HPASS), the Attitudes Toward Obese Persons Scale (ATOP), the Genderism and Transphobia Scale (GTS), and the Mental Illness Clinician's Attitudes Scale (MICA-4).

The most frequently assessed by the identified instruments were race/ethnicity and gender followed by weight. The IAT, was the most commonly used tool for assessing implicit bias in healthcare professionals. Nevertheless, its status as a reference standard ("gold standard") remains under debate due to the lack of validated alternative instruments or criterion variables that would allow determination of its sensitivity and specificity. None of the studies reported validation or universal cut- off points for the test, so the interpretation of D-score depends on the aim of studies and the original parameters described by Greenwald et al. (2003)[15].

Other measures identified in this review were Likert-type scales assessing attitudes and beliefs, with only a small subset of studies conducting formal criterion validity analyses in comparison to the IAT. Overall, described psychometric information (reliability and construct validity).

Figure 1 maps bias constructs against bias types, showing that attitudes related to race/ethnicity dominate the literature (n = 24), followed by stereotypes concerning weight (n = 13) and sexual orientation (n = 6). Race/ethnicity was the most frequently assessed bias target across constructs, particularly in studies examining attitudes, whereas disability and age were rarely explored (≤ 4 studies each), leaving notable evidence gaps. **Figure 2** maps care settings against bias types, with hospital-based (n = 12 for race/ethnicity; n = 10 for sexual orientation) and academic settings (n = 9 for multiple bias; n = 7 for weight) most frequently studied, while primary care and community settings had consistently fewer than six studies per bias type.

4. Discussion

This scoping review synthesizes the growing body of literature examining implicit bias among healthcare professionals, with an emphasis on constructs (attitudes, stereotypes, and cognition), bias targets (e.g., race, gender, weight), and care settings. Our evidence maps highlight race/ethnicity as the most frequently studied bias type, particularly in relation to attitudes, followed by weight and sexual orientation. The predominance of racial/ethnic bias research aligns with prior reviews [23,41] and reflects global calls to address structural racism in healthcare [22,26].

Consistent with previous reviews [8,30], the Implicit Association Test (IAT) remains the most widely used instrument, despite ongoing concerns about its validity and reliability [4,16,42]. In our included references, fewer than half (Table 2,3 and supplementary file Table s6) reported psychometric properties of the tools used. This undermines the interpretability of findings, particularly in studies measuring changes in bias post-intervention [18,28]. As previously noted, IAT scores may be influenced by contextual factors [24], and lack of standardization in administration can hinder cross-study comparisons. Additionally, we found methodological challenges associated with D-score interpretation; some papers mention a potential adaptation or familiarization of participants with the test[12,15,36], which can change the reaction times and affect the detection of truly automatic responses, the theoretical paradigm of the implicit bias assessment. Based on these results, future projects must consider the construction of such differential tools focused on automatic and more authentic non- controlled responses.

Measurement choices were closely tied to the constructs evaluated: stereotype-based studies often used scenario-based tools or vignettes [43,44], while attitudes were mostly assessed via

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IAT[45,46]. Only a minority of studies incorporated both explicit and implicit measures, potentially limiting the depth of interpretation. This pattern suggests a gap in integrating multi-dimensional approaches to bias, as recommended by Blair (2013) [10] and De Houwer (2019)[9].

Qualitative components were included in several studies [47–49], offering insights into context-specific manifestations of bias and its perceived impact on care delivery. However, such mixed-methods designs were rare, even though they can enhance understanding of how bias is enacted in real-world interactions [17,27]. Few studies [44,50–55] explored longitudinal outcomes or behavior-based consequences, limiting our ability to assess how biases translate into disparities in health outcomes.

Additionally, gaps persist in the examination of bias across diverse identities. While race/ethnicity remains central, biases related to age, disability, or intersecting identities are underexplored, despite their relevance to healthcare delivery [19,21]. This gap limits the comparability of the measures across different settings and reinforces the importance of developing and adapting tools to assess bias with reliability and validity tests in research and clinical practice. The dominance of academic and hospital settings (See Evidence Maps, Figures 1 and 2) may further restrict the generalizability of findings to primary care or community contexts where different power dynamics are at play.

Finally, our findings underscore the need for theoretical clarity. Some studies failed to specify whether bias was conceptualized as unconscious prejudice, stereotype activation, or judgment distortion. As Holroyd and Puddifoot (2019)[13] and Welpinghus (2020)[5] argue, conceptual ambiguity impedes progress in understanding the mechanisms and potential mitigations of implicit bias.

5. Conclusions

This review highlights a growing but uneven body of research on implicit bias in healthcare. Most studies focus on racial and ethnic bias, often measured through the IAT, with limited attention to other identities, care settings, or behavioral outcomes. Methodological challenges including underreported psychometrics and construct ambiguity, limit comparability and practical application. Broader conceptual frameworks, improved measurement tools, and greater attention to diverse contexts and populations are needed to inform effective mitigation strategies and advance equity in clinical education and practice.

Supplementary Materials: The following supporting information can be downloaded at the website of this paper posted on Preprints.org, Figure S1: title; Table S1: title; Video S1: title.

Author Contributions: Conceptualization, AMRG, KCA, AMC, JACM, YFR and ABR; methodology, KCA and AMRG; screening and study selection, AMRG, KCA, AMC, JACM, YFR and ABR; data charting and verification, AMRG, KCA, AMC, JACM, YFR and ABR; formal analysis and synthesis, AMRG, KCA, AMC, JACM, YFR and ABR; writing original draft preparation, AMRG; writing—review and editing, all authors; supervision, KCA. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable. However, the Project Study received ethical approval from the Research Ethics Committee of Fundación Universitaria Sanitas (Approval Code: CEIFUS 1778-24; 4 June 2024; Session Act No. 021-24).

Data Availability Statement: All data generated or analyzed during this scoping review are included in this published article and its Supplementary Materials.

Acknowledgments: None.

 doi:10.20944/preprints202603.0751.v1

Abbreviations

The following abbreviations are used in this manuscript:IAT, Implicit Association Test; BIAT, Brief Implicit Association Test; SC-IAT, Single-Category Implicit Association Test; GNAT, Go/No-Go Association Task; AMP, Affect Misattribution Procedure; JBI, Joanna Briggs Institute; PRISMA-ScR, Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews.

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