

Research on the Extension Mechanism of Humanistic Care Ability of Emergency Department Medical Staff Assisted by AI

Beilei Huang, Huali You

First Affiliated (Nan Sha) HospitalSun Yat-sen University, Guangzhou, Guangdong, 511458, China

ABSTRACT

Artificial intelligence (AI) is infiltrating the medical field at an unprecedented pace, bringing new momentum to the work of emergency department medical staff. However, a highly intelligent medical environment cannot fully replace genuine human connection. Patients in emergency departments often experience fear, anxiety, and uncertainty. The humanistic care capacity of medical staff directly influences patient trust and treatment experience. While AI enhances the efficiency of information transmission and the precision of decision-making, it also poses the risk of reducing the warmth of interpersonal interactions. Finding a balance between technological efficiency and human compassion has become a crucial challenge for emergency healthcare services. Centering on emergency departments, this paper explores the connotation, challenges, and expansion mechanisms of humanistic care capacity under AI assistance, aiming to inject more warmth and empathy into emergency medical services and achieve a deep integration of technology and humanity.

KEYWORDS

AI Assistance; Emergency department; Medical staff; Humanistic care; Ability extension

1 Introduction

In the emergency department, every second counts. Yet, in this fast-paced process, what patients most desperately need—comfort and understanding—is often overlooked. The torment of illness, unfamiliar surroundings, and a tense atmosphere fill patients and their families with fear and helplessness. Medical staff not only shoulder the responsibility of rapid treatment, but must also convey warmth and trust in high-pressure situations. With the rapid development of AI, technologies like intelligent triage, emotion recognition, and automated monitoring have significantly improved medical efficiency. However, humanistic care—the soul of healthcare—cannot be fully delegated to cold machines. Only when AI becomes an enabler of perception and communication can medical staff more accurately allocate their limited time and energy to meet patients' urgent emotional needs, allowing healthcare to truly return to its essence of "caring with warmth."

2 Connotation and practical dilemmas of humanistic care ability among emergency department medical staff

2.1 The core connotation of humanistic care capacity

The humanistic care capacity of emergency medical staff refers to their ability to respond to patients' psychological, social, and emotional needs with respect, empathy, warmth, and a sense of responsibility, especially in tense, high-speed, and emotionally volatile working environments. This capacity is not only a reflection of professional competence but also the irreplaceable humanistic power in medical behavior. Beyond clinical skills, it requires sensitivity to non-verbal cues and the timely identification of negative emotions such as anxiety, fear, and loneliness, followed by appropriate verbal, physical, and situational interventions. In emergency scenarios, where sudden illness or tragedy unfolds, medical staff must often make quick judgments and provide emotional support to prevent emotional breakdowns in patients and families, maintaining a basic sense of trust. Though intangible, this ability ultimately determines whether healthcare can transcend mere disease treatment and reach the level of treating the person as a whole.

2.2 The practical challenges of humanistic care in emergency settings

Despite its widely accepted value in modern healthcare, the implementation of humanistic care in emergency settings faces serious challenges. The inherently high-intensity, fast-paced, and high-risk nature of emergency medicine keeps staff in a state of physical exhaustion and mental strain, making it difficult to offer each patient adequate emotional support and psychological care. The contradiction between limited staff and the surge in patient numbers forces prioritization of physiological stabilization over emotional needs. Furthermore, the diverse backgrounds of patients—differing in age, culture, and emotional resilience—complicate communication and emotional response.

Miscommunication or lack of understanding can trigger dissatisfaction or even conflict, especially when expectations are unmet due to information asymmetry or treatment anxiety. Adding to this, the lack of standardized procedures and performance evaluation metrics for humanistic care leads to hesitation among staff, despite their willingness. In cases involving special populations such as dementia patients, individuals with intellectual disabilities, or traumatized youth, the absence of professional psychological training further limits effective engagement, increasing workload and diminishing the quality and stability of care.

2.3 Structural constraints on capacity enhancement

Beyond day-to-day pressures, the development of humanistic care capacity is also restricted by deeper systemic issues. On the one hand, both medical education and in-service training often emphasize technical competence while neglecting emotional literacy, with few structured, practice-oriented courses in humanistic care. Most healthcare workers rely on experiential learning to develop care responses, lacking theoretical grounding and institutional guidance, which results in uneven and incidental skill development. On the other hand, hospital evaluation systems rarely include humanistic service quality as a formal metric, focusing instead on clinical efficiency and economic output. This deprioritization undermines intrinsic motivation for humanistic care. Societal recognition of the emotional labor performed by healthcare workers remains inadequate; such efforts are often "invisible, immeasurable, and unrecognized" in both public discourse and institutional policy, weakening staff morale. Particularly in the current AI-driven clinical landscape, as intelligent systems increasingly handle communication, follow-up, and emotion detection, medical staff may begin to rely on these tools excessively, thereby diminishing their own initiative and perceptiveness. The blurred boundaries of technological substitution can lead to new forms of interpersonal coldness and professional detachment. Therefore, extending humanistic care capacity requires a coordinated effort across institutional design, training systems, cultural atmosphere, and technological guidance to reshape the depth and warmth of emergency medicine through a "technology + humanity" model.

3 Mechanism analysis of the extension of humanistic care ability empowered by AI

3.1 AI-assisted approaches to enhancing humanistic care skills of medical staff

In practical applications within the emergency department, AI tools assist medical staff in delivering humanistic care through various pathways. Intelligent triage systems integrate patient condition, speech, and facial expression data, enabling real-time identification of emotional states and providing communication suggestions to help staff quickly assess patients' psychological and emotional needs. When caring for elderly patients, staff are prompted by the system to use a slower tone and maintain eye and physical contact, helping to alleviate inner anxiety. The AI-assisted system can proactively push risk alerts and care recommendations based on changes in patients' physiological indicators, helping medical staff promptly identify abnormal conditions in chronic disease patients. Meanwhile, under AI guidance, nursing staff optimize daily ward rounds and care procedures, dynamically adjusting care plans to provide more targeted support for patients in regaining their daily living abilities. For pediatric patients, even when clinical recommendations are similar, AI often generates lengthy technical terms, whereas experienced physicians transform these into "warm and understandable language, complemented by tone, facial expressions, and gestures," making it easier for families to understand and reducing anxiety. At night, intelligent companion robots are able to automatically detect groaning or crying and promptly notify staff for timely intervention. By continuously collecting diverse cases and follow-up data from clinical practice, the system leverages deep learning models to enhance its recognition of both typical and rare symptoms in pediatric patients, thus providing medical staff with more accurate assistance when dealing with complex conditions. In the follow-up stage, AI automatically generates psychological assessment questionnaires and, based on responses, provides targeted suggestions, such as increasing communication frequency or involving psychological professionals for anxious patients. For communication with family members, AI tools automatically translate medical advice into language or voice messages that are easy to understand and remind medical staff to contact families at appropriate intervals, enhancing information transparency and emotional support.

3.2 Data-driven intelligent identification of humanistic care needs

While medical staff use AI to assist in daily communication and comfort, background systems continuously analyze patient data, shifting humanistic care from passive response to proactive identification. Through vertical data sharing across hospital regional medical consortia, AI assistants can access medical records, imaging, physiological monitoring, and follow-up information in real time, forming dynamic patient profiles. In clinical settings, AI automatically parses speech and text content from consultations, ward interactions, and psychological assessments, capturing expressions of

“anxiety” or “resistance” and pushing potential needs to the responsible staff. For instance, when patients or their families express pessimism or loneliness in communication, the system automatically flags them as high-priority cases. The integration of imaging and monitoring devices with AI modules allows pre-treatment imaging evaluation to be completed in just five minutes, improving efficiency while recording patient behavioral responses and generating emotional tags for subsequent care. The standardized collection of high-quality data is key: “Only with standardized, high-quality data generated under professional clinical models can large AI models function effectively.” At the same time, the AI platform anonymizes and categorizes sensitive data to ensure patient privacy. In practice, AI also dynamically adjusts recognition thresholds based on patients’ psychological history, follow-up feedback, and family support, achieving continuous monitoring and proactive alerts for emotional changes, so that staff can intervene in a timely manner and deliver precise humanistic care services.

3.3 Application of affective computing and natural language processing in communication

Focusing on patients’ emotions and the details of doctor-patient communication, affective computing and natural language processing (NLP) offer more intelligent and practical support for humanistic care in emergency departments. AI-assisted systems can analyze word choices, tone, and speech rate during conversations, and combine these with facial expressions and body movements to assess real-time states of anxiety, fear, or resistance. For example, the system analyzes a vast number of audio and text records of doctor-patient interactions, extracts features of various emotions and communication styles, and automatically generates diverse, human-centered communication strategy templates, enabling medical staff to respond more flexibly to the psychological and emotional needs of different patients. In cases where tension or strong family emotions arise in the emergency department, AI can automatically detect “non-medical” stress signals such as increased speech rate or emotional language, and promptly prompt staff to use gentle language or adjust their communication strategies to improve comfort. In actual consultations, experienced physicians will transform lengthy technical terms generated by AI into “warm and understandable language, complemented by tone, facial expressions, and gestures,” helping families better understand and reducing anxiety. Some hospitals have launched AI voice assistants that dynamically tailor educational content to patients’ cultural background and educational level, such as using graphics and simplified language for those with lower education, thus improving the effectiveness of health education. NLP modules can also automatically generate personalized greetings or psychological counseling suggestions, enabling medical teams to promptly adjust communication approaches and accurately meet patients’ humanistic needs, even under high pressure.

3.4 Optimizing doctor-patient relationships assisted by AI

The deep integration of AI not only changes frontline procedures in emergency departments but also restructures doctor-patient relationships at the institutional and service ecosystem level. By connecting regional medical consortia and multiple hospital branches, hospitals have established AI-based data sharing and collaboration platforms, enabling dynamic updates and visualization of patient information for the entire medical team and providing an institutional basis for collaboration. On this foundation, AI promotes diagnostic transparency and balanced information distribution, effectively reducing misunderstandings and mistrust caused by information asymmetry. For example, AI assistants automatically generate diagnostic records, medication plans, and condition explanations that are synchronously delivered to patients and their families, “automatically translating medical advice into text or voice that is easy for families to understand and reminding staff to contact families at appropriate times,” shortening communication chains and increasing patient participation and sense of security. Multidisciplinary teams use the AI platform to jointly assess patients’ physiological, psychological, and social needs, making care plans “visible on the same screen” and “clearly divided,” thus reducing information omissions and ambiguity of responsibility often seen with single-line communication. In addition, AI facilitates collaboration among medical staff, psychologists, and social workers, forming a comprehensive support system. With the normalization of intelligent follow-up and continuous monitoring, doctor-patient interactions shift from isolated events to ongoing engagement, and trust and understanding accumulate through daily details. By innovating “soft” and “hard” connectivity in institutional mechanisms, AI helps emergency departments build an open, collaborative, and continuously optimized new ecosystem for doctor-patient relationships^[5-8].

4 Optimizing the path to deep integration of AI and humanistic care

4.1 Enhancing dual training in humanistic education and technical literacy

As artificial intelligence continues to penetrate the frontlines of medical care, healthcare professionals must not only master the use of technological tools but also be able to respond with flexibility and warmth in complex and ever-

changing human contexts. To achieve true synergy between AI and humanistic care, it is essential to break the traditional divide between technical and humanistic training and establish a dual-track educational mechanism. On one hand, medical schools and continuing education systems should strengthen the systematization and practicality of humanistic education, incorporating courses such as doctor-patient communication, basic psychology, cultural sensitivity, and empathy training into the core curriculum. Special scenario-based modules should be designed for emergency settings, using role-playing, real-case discussions, and situational simulations to enhance healthcare providers' ability to perceive emotional changes and respond appropriately to patients' psychological states. On the other hand, AI literacy should be simultaneously promoted and deepened, enabling medical staff to understand system functions, user interfaces, and ethical boundaries, thereby increasing their autonomy and confidence in using AI tools. Moreover, interdisciplinary joint training programs should be established, integrating resources from information technology, behavioral sciences, and nursing to foster a multi-perspective knowledge base. This approach will allow healthcare workers to understand both the "logic of algorithms" and the "temperature of emotions," truly realizing a virtuous cycle in which technology empowers humanity and humanity guides technology.

4.2 Building a people-centered standardized system for AI medical applications

While the rapid adoption of AI in emergency departments has significantly improved efficiency, it also raises higher demands for regulatory oversight and humanistic adaptability. At present, most AI systems are developed under enterprise-led models, lacking deep integration with frontline clinical and humanistic needs. Therefore, there is an urgent need to establish a people-centered and emotionally responsive standard system for AI applications in healthcare. During the design and approval stages, regulatory bodies should collaborate with ethics committees, clinical experts, and patient representatives to evaluate AI products based on indicators such as human expression capabilities, emotional recognition accuracy, interaction friendliness, and privacy protection. Before implementation, hospitals should engage medical staff in testing and feedback processes, allowing their practical insights to inform the iterative optimization of system interfaces and communication strategies, ensuring the system aligns with healthcare providers' communication habits and patients' comprehension levels. During actual use, a continuous multi-party feedback mechanism should be established, including evaluations from healthcare workers, patients, and families. This would enable timely identification of issues such as emotional misinterpretation, rigid language output, or disruption in communication flow, allowing for dynamic adjustments to system parameters. By building warm, responsive, and accountable standards, AI can evolve from a "technical assistant" to an "emotional companion," becoming a reliable support force for healthcare providers and a true enabler of humanistic care.

4.3 Creating a collaborative and intelligent humanistic medical ecosystem

The enhancement of humanistic care capacity should not rely solely on the efforts of frontline healthcare workers but must be elevated to a systemic restructuring of hospital governance philosophy. A composite vision of "AI + Humanity" should be embedded throughout hospital management policies, departmental collaboration processes, and service culture development. It is recommended that hospitals establish internal bodies such as "Intelligent Humanistic Care Task Forces" or "Multidisciplinary Integration Committees," bringing together representatives from medical, nursing, psychology, ethics, information technology, and social work departments to oversee the full cycle of AI system implementation, assessment, and feedback. In clinical services, "humanistic care trigger points" can be set up—once the system detects signs of patient anxiety, fear, or resistance, it can automatically send intervention alerts to the care team and recommend suitable communication strategies based on the specific context, assisting staff in responding effectively. At the same time, hospitals should strengthen cultural guidance by promoting the concept of "technology with warmth," encouraging healthcare professionals to view AI tools as amplifiers of human perception, rather than substitutes for professional responsibility. In the long run, through the joint efforts of institutional support, cultural leadership, and cross-sectoral collaboration, emergency care can transition from being "technology-dominated" to a model of integrated development led by humanity and supported by technology—ultimately building a new ecosystem of intelligent and human-centered healthcare.

5 Conclusion

The continuous integration of AI technology provides new ideas and methods for extending the humanistic care abilities of emergency department medical staff. Through data sharing, intelligent identification, and multi-disciplinary collaboration, medical staff can more promptly detect and meet the multi-level needs of patients, fostering doctor-patient relationships that are more trusting, open, and cooperative. However, AI can only serve as an empowering tool

and cannot replace the professional judgment or emotional warmth of healthcare providers. "The care and warmth between people cannot be given by AI." In the future, efforts should focus on further improving technical platforms and strengthening humanistic care capacity, to achieve an organic integration of intelligent technology and humanistic values.

About the Author

Beilei Huang, Full-time undergraduate degree, Nurse, Research Interest: Critical and Emergency Care Nursing.

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