Research on the Application and Effect of Generative AI in the Risk Assessment of Elderly Patients with Chronic Diseases in Nursing Care

Wan Wenxue[1], Shen Lu[1],Chang Yawei[1], Jin Xueqin[2]

1. The School of Nursing, China Medical University, Shenyang, Liaoning 110000, China; 2.The First People's Hospital of Kunshan, Kunshan, Jiangsu 215300, China

Introduction

Elderly patients with chronic diseases are at high risk of adverse nursing events such as pressure injuries, falls, and malnutrition. Generative AI can process vast amounts of unstructured medical data, generate predictive scores and actionable clinical recommendations, and offer new possibilities for precise nursing decision-making.

Key Findings

AI models can achieve dynamic risk assessment based on real-time data streams. AI assistance improves the efficiency of risk assessment, helps to rapidly identify high-risk patients, and provides evidence-based recommendations as a reference.

Methods

A prospective mixed-methods study was conducted. Phase 1: A large language model was fine-tuned using multi-source data from hospital electronic health records (EHRs) to construct a dynamic risk prediction and personalized recommendation generation system. Phase 2: A non-randomized controlled trial was implemented to compare outcomes between the intervention group (with AI-generated recommendations integrated into care) and the control group (receiving usual care). The effectiveness and applicability of the system were comprehensively evaluated via quantitative metrics and qualitative analysis of nurse interviews. Additionally, semi-structured interviews were conducted with nurses who used the system, and thematic analysis was employed to explore their user experience, perceived usefulness, ease of use, as well as barriers and facilitators to clinical integration.

Analyses

Quantitative data were evaluated by AUC-ROC to evaluate the discrimination of the model, and the DeLong test was used to compare the difference between the model and the traditional scale. Rates of adverse events were compared with the use of the chi-square test. Thematic analysis was used to refine the core themes of qualitative data.

Results

The generative AI model is expected to yield a higher area under the receiver operating characteristic curve (AUC-ROC) for risk prediction compared to traditional assessment scales. Moreover, the intervention group is anticipated to have a lower incidence of adverse events (e.g., falls, pressure injuries). Qualitative analysis revealed core themes such as "improved assessment efficiency" and "balance between human and machine decision-making".

Conclusions

The generative AI nursing risk assessment model developed and verified in this study can effectively integrate multi-source data and realize prospective, dynamic and accurate assessment of nursing risks for elderly patients with chronic diseases. The prediction performance of the model is better than that of traditional tools, and the personalized intervention recommendations generated by the model also show the potential to reduce the incidence of nursing adverse events in practice. The results of qualitative research further confirmed that the tool, as a clinical decision support system, could improve the efficiency and quality of nursing work, and emphasized the importance of maintaining the "human-machine collaboration" mode in clinical application. Future research should focus on optimizing the integration of clinical workflows, and carry out multi-center studies to verify the generalization ability of the model.