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Construction and Application of a "Five-Proactive" Predictive Nursing Management System in A Tertiary Hospital: A Practice Innovation for High-Quality Development

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Abstract: *Background*: Under the National Health Commission's Further Improvement of Nursing Service Action Plan (2023–2025) and the context of high-quality development in public hospitals, traditional reactive nursing models have shown limitations in patient safety and quality outcomes. *Objective*: To develop and implement a predictive nursing management system integrating "Prediction–Early Warning–Prevention–Emergency Response" and a supporting "Five-Prevention System" (risk prediction, safety early warning, proactive prevention, emergency preparedness, and practical simulation). *Methods*: Taihe Hospital, a large tertiary hospital in Shiyan, China, systematically introduced a predictive nursing model starting in 2024. Interventions included tiered training (14 themes, 648 sessions, 19,622 nurse attendances), information technology upgrades (I-EWS, tri-color risk warning system), risk stratification (unit/nurse manager/nurse levels), performance incentives, and regular emergency drills. Outcome indicators included adverse event reporting, complication rates, length of stay, and patient/nurse satisfaction. *Results*: After implementation, the proportion of reported grade-IV adverse events significantly increased (indicating earlier detection of potential risks). Elective surgery complication rates, unplanned readmission rates, and average length of stay all decreased. Nurse professional value and patient satisfaction improved markedly. Several serious adverse events (e.g., postoperative neck hematoma leading to airway compression) were prevented through early warning and intervention. *Conclusions*: The predictive nursing "Five-Prevention System" is feasible and effective in shifting nursing practice from reactive to proactive, improving patient safety and nurse empowerment. The model provides a replicable pathway for nursing management transformation in large public hospitals.

Keywords: Predictive nursing; Five-Prevention System; Patient safety; Nursing quality; High-quality development of public hospitals

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1. Background

With the deepening of China's healthcare system reform and the promotion of high-quality development in public hospitals, the connotation and scope of nursing services are undergoing profound changes [1]. The World Health Organization's Global Patient Safety Action Plan 2021–2030 also sets the core vision of minimizing avoidable harm and providing safer care for all. However, nursing practice still faces the limitations of a "passive-reactive" model: nurses primarily execute medical orders, lack forward-looking assessment and decision-making, experience low professional recognition and high burnout, and bear great pressure in managing high-risk patients [2]. Meanwhile, the shift to DRG/DIP payment systems requires the nursing role to transform from "executor" to "value manager", with nursing services moving upstream to participate in cost control and complication prevention [3]. Therefore, how to innovate nursing management models, unleash nurses' potential, and enhance their key role in ensuring medical quality and safety has become an urgent issue in the high-quality development of public hospitals.

Predictive nursing is defined as a model in which nurses comprehensively analyze and judge patients' conditions and potential risks through situational awareness, identify existing and potential nursing problems, and implement corresponding measures to effectively prevent deterioration or complications [4]. Its core lies in anticipating possible adverse reactions based on the laws of disease onset, progression, and changes, enabling early detection, early prevention, and early treatment, thereby making nursing work proactive rather than reactive [5].

As a large tertiary general hospital, Taihe Hospital has systematically promoted the construction of a predictive nursing management model since 2024, driven by both national policies and disciplinary development. Focusing on "ensuring safety, improving quality, enhancing service, and increasing efficiency", the hospital has developed a distinctive "Five-Prevention System" for predictive nursing, forming a closed-loop operational mechanism from concept to action, training to practice, and management to incentives. This paper systematically describes the innovative concepts, implementation pathways, and outcomes of predictive nursing at Taihe Hospital, aiming to provide a reference for the transformation of nursing management models in public hospitals.

2. Innovative concepts

The essence of predictive nursing lies in the character "pre-" (prevention, prediction): through forward-looking risk assessment and intervention, the focus of nursing work shifts from post-event remediation to pre-event prevention, striving to let "prediction" avoid "encountering" adverse events. Based on this concept, Taihe Hospital innovatively constructed a predictive nursing management framework of "Prediction–Early Warning–Prevention–Emergency Response", and further refined the core connotations of the "Five-Prevention System": risk prediction, safety early warning, proactive prevention, emergency preparedness, and practical simulation.

Risk prediction is the starting point. Nurses identify high-risk patients (major surgery, critical illness, multiple comorbidities) and anticipate possible nursing risks through comprehensive analysis.

Safety early warning is the key transmission link. The hospital developed an early-warning threshold manual, introduced information technology-based early warning measures, and established risk warning thresholds and intelligent reminder mechanisms based on clinical information, ensuring nurses can detect early signs of deterioration.

Proactive prevention is the ultimate goal. Combined with quality monitoring indicators, innovative clinical techniques, targeted improvement of safety hazards, and clinical nursing pathways are implemented to deliver precise preventive measures.

Emergency preparedness is the safeguard system. Cross-department emergency response channels are kept open, and all nurses are required to achieve competence in emergency skills, ensuring "preparedness prevents adversity."

Practical simulation is an important means of competence testing. Regular emergency drills and scenario-based simulations hone nurses' emergency response and practical operation abilities, enabling them to respond calmly when real risks arise.

The construction of the "Five-Prevention System" has driven three fundamental shifts in nursing work: from passive execution to active management, from problem-driven to risk-driven, and from experience-based to evidence-based nursing. The essence of this transformation is moving the focus of nursing work from "problems that have already occurred" to "risks that may occur", reshaping the nurse's role from "order executor" to "patient safety guardian" [6].

3. Implementation pathways

3.1. Top-level design: Integration into hospital development strategy

Taihe Hospital incorporated predictive nursing into its overall development strategy. Under the "Efficiency Improvement Year" initiative, the hospital formulated the Implementation Plan for Promoting Predictive Nursing in Taihe Hospital, defining a two-year construction period with five progressive stages: systematic training, full implementation, mid-term supervision, outcome evaluation, and continuous improvement.

Financial support was fully provided: the 2025 nursing budget allocated CNY 2 million for nursing information system construction, CNY 850,000 for nursing training, CNY 800,000 for nursing specialty development, CNY 800,000 for traditional Chinese medicine nursing, CNY 600,000 for advanced study, CNY 1.08 million for academic exchanges, CNY 300,000 for awards and recognition, and CNY 500,000 for nursing equipment — forming a complete support chain from hardware investment and talent cultivation to academic development.

In terms of management structure, the hospital follows a vertical "decision- management-execution-implementation" system to ensure that predictive nursing concepts effectively penetrate every clinical unit. The Nursing Department incorporated predictive nursing into the comprehensive nursing target management system, signing responsibility agreements with head nurses of all wards, clarifying assessment indicators and scoring standards. In the 2025 nursing comprehensive target management framework, the predictive nursing special assessment accounts for 21 points, covering eight dimensions, including nursing service indicators, inpatient satisfaction, responsible nurse satisfaction, voluntary adverse event reporting, and detection and elimination of major safety hazards, thereby shifting from passive accountability to active empowerment and from post-event remediation to pre-event prevention.

3.2. Stratified management: precise implementation with tailored strategies

To enhance the operability and specificity of predictive nursing implementation, Taihe Hospital established a multi-level stratified management system.

Nursing unit level: According to the severity and risk of patients and nurses' workload, all units were divided into three categories (I, II, III), with differentiated management requirements and assessment standards.

Head nurse level: Based on specialty characteristics, patient criticality, workload, etc., head nurse positions were classified as A or B, with clear indicators, regular assessment, and dynamic adjustment.

Nurse level: Based on professional competence, work quality, and technical title, clinical nursing positions were graded from N0 to N5, enabling refined management of job competencies.

Through stratified management, the hospital ensured that "every person has a goal and every shoulder bears a responsibility", laying the organizational foundation for full implementation of predictive nursing.

3.3. Training empowerment: systematic cultivation of predictive thinking

The core of predictive nursing competence lies in nurses' clinical thinking and risk identification ability, which requires systematic training. Taihe Hospital identified 14 major training themes covering symptom recognition of critical emergencies such as stroke, myocardial infarction, acute pulmonary embolism, and aortic dissection. Nursing management teams visited each clinical department to deliver training. During 2024–2025, 648 training sessions were conducted, with a total attendance of 19,622 nurse-times, essentially covering all nurses in the hospital. Training content included theoretical lectures, clinical case analyses, and scenario-based simulations, solidifying nurses' emergency knowledge reserve, enhancing risk awareness, and cultivating predictive thinking.

Concurrently, the hospital conducted 1,779 skill assessments in emergency procedures and 49 emergency drills. Through "assessment to promote learning, drills to promote application", nurses' emergency response and practical abilities were honed, ensuring that theoretical knowledge and clinical skills translate into core competencies. In 2025, a Predictive Nursing Application Ability Competition was held, using simulated clinical scenarios to comprehensively evaluate participants' clinical application of predictive nursing. Additionally, a Nursing Condition Observation Competition and a Critical Patient Risk Emergency Competition were conducted, with on-site scenario simulations integrating real cases, where 24 excellent nurses competed, fostering a positive atmosphere of "combining competition with training, promoting learning through competition."

3.4. Information technology support: enhancing early warning accuracy

Information technology is a crucial enabler of predictive nursing. Taihe Hospital introduced and developed multiple information systems to significantly improve the accuracy and efficiency of nursing risk identification through data integration, intelligent analysis, and efficient linkage. The hospital upgraded its nursing information system to achieve early risk identification and intelligent reminders; established an I-EWS risk management process based on the CIS system to enable dynamic monitoring and graded early warning of patient deterioration; introduced an early warning management system and a BI nursing data extraction system to provide data support for nursing decisions; and developed an "Overview at a Glance" system for centralized display and efficient linkage of multi-source information.

In practice, the hospital constructed a tri-color early warning management pathway for high-risk nursing patients. Based on urgency and special patient characteristics, risk levels are categorized as: Red (high risk) — critically ill or life-threatening patients, tracked by head nurses for implementation of high-risk measures, with follow-up by deputy director of nursing within 24 hours; Yellow (medium risk) — seriously

ill patients requiring close monitoring, tracked by head nurses of larger units within 24 hours; Green (low risk) — recovering patients with potential risks, tracked by head nurses for implementation of measures, with management strategies adjusted as risk level changes. The tri-color warning system enables dynamic risk grading, precise intervention, and closed-loop management, transforming traditional post-event handling into pre-event warning and intra-event intervention.

3.5. Risk prediction: Comprehensive process review and standardization

Risk prediction is the foundation of predictive nursing. Taihe Hospital established a "regular + timely" mechanism for risk prediction, conducting annual safety hazard inspections and nursing risk reviews covering 272 items. Hospital-wide, 11 risk assessment tools were integrated. Based on high-risk diseases and patients prone to critical deterioration or serious complications, early warning prompts were provided from multiple dimensions (symptoms, signs, laboratory indicators, vital signs) to guide nurses in rapid identification, response, and management of emergencies. At the same time, 168 "one department, one strategy" nursing risk prevention plans were developed, listing key preventive measures in a checklist format to ensure clear risk prevention protocols for each department and patient. At the specialty level, specialty-specific nursing risk early warning manuals were formulated, systematizing and manualizing early warning signals and response strategies for various diseases for easy reference by clinical nurses.

3.6. Performance incentives: A balanced system of rewards and accountability

Performance management is an important lever for promoting predictive nursing implementation. Taihe Hospital established a predictive nursing performance assessment system and a secondary performance distribution plan for nursing units, incorporating key predictive nursing indicators into comprehensive nursing target assessments and strictly auditing performance distribution. The hospital's 2025 Quality Control Implementation Plan specifies that quality performance accounts for 30% of department performance, with department quality control scores directly linked to the proportion of quality performance achieved. This design transforms predictive nursing from a "soft task" into a "hard indicator" and from an "advocacy requirement" into an "accountability constraint."

On the positive incentive side, the hospital established a weekly "Predictive Nursing Typical Case" sharing system and organized "Predictive Nursing Case Sharing" activities. Based on clinical practice and typical cases, the activities demonstrated the entire process from risk prediction and early warning to preventive measures. Model predictive nursing departments and demonstration departments were selected, using benchmarking to stimulate enthusiasm and creativity across the hospital. A series of reports on typical predictive nursing cases was published via the hospital's WeChat official account and other channels, enhancing nurses' professional confidence and sense of professional value. The hospital's Party Committee Secretary summarized at a typical case light-and-shadow exhibition: "The professional value of nursing is seen." This incentive-centered cultural approach enables nurses to truly grow from "executors" into "predictors" and "guardians" of patient safety.

4. Outcomes

4.1. Significant improvement in nursing quality and patient safety

After the implementation of predictive nursing, Taihe Hospital achieved comprehensive improvements in

nursing quality and patient safety indicators. The proportion of reported grade-IV adverse events increased significantly, indicating that more potential safety hazards were detected and intervened upon early, achieving a forward shift of the safety threshold. Elective surgery complication rates, unplanned readmission rates, and average length of stay all decreased, and the incidence of disease and care-related complications was markedly reduced. Specific examples include: through predictive early warning nursing, multiple cases of unplanned return to surgery were avoided; 35 medication safety early warnings were issued; and numerous condition-observation early warning cases emerged. For instance, in the central operating room, a circulating nurse noticed a patient's bilateral neck "progressive" swelling after neck surgery. Relying on her professional knowledge and deep understanding of postoperative complication risks, she adhered to the principle of "no resolution, no rest", promptly reported and escalated the warning, successfully preventing the patient from developing airway compression due to hematoma and thereby avoiding a life-threatening event. These vivid cases fully demonstrate the unique value of predictive nursing in ensuring patient safety and preventing serious adverse events.

4.2. Dual improvement in nurses' professional value and patient satisfaction

After the adoption of predictive nursing management, both physician satisfaction and inpatient satisfaction increased significantly. National public hospital performance assessment results showed a continuously improving patient experience. More importantly, predictive nursing shifted nurses from traditional "order executors" to "safety guardians" and from "passive response" to "active prediction", fully recognizing and highlighting nurses' professional value. The series of initiatives — typical case reports, model department selection, and skill competitions — effectively enhanced nurses' sense of professional achievement, confidence, and belonging, positively alleviating burnout and stabilizing the nursing workforce.

4.3. Industry recognition and demonstration effects

Taihe Hospital's innovative predictive nursing practice has received high recognition from within and outside the healthcare industry. During 2024–2025, the hospital received two "Innovative Practice Cases in Healthcare Quality and Efficiency Improvement" awards from the National Health Commission's Institute of Hospital Management, as well as a first prize, second prize, and best organization award in the Geriatric Rehabilitation Nursing Case Competition of the Chinese Rehabilitation Medicine Association, and an "Excellent Work Award" from the Hubei Provincial Nursing Society. Additionally, five research projects were submitted for funding, five related papers were published, and four utility model patents were successfully granted, initially forming a virtuous cycle of mutual promotion between theoretical research and practical application.

5. Discussion and future directions

The construction and implementation of the predictive nursing "Five-Prevention System" at Taihe Hospital provides a replicable pathway for transforming nursing management models in large public hospitals. Reflecting on the process, several insights can be drawn.

First, predictive nursing competence is cultivable. Taihe Hospital's experience shows that through systematic, hospital-wide training and empowerment, supplemented by practical drills and scenario simulations, nurses' risk awareness and predictive thinking can be significantly improved. Only by

continuously infusing nursing staff with new knowledge, skills, and ways of thinking can the vitality and effectiveness of predictive nursing be maintained.

Second, identifying key elements is critical for improving predictive nursing capability. Effective implementation requires focusing on: identifying key patients (major surgery, critical illness, multiple comorbidities), defining key measures (accurate condition assessment, evidence-based nursing plans, attention to key indicators, establishing warning thresholds), and developing monitoring indicators with regular indicator-driven analysis and improvement. Only by accurately grasping the core elements of predictive nursing can tangible results be achieved in ensuring patient safety and improving specialty nursing quality.

Third, information technology provides essential technical support. Through the introduction and development of multiple information systems, Taihe Hospital achieved early risk identification, dynamic monitoring, and intelligent early warning, significantly improving warning accuracy and intervention efficiency. Practice has proven that deep integration of information technology and nursing management is an important engine driving predictive nursing from concept to practice [7].

Fourth, institutional and cultural construction ensure the long-term sustainability of predictive nursing. Taihe Hospital incorporated predictive nursing into comprehensive target management and performance evaluation systems, establishing a full-chain incentive mechanism from job-based stratified management to secondary performance distribution. As a result, a nursing safety culture of "active prediction and precise prevention" has taken root throughout the hospital. When predictive thinking becomes every nurse's work habit, nursing practice truly shifts from "passive execution" to "active management" and "proactive intervention" [8].

Several challenges remain. Data quality of information systems needs further improvement; the accuracy of predictive nursing decisions requires more evidence-based support; and implementation outcomes vary across departments. In the future, Taihe Hospital will continue to deepen the predictive nursing system, conducting further research on intelligent early warning model development, multidisciplinary collaboration models, and predictive nursing evaluation standards, further unlocking nurses' potential, leveraging nursing's professional value, and contributing nursing strength to the high-quality development of public hospitals.

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Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhao SR, 2026, Practice and Reflection on High-quality Development of a Prefecture-level Hospital under the Context of Deepening Healthcare Reform. China Health Standard Management. 17(2): 43–46.

[2] National Health Commission, National Administration of Traditional Chinese Medicine, 2023, Further

Improvement of Nursing Service Action Plan (2023–2025).

[3] Shun SC, 2020, A Path to Better Nursing: Fostering Person-centered, Proactive Nursing Care. Journal of Nursing Research, 28(6): e119.

[4] Lyu YJ, Cai WQ, Chen TT, et al., 2025, Research Progress on Predictive Nursing Strategies for Critically Ill Patients Based on Artificial Intelligence. China Medical Herald, 22(13): 101–104.

[5] Zhou YH, 2019, Effect of Predictive Nursing on Therapeutic Efficacy of Noninvasive Mechanical Ventilation in Type II Respiratory Failure. Journal of Xinxiang Medical University, 36(1): 89–91.

[6] Kim D, Shin H, Chang SO, 2023, Proactive Nursing: A Concept Analysis. Journal of Korean Academy of Nursing, 30(4): 459–468.

[7] Xue D, Zhou P, Huang JX, et al., 2011, Correlation Analysis between Strategy, Culture and Performance in Chinese Public Hospitals. Chinese Journal of Hospital Administration, 31(6): 15–17.

[8] He HB, Chai JL, Zhao SG, et al., 2021, High-quality Development Transformation Strategy of Public Hospitals Based on the Concept of "Big Quality". Chinese Journal of Hospital Administration, 41(8): 1–3.