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Artificial Intelligence-Empowered Nursing Practice: Current Status, Challenges and Development Paths

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ABSTRACT

Under the macro background of medical digital transformation, artificial intelligence technology has gradually penetrated into the nursing industry and has a far-reaching impact on the traditional nursing service mode and discipline development system. Based on the macro industry perspective, this paper conducts research from the three dimensions of application status, practical challenges and development path, comprehensively sorts out the overall application trend and industry value of intelligent technology in the nursing field, objectively analyzes the ethical risks, adaptation problems and industry weaknesses that are common in the process of technology implementation, and puts forward optimization ideas for the long-term development of the adaptive nursing industry in combination with the development trend of digital medicine. The research aims to provide a macro reference for the standardized and systematic development of intelligent nursing and help the digital and stable transformation and high-quality development of nursing discipline.

1. Introduction

Digitization and intelligence have become the overall trend of reform and development in the modern medical industry. Nursing, as an important foundation of the medical service system, has gradually entered the stage of intelligent iteration[1]. The current level of aging in society continues to deepen, and the demand for public health is constantly upgrading. The traditional nursing model is gradually showing limitations in terms of service efficiency, resource allocation, and service coverage. The integration of artificial intelligence and the nursing field provides a new development direction for improving the quality and efficiency of nursing services and optimizing the structure of medical resources[2]. However, from the perspective of the overall development of the industry, intelligent nursing is still in the stage of exploration and promotion. There are still many areas that need to be improved in terms of technology application, industry standards, talent system, etc. It is necessary to sort out the overall development of the industry from a macro level, rationally view various problems in the transformation process and build a long-term and stable intelligent nursing development system. See Figure 1.

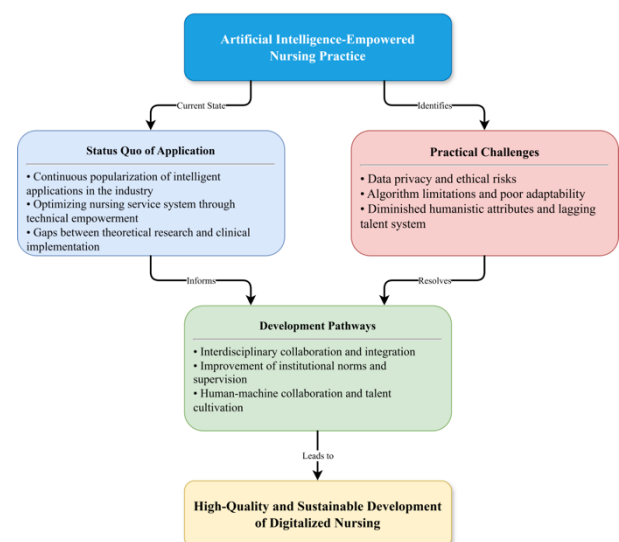


Figure 1: Framework diagram

2. Current Situation

From the macro development trend of the industry, artificial intelligence has gradually integrated into multiple core areas such as clinical nursing, health management, and nursing education, showing a steady promotion and multi-point application trend, providing good technical support for the digital upgrading of the nursing industry. Intelligent technology can rely on the advantages of big data analysis and intelligent computing to assist nursing work in dynamic health monitoring, risk prediction, and service evaluation. It can improve the standardization and accuracy of nursing services at the overall level, alleviate the pressure of traditional nursing work to a certain extent, and optimize the nursing service process [3-5].

Meanwhile, intelligent tools can undertake repetitive and transactional basic work in nursing scenarios, effectively reducing the workload of nursing staff and promoting the gradual transformation of nursing services towards high-quality and high humanistic value [6-7]. In the field of nursing education and remote health services, intelligent technology is gradually being applied, providing new ideas for cultivating digital literacy of nursing talents and promoting cross regional health services. Overall, there is rich academic research on empowering nursing with artificial intelligence in China, with comprehensive theoretical exploration dimensions. However, most of the research remains at the level of theoretical deduction and experimentation. From the perspective of clinical implementation, the scenarios for the deep integration of relevant technologies into the nursing system of medical institutions and the realization of normalized and large-scale applications are still relatively limited. There is still significant room for improvement in the integration of theoretical research and clinical practice.

3. Challenges and Difficulties

Intelligent nursing still faces multidimensional and systematic development challenges in the process of promotion, covering multiple levels such as technological application, industry standards, ethical construction, and talent adaptation, which to some extent restricts the standardized popularization of intelligent nursing.

Firstly, there are hidden risks in terms of data security and privacy protection. The development of intelligent nursing relies on massive medical and health data support, but currently the industry has not formed a unified and perfect data management and privacy protection system [8-9]. There are still regulatory loopholes in the collection, sharing, application, and storage of medical data, and the overall data risk control capability needs to be improved, which poses certain ethical and compliance risks.

Secondly, the inherent limitations of intelligent algorithms pose certain clinical application risks. The current artificial intelligence algorithms generally suffer from industry common problems such as training bias and insufficient decision transparency. The stability and adaptability of algorithm decisions are difficult to fully adapt to complex clinical nursing scenarios [10]. If the industry overly relies on intelligent algorithms to assist decision-making, it is easy to cause homogenization and standardization of nursing services, making it difficult to adapt to the personalized needs of different patients and conditions, which to some extent affects the quality of nursing services and the relationship between nurse and patient trust.

Furthermore, the popularization of intelligent technology can easily lead to industry problems of weakened humanistic attributes in nursing services. Humanistic care, empathetic services, and comprehensive clinical judgment are the core values of nursing discipline, and also the core advantages that cannot be replaced by intelligent technology [11-12]. In the process of digital transformation in the industry, there is a tendency for some scenarios to focus more on technology and less on humanities. Over reliance on intelligent devices to carry out nursing work may gradually weaken the clinical reasoning and subjective judgment abilities of nursing staff, leading to nursing services being more technical and procedural, deviating from the human centered nature of nursing. The existing nursing ethics standards also generally emphasize that intelligent technology can only serve as an auxiliary tool for nursing work and cannot replace the humanistic values and professional judgments of nursing staff [13].

In addition, the industry's talent training system is not well adapted to the pace of intelligent development. The current update of the domestic nursing education system is relatively lagging, with insufficient coverage of cutting-edge teaching content such as digital nursing, intelligent technology application, and algorithm risk assessment. The digital teaching ability of teachers needs to be improved, and the regular digital literacy training system for in-service nursing staff is also not yet perfect [14-15]. The overall intelligent application ability and risk management ability of nursing talents in the industry vary greatly, making it difficult to fully adapt to the industry demand for the large-scale development of smart nursing, and becoming an implicit weakness that restricts the high-quality implementation of smart nursing [16-17].

4. Development Path

From a development perspective, promoting the long-term development of intelligent nursing requires adhering to the core principles of "people-oriented, technology empowerment, ethical support, and standardized development", coordinating multiple dimensions such as technological iteration, institutional construction, talent cultivation, and model innovation, and promoting the deep and stable integration of intelligent technology and the nursing industry.

Firstly, establish an interdisciplinary collaborative development system to enhance the adaptability of the technology industry. Based on the overall development needs of the nursing industry, we will promote interdisciplinary collaboration in medical, nursing, artificial intelligence, big data, and other fields, guide technology research and development to conform to the laws and service characteristics of the clinical nursing industry, optimize the overall adaptability of intelligent nursing technology, and narrow the industry gap between theoretical research and clinical practice [18].

Secondly, improve industry standards and regulatory systems, and build a solid overall risk defense line. Based on the development trend of the intelligent nursing industry, gradually improve the industry standards and institutional norms for medical intelligent application, data management, and algorithm use, clarify the boundaries of industry responsibilities, unify technical application guidelines, regulate the development order of the industry from a macro level, reduce the overall risks of technical application and data management, and protect the legitimate rights and interests of patients [19].

Thirdly, optimize the talent cultivation system in the industry and make up for the overall shortcomings in abilities. Promote the digital reform of the nursing education system, improve intelligent nursing related teaching content, and focus on cultivating nursing practitioners' digital literacy, critical thinking, and risk assessment abilities. At the same time, we will improve the on-the-job training mechanism in the industry, continuously enhance the intelligent service capabilities of the overall nursing team, and create a composite nursing talent pool that is suitable for the digital age.

Fourth, establish a new industry development model for human-machine collaboration. Clarify the industry functional positioning of intelligent technology and nursing staff, rely on artificial intelligence to undertake process oriented and repetitive auxiliary work, and leverage the advantages of efficient technological empowerment; Adhere to the core subject position of nursing staff in clinical decision-making, humanistic services, and ethical control, and balance the industry relationship between technological empowerment and humanistic nursing. Relying on the new generation of information technology, continuously improving the intelligent nursing service system, and promoting the transformation and upgrading of the nursing industry towards precision, prevention, and comprehensive health services [20-21].

5. Conclusion

Overall, artificial intelligence provides important development opportunities for the digital transformation of the nursing industry, optimizing nursing service models, improving industry service efficiency, and injecting new impetus into the innovative development of nursing disciplines. However, at the same time, common industry problems such as hidden risks in data risk control, limitations in algorithm application, weakened humanistic attributes, and lagging talent systems still constrain the standardized and large-scale development of smart nursing. The transformation of the intelligent nursing industry is not simply a combination of technologies, but a comprehensive and systematic industry innovation. In the future, the nursing industry needs to continuously balance the relationship between technological development and humanistic services, efficiency improvement and risk prevention and control. Through institutional improvement, talent cultivation, and model innovation, the empowering value of intelligent technology should be continuously released, and the core values of nursing discipline should be adhered to, promoting the stable, high-quality, and sustainable digital development of the nursing industry.

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