AI-Assisted Clinical Judgment in Nursing: A Human-Centered Informatics Framework for Safer Bedside Decisions

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Introduction/Background

Clinical judgment errors remain a leading contributor to adverse patient outcomes, particularly in high-acuity nursing environments. While artificial intelligence (AI) has shown promise in clinical decision support (CDS), its application in nursing remains underexplored. This study introduces a novel human-centered informatics framework that integrates AI-assisted guidance into the nursing process to enhance safety, reduce cognitive overload, and support real-time judgment in bedside care.

Methods/Intervention

We conducted a multi-phase design science investigation incorporating interviews, simulated workflows, and validation workshops with nursing informaticists, educators, and clinical staff. Based on qualitative and observational data, we developed a prototype AI-informed CDS model structured around five clinical judgment domains: recognition, prioritization, rationale, intervention, and reflection. The model was embedded within a low-fidelity EHR simulation to test integration points, alert fatigue thresholds, and role-based data access.

Results/Outcome

The framework yielded a 23% improvement in clinical task accuracy during simulation, with participants reporting increased confidence and decreased task saturation. Nurses noted that AI-generated prompts were most helpful when linked to rationale-based flagging (e.g., abnormal vitals contextualized by patient history). Alert fatigue was lowest when the system offered tiered prompts tied to severity and documentation stage. Informaticists validated the governance logic and traceability layers as compatible with institutional GRC protocols.

Conclusion

AI-assisted clinical judgment, when grounded in human-centered design, offers measurable benefits to nursing workflow accuracy and safety. Our results suggest that structured integration of AI into nursing CDS tools can reduce risk and enhance decision transparency — particularly when implemented with thoughtful governance and escalation protocols.

Statement of Impact

This study highlights the untapped value of AI in nursing informatics and repositions nurses as proactive AI users—not just data generators. The framework sets a precedent for integrating AI in frontline clinical reasoning, contributing to safer care delivery and aligning with enterprise-level health IT governance.

Keywords

Clinical Decision Support (CDS); Nursing Informatics; Human-Centered Design; Artificial Intelligence in Healthcare; Clinical Judgment; Governance, Risk, and Compliance (GRC)