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Discussion

Nursing in a posthuman era: Towards a technology-integrated ecosystem of care



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ABSTRACT

The healthcare sector has undergone significant transformation due to the rapid advancements in artificial intelligence and biotechnologies, presenting both opportunities and threats to the nursing profession. Posthumanism, as a critical perspective challenging anthropocentrism and emphasizing the increasingly blurred boundaries between humans and nonhumans, provides a novel lens to comprehend these technological advancements. In this commentary paper, I draw on the posthuman discourse to argue that in light of these technological forces, we need to contemplate the core values and fundamental patterns of knowing within the nursing discipline, reconfigure nursing scope, redefine its relations with other agents, and embrace a technology-integrated ecosystem of care.

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What is known?

- It has become increasingly prevalent to integrate artificial intelligence and biotechnologies into various nursing domains.
- The nursing profession has been characterized by four interrelated and interdependent metaparadigms: person, health, environment, and nursing.
- The nursing discipline has been profoundly influenced by five fundamental patterns of knowing: empirical, personal, ethical, aesthetic, and emancipatory.

What is new?

- Posthuman discourse provides us with a novel perspective to think about our roles as nursing professionals, our relationship with technology and the broader ecosystem of care.
- Nursing professionals should critically examine the impact of technological advancements on nursing practice and more importantly, the core values and fundamental patterns of nursing knowing. This necessitates a fundamental shift in our familiar mindsets towards technology and health, research

topics and methods, and our normalized nursing practice patterns and pedagogy.

1. Introduction

The emergence of ChatGPT has been a major shock to the world. Its powerful function in generating sophisticated natural language responses has significantly impacted our current life and work and as we can foresee, will transform our lives very shortly. Yet, ChatGPT is just one of the numerous outstanding examples of the rapid progress in artificial intelligence (i.e., AI) and technologies that have surfaced in recent years. A recent systematic review identified 78 chatbots that have been employed to support cancer diagnosis, treatment, monitoring, workflow planning, and health promotion [1]. Furthermore, there is a growing trend in nursing practice that incorporates various types of robots, wearables, voice-activated devices, and virtual reality to support patient rehabilitation and emotional, cognitive, and social needs [2,3]. All these advancements have started to influence nursing roles, workflows, and nurse-patient relationships [4].

In response to the advent of ChatGPT, some informative editorials and commentary papers have been published, discussing the potential benefits, risks, ethical concerns, and wise use of technology in nursing [5–7]. However, few have addressed the broader

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impact of technology on the nursing discipline. In this commentary paper, I draw on the posthuman discourse [8] to argue that in light of these transformative technological forces, we need to contemplate the core values and fundamental patterns of knowing within the nursing discipline, reconfigure nursing scope, redefine its relations with other agents, and embrace a technology-integrated ecosystem of care.

2. Posthuman tenets

In the book *The Order of Things*, French postmodern philosopher Michel Foucault gave a bold assertion about “The Death of Man” to criticize the longstanding anthropocentrism [9]. For centuries, humans have been viewed as “the measure of all things”, the creators of natural laws, and the center of the world. However, Foucault rejected the notion of a fixed, universal, and essential human nature and instead saw humans as historically and culturally constructed beings. “The Death of Man” is an argument for the dissolution of human subjectivity in that it is always shaped by various social, cultural, and historical forces. In the book *We Have Never Been Modern*, another French philosopher and sociologist Bruno Latour argued that modernity characterized by purification or dualistic distinctions, such as nature/culture, subject/object, and society/individual, is flawed. Such binary distinctions fail to capture the complex interconnection among entities [10]. He proposed the Actor-Network Theory which views social interactions as a network of interconnected actors that constantly shape each other. Humans and non-humans are equal actors or agents in shaping social relations and structures [11].

Posthumanism is one stream of the post-thoughts closely linked to and to some extent, influenced by Michel Foucault and Bruno Latour. It is an umbrella term and a multidisciplinary field that has been defined in various ways. Literally, posthumanism can be seen as “after” humanism, a desire to move beyond humanism [12]. In general, posthumanism can be understood from two interconnected perspectives [13]. First, posthumanism is about decentering. It serves as a critique of the anthropocentrism, acknowledging the intricate interdependence of all entities [13]. We are all part of a larger ecosystem of life where humans and their natural environment are interdependent, mutually-constitutive, and thus inseparable. Humans are not the only agents who have intelligence and agency, neither are they the central or dominant species in the world. Rather, environment, technology and other non-human entities play an increasingly significant role in shaping our lives. Posthumanism represents a fundamental shift in the way we understand ourselves and our relationship with the world.

Second, posthumanism is about transcending. It describes a future stage of human evolution characterized by blurring boundaries between humans and nonhumans [13]. In a posthuman era, the conventional understanding of “humans” as pure biological beings separate from other species such as animals and machines, becomes challenged. Rather, the definition of humans becomes more fluid and variable, encompassing a range of entities surpassing the traditional human form. This includes the emergence of cybernetic organisms, commonly known as cyborgs, which combine biological and artificial components. As technology advances and integrates into our daily lives, we become more reliant on it to enhance and augment our physical and cognitive capabilities [8,13]. In healthcare, for example, artificial organs such as artificial hearts, kidneys, livers, and pancreases have been designed to function similarly to their natural counterparts, providing replacement or augmentation options for damaged organs; genetic engineering technology enables manipulation of the genetic makeup of living organisms, offering treatment options for genetic disorders and potentially allowing for the creation of “designer

babies” with desired traits.

There are two underlying assumptions of posthumanism. First, it challenges the notion that thinking and knowing are exclusive to humans and recognizes that the knowing subject is a complex assembles of various organic species and technological artifacts. They interact and connect to produce knowledge. Second, posthumanism asserts that the relationship between humans and nonhumans is not hierarchical. All organisms possess degrees of intelligence, creativity, and ability, and should be viewed as partners in knowledge generation [8].

Posthumanism has several implications for knowledge production regarding the study objects, research methodologies, and conceptual aspects. Posthumanism concerns a collective subject—a broad spectrum of human subjects and non-human objects and subjects (such as animals, plants, and technologies) as the study focus. All these entities are serious agents and co-constructors of collective knowing. Posthumanism also acknowledges that both humans and nonhumans are heterogeneous entities, embracing the principle that “We-are-(all)-in-this-together-but-we-are-not-one-and-the-same” [8,14]. This principle emphasizes the importance of diversity and inclusivity and encourages us to recognize the unique contributions of different perspectives and experiences in understanding the world [14]. Posthumanism requires a shift of perspectives and a dramatic change to our familiar mindsets. Rather than disconnecting the social world from the natural, we should view them as a complex, multi-layered, and interdependent network. Methodologically, posthumanism calls for a high level of interdisciplinary collaboration. The disciplinary and institutional boundaries should be urgently removed to foster engagement and collaboration and build collective knowledge critically and creatively [8].

3. Reconfiguring nursing

There has been a call for introducing posthumanism to nursing to combat the dominance of a longstanding human science perspective which has contributed to a narrow definition and scope of nursing [15]. Posthumanism requires us to interrogate the received wisdom in nursing, reflect on the core values and fundamental patterns of knowing in our discipline, and practically reimagine the role of nurses in the healthcare system [16–19].

3.1. Revisiting the four metaparadigms of nursing

To embrace a posthuman perspective, we need an expansion of the conceptual repertoire of the discipline and fundamentally a reconfiguration of the four metaparadigms of nursing that have been guiding nursing theory development and practice [15,19]. Nursing has been characterized by four interrelated and interdependent concepts: person (i.e., recipients of nursing care), environment (i.e., internal and external context in which nursing care takes place), health (i.e., the state of health or illness of the person) and nursing (i.e., nurses providing care using professional knowledge and skills) [20,21]. Posthuman thoughts have several implications for deepening our understanding of the four nursing metaparadigms:

- (1) Posthumanism challenges the conventional human-centered perspectives that have shaped our understanding of nursing care. In contrast to the traditional emphasis on personal health, posthumanism urges us to situate a person within a broader social, technological, and environmental network. It highlights their collectiveness in shaping the micro-level human well-being and the macro-level sustainable development goal [8,14]. To achieve these goals, nurses should

bear more social and political responsibilities, extending beyond individual health concerns.

First, nurses have the social responsibilities to promote environmental and planetary health, fostering a harmonious coexistence between humans and nature. Planetary health which emphasizes the interconnectedness of the health of humans, other species, and the physical environment, has gained significant traction within the nursing discipline [22]. Nurses are recognized as a powerful force in promoting environmental sustainability and human well-being, and thus achieving sustainable development goals [23]. Second, nurses' political responsibilities are manifested in the emancipatory knowing of nursing, which aims to dismantle systems of oppression and promote equity and fairness [17,18,24]. It involves active engagement in political processes and activities to advocate for social justice, health equity, and the rights of marginalized populations, and collaboration with community organizations and stakeholders to address social determinants of health [18,24].

- (2) Posthumanism emphasizes the interconnectedness and interdependence of humans, technology, and the environment. Health, accordingly, is not purely the absence of diseases but a state resulting from the complex interplay among biological, social, cultural, and technological factors. It implies that a more holistic and personalized care approach should be taken to understand the broader contexts of patients to achieve their health goals [25]. While the concept of holism is well-recognized conceptually, its implementation has been challenging. Zhao proposed a seven-step small data-based approach for personalized care, which considers getting rich patient narratives, building symptom networks, and co-developing individualized care plans as key components [26].
- (3) In light of the increasingly blurred boundaries between humans and machines, posthumanism prompts a critical examination of the traditional concepts of patients and nurses and calls for a revisit of their connotations. Multiple fundamental questions arise that require careful consideration: Can cyborgs be considered patients or recipients of nursing care? Can humanoid nurse robots be recognized as nurses? Is good care necessarily human care? [16,27,28] These inquiries challenge our preconceived notions and highlight the need for a deeper understanding of care in a posthuman context. In a proposed theory of posthuman care, DeFalco challenged the prevailing belief that technology is amoral and neutral and urged us to move beyond the common assumption that human care is the golden standard—*“like ‘us’ humans, care has always been posthuman, a vital, vibrant relationality produced by and through the constant flux of tools and technologies, behaviors, embodiments, economies and ecologies. (P 51)”* [27]. Posthumanism provides a space for discussion on the boundaries of both “patients” and “nurses.”

Posthumanism also challenges nurses' conventional roles and responsibilities, given the growing significance of technology and AI in healthcare. It calls for a more collaborative and inclusive approach to nursing, where nurses actively engage with and harness the potential of technology to provide high-quality and ethical care [27,29].

In light of the emerging and transformative technological forces, we need a more fluid and dynamic view of the nursing profession, situating it within an ever-changing healthcare landscape and constantly reflecting on its core values. Posthumanism offers us a lens to contemplate the connotations of each metaparadigm

critically, consider the implications of their high interconnectedness, and practice healthcare that is more holistic, personalized, inclusive, and ethically-sound.

3.2. Expanding nursing knowing to embrace complexity and diversity

Posthumanism also poses implications for the five fundamental patterns of nursing knowing: empirical, personal, ethical, aesthetic, and emancipatory knowing, which have been well-recognized within the discipline [30,31].

- (1) Empirical knowing refers to the scientific knowledge of nurses developed through observation, measurement, and testing [30,31]. In the posthuman era, AI and biotechnologies provide new data sources and tools for nursing research. This requires us to explore new methodological approaches and data analytic strategies, and collaborate with an interdisciplinary team to build scientific knowledge [32]. It is also essential for nurses to develop capacities in interpreting large-volume and complicated patient health data to inform decision-making. Moreover, the progress in biotechnologies may give rise to new forms of human diseases, such as the risk of infection associated with implantable medical devices [33] and immunogenic toxicity and DNA-damage toxicity caused by gene editing technologies [34]. Nurses need to employ scientific methods to understand the causes, outcomes, and optimal interventions for such conditions.
- (2) Personal knowing refers to nurses' self-knowledge developed through personal experiences, emotions, and an understanding of the subjective experiences of patients [30,31]. In the posthuman era, it is crucial for nurses to actively accumulate personal knowledge on technology use, keep up with and make the best of technologies for patient care [35,36]. Technological competency will be an integral part of caring competency. Furthermore, AI has been increasingly used as a clinical decision-support tool, which requires nurses to enhance their professional knowledge and use these tools critically and judiciously to make clinical judgments [16,37].
- (3) Ethical knowing is the moral knowledge of nurses that involves using ethical principles to guide nursing actions [30,31]. In the posthuman era, technological advancements will present increasingly complex ethical challenges to patient care, such as privacy and personal autonomy concerns. It explains the existence of over 84 AI ethics initiatives to date that have published reports on high-level ethical principles for AI development and deployment [38]. Mittelstadt argued that relying solely on principles cannot guarantee ethical AI practice, particularly in fields such as medicine which has its professional codes and norms [39]. In nursing, we must develop and unify ethical frameworks regarding the use of AI and technology. These frameworks should be implemented in tangible and visible ways to ensure our care is conducted responsibly and ethically. American Nurses Association Center for Ethics and Human Rights suggested that *“for AI to be implemented ethically, it cannot transgress the core values of nursing, usurp aspects of caring that can only meaningfully be carried out by human beings, and it must support, open, or improve opportunities for nurses to provide the uniquely human aspects of care. (P1)”* [40].
- (4) Aesthetic knowing is the art of nursing which requires nurses to use intuition, creativity, and empathy to understand and address patients' needs [30,31]. In the posthuman era, the accessibility of individual health data would allow nurses to

adopt a more holistic and personalized approach to patient care to satisfy their personal needs [25]. Care robots are very likely to share many repetitive tasks from nurses. This would allow nurses to have more time to engage with patients and improve individualized care and patient experiences [29]. Furthermore, with easier access to healthcare information online, patients are expected to play a more proactive role in their healthcare decision-making. The traditional and long-standing paternalistic model of healthcare decision-making may face challenges and shift towards shared decision-making [41]. Nurses, therefore, need to grasp more interpersonal communication skills to assist patients in making informed and values-congruent decisions. A recent case exemplifying this trend is the use of ChatGPT to provide answers for common problems related to prostate cancer. Zhu and colleagues found that although not yet perfect, ChatGPT can provide correct answers to basic questions that prostate cancer patients are concerned about and can analyze specific situations to a certain extent. They further indicated that ChatGPT could help democratize medical knowledge and enable shared decision-making [42].

- (5) Emancipatory knowing concerns the role of nurses in challenging the power dynamic in the healthcare system, advocating for marginalized populations, and promoting health equity and social justice [24,31]. The fast advancement of technologies in the posthuman era would conceivably exacerbate health inequity, with the underprivileged population having limited access to advanced healthcare technologies. In response, nurses should bear more social commitment and responsibilities to critically examine the impacts of technology on marginalized populations and advocate for equitable access to healthcare resources [17,18]. Moreover, nurses and patients should push for an active engagement in technology development and implementation process to ensure its inclusive design and relevance [37].

While these patterns are discussed separately, they are deeply interconnected and intertwined non-hierarchically. It is essential to recognize the validity of each pattern of knowledge. In a posthuman context, this implies that we should challenge the idea of empirical knowledge being supreme and instead advocate for epistemic justice and diversity [17,18,43]. By doing so, these various patterns of knowing can work collaboratively to shape the ongoing development of nursing profession.

4. Toward a technology-integrated ecosystem of care

In our traditional healthcare system, healthcare is considered human care, and technology plays a supportive role. The technology-integrated ecosystem of care in posthuman envisions a shift where technologies are no longer peripheral but rather an integral and central part of the care system [16,44]. Health professionals will be equipped with advanced tools to diagnose, treat, and manage diseases more effectively. The rich personal health data generated from those technologies become a valuable resource in developing tailored and individualized care plans [44]. Just as the role of Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) in our current healthcare practice, technologies such as AI-assisted diagnosis, care robots, wearable devices, virtual consultation and remote monitoring, will become increasingly integrated into the healthcare system to support care and self-care, and shape the healthcare landscape. These technologies work in a coordinated and seamless way to support the full spectrum of care from hospital, community to home [45].

While technology is emphasized in this system, healthcare

teams continue to play an irreplaceable role in multiple aspects. First, health professionals' critical and creative thinking remains vital in developing appropriate treatment plans, especially for people with complex health conditions, comorbidities, or rare diseases. Second, health professionals' skills in performing complex procedures and navigating robots and other technologies are crucial in delivering effective healthcare practice. Third, as health data becomes more accessible, health professionals' abilities to analyze and interpret data become critical to inform treatment decisions. Lastly, health professionals are uniquely positioned to build human connections and provide emotional support to patients. In this ecosystem, it is not only technology and healthcare teams that contribute but also a network of actors, including patients and their families, social workers, professional associations, health insurers, and regulatory bodies. They utilize their knowledge and skills to support patient care and services.

While the technology-integrated ecosystem of care can enhance patient-centredness and efficiency in healthcare practice, it bears ethical risks, such as the security concerns of health data and the potential exacerbation of health inequity, which should be addressed judiciously [38–40]. Additionally, the field must tackle technical challenges such as data standardization and interoperability (i.e., exchanging data seamlessly across different systems and platforms) to allow for better coordination of care [45].

5. Conclusion

Posthuman thoughts provide us with a novel perspective to understand ourselves as nurses, our relationship with technology and the broader ecosystem of care. As the nursing discipline continues to progress, it must actively adapt to and embrace technological advancements, meanwhile critically reflecting on their impact not just on nursing practice but more profoundly, on the core values and fundamental patterns of knowing of the discipline. This will require a fundamental shift in our familiar mindsets towards technology and health, in our research topics and methods, and of course, our normalized nursing practice patterns and pedagogy.

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Data availability statement

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Declaration of competing interest

The authors have declared no conflict of interest.

Appendix A. Supplementary data

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