

Abstract

AI-Based Clinical Decision Support Systems in Nursing Practice: A Systematic Review of Clinical Outcomes, Workflow Integration, and Adoption

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Introduction. Clinical Decision Support Systems (CDSS) and AI tools are reshaping nursing practice, yet evidence on their impact on clinical outcomes, workflow integration, and adoption remains heterogeneous. This systematic review examines effectiveness and implementation of AI-based CDSS in settings where nurses are primary or co-primary users.

Methods. PRISMA 2020; PubMed, CINAHL, Scopus, Embase, (2016–2025). Inclusion: primary studies; AI CDSS; nurses as primary/co-primary users; outcomes: clinical, workflow, adoption. From 980 records: 347 duplicates removed; 403 excluded title/abstract; 207 excluded full-text; 11 included. Quality: RoB2 (RCTs), JBI tools (other designs).

Results. Eleven studies (6 RCTs/cluster-RCTs, 3 pre-post, 1 qualitative, 1 experimental simulation); 6 countries; settings: hospital, ED, primary care, mental health, assisted living. CDSS improved clinical outcomes in 8/11 studies: symptom management, hospitalisation reduction, delirium detection, aggression prevention. Nurse-led implementation facilitated workflow integration. Barriers: organisational readiness, training gaps, usability.

Discussion. AI-based CDSS demonstrate consistent benefit when nurses are active users. Structured implementation strategies, nurse-led protocols, and usability-centred design are critical for sustainable adoption. Future research should address equity, scalability, and nurse-specific outcome measurement.

Keywords: Artificial Intelligence, Nurse Workflow, Clinical Decision Support

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