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Biotechnology: digital revolution and aesthetic knowledge in nursing

Biotecnologia: revolução digital e conhecimento estético em enfermagem

Biotecnología: revolución digital y conocimiento estético en enfermeira

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Abstract

Background: Aesthetic knowledge in nursing has been challenged by the increasing importance of cutting-edge biotechnologies in care processes.

Objective: This article aims to reflect on the new possibilities of thinking and knowledge in nursing brought about by biotechnologies and the digital revolution, starting from Barbara Carper's perspective on aesthetic knowledge in nursing.

Main topics under analysis: Biotechnologies, aesthetic knowledge in nursing, empathic relationship.

Conclusion: The aesthetic component of care, as an organizing anchor, provides meaning and supports clinical nursing practice in contexts of technological hybridism. The idea of an *embodied technology* points towards a different way of systematizing knowledge that allows overcoming the dichotomy between aggressive technology and humanistic nursing care.

Keywords: epistemology; nursing care; technological development; knowledge; esthetics

Resumo

Enquadramento: O conhecimento estético em enfermagem é uma dimensão que tem sido colocada em causa com a afirmação das biotecnologias de ponta nos processos de cuidar.

Objetivos: Este artigo tem como objetivo analisar reflexivamente as novas possibilidades de pensamento e conhecimento em enfermagem trazidas pelas biotecnologias e revolução digital, a partir da perspetiva de Bárbara Carper sobre o conhecimento estético em enfermagem.

Principais tópicos em análise: Biotecnologias, conhecimento estético em enfermagem; relação empática.

Conclusão: A componente estética do *cuidar*, enquanto âncora organizadora, dá sentido e sustenta a *praxis* clínica de enfermagem, em contextos de hibridismo tecnológico. A ideia de uma *tecnologia encarnada* aponta para uma outra forma de sistematizar o conhecimento que permita a superação dicotómica entre a tecnologia agressiva e o cuidado humanizado em enfermagem.

Palavras-chave: epistemologia; cuidados de enfermagem; desenvolvimento tecnológico; conhecimento; estético

Resumen

Marco contextual: El conocimiento estético en enfermería es una dimensión que se ha cuestionado con la afirmación de la biotecnología más avanzada en los procesos de cuidado.

Objetivos: Este artículo tiene como objetivo analizar y reflexionar sobre las nuevas posibilidades de pensamiento y conocimiento en enfermería derivadas de la biotecnología y la revolución digital, a partir de la perspectiva de Bárbara Carper sobre el conocimiento estético en enfermería.

Principales temas en análisis: Biotecnologías, conocimiento estético en enfermería; relación empática.

Conclusión: El componente estético del cuidado, como ancla organizadora, da sentido y sostén a la práctica clínica de enfermería, en contextos de hibridismo tecnológico. La idea de una tecnología encarnada apunta a otra forma de sistematizar el conocimiento que permita la superación dicotómica entre la tecnología agresiva y el cuidado humanizado en enfermería.

Palabras clave: epistemologia; atención de enfermería; desarrollo tecnológico; conocimiento; estético

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Introduction

Knowledge and art in nursing

According to Carper (2006), who has identified fundamental patterns of knowing in nursing, *scientifically validated* knowledge is empirical, factual, objectively descriptive, and generalizable. There is a strong reluctance to accept aspects that do not result directly from empirical research based on the positivist-experimental model as a form of validated knowledge in nursing.

From a conceptual perspective, as well as at the level of the theoretical and ideological substrate, the concept of professional nursing competencies is often imbued with *technical-rational assumptions*.

This technical rationality, which frames the world of professional education and practice in nursing, aims to respond to well-defined instrumental issues that require specific techniques, intervention strategies, and algorithms to solve them.

However, when applied to certain dimensions of nursing care (e.g., mental health), this model proves to be decontextualized, simplistic, and reductive. Consequently, technical rationality-based academic curricula fail to build a structured scientific knowledge in nursing to help students and professionals engage properly in complex and disorganized subjectivities, build integrated therapeutic relationships, or provide healthcare throughout the life cycle in hyper-complex health care environments (Grant & Radclife, 2015).

Therefore, nursing knowledge is much more comprehensive and emerges at a crossroad of bodies of knowledge, in which an *ecology of knowledge* is being built, in a more or less emancipatory way, depending on the contexts and actors that organize and experience the relationship of care at every moment (Santos, 2007; Queirós, 2016).

The history of modernity is marked by the monoculture of scientific knowledge, which delegitimizes any form of knowledge and knowing that are not produced under the parameters of science. The unrest towards the historical and material wasting of non-hegemonic knowledge by modern science culminates in a utopian reflection about the reinvention of knowledge. The hegemonic modernity condensed in scientific rationality and techno-sciences is characterized by ruptures and dichotomies, lines dividing reality, and a way of thinking - abyssal thinking. These dichotomies reflect conceptual fractures rooted in power relations, hierarchies, and constellations of possibilities, epistemological cartographies (Santos, 2007).

The affirmation of nursing as an *art of caring*, as a legitimate form of knowledge, from a fluid and open approach, allows for the integration of multiple conditions, situations, and experiences of *care* (Carper, 2006).

By claiming aesthetic knowledge in nursing as a legitimate and autonomous form of knowledge, we believe that Barbara Carper is expressing the possibility of a *post-abyssal thinking* in nursing.

In a way, a comprehensive and personalized care, due to its subtlety and creative complexity, can incorporate the concept of *Great Art*. For example, some paintings by Rembrandt, namely *Bathsheba at Her Bath* (1654) or *The Polish Rider* (1655), are characterized by showing, within its composition, elements and fragments that do not fall within his usual technical style. This makes these paintings unique due to their *distortions* and, in turn, this lack of unification with his typical style unifies them as a critical painting in comparison to the painting canons of his time. However, the exceptionality of these paintings allows integrating them into the uniqueness of the painter's work, because "disunifying" from the cultural context is the unifying feature of Rembrandt's work (Bal, 1991, p. 75).

Nursing care, given its creative complexity, is characterized in its aesthetic dimension by sensitivity, intuition, and technique. It is accomplished in the interpersonal relationship established in due time by integrating technical protocols, but reconfiguring them based on the subjects' unique and unrepeatable contexts.

Evidence shows that the design of nursing care must be imbued with a sense of structure that gives it an aesthetic dimension, a delicate perception of balance, rhythm, and unity in relation to the dynamics of integra-

tion and association with the whole. The intuitive use of creative resources gives origin to the hyper-complexity of caring, opening up the possibility of using the technological substrate and the scientific evidence of biomedical knowledge in *integral care*. In this sense, aesthetic knowledge in nursing integrates the characteristics of a complex cultural act or process, which causes or produces an aesthetic experience. The experiences of *beauty* and *sublimity,* associated with the aesthetic component of nursing care, are part of care practices and concrete experiences (Siles-Gonzáles & Solano Ruiz, 2016).
This article results from research carried out within the scope of the project Nursing Care: Cyborgs, Biotechnology and Digital Care. Starting from Barbara Carper's perspective on aesthetic knowledge in nursing, it aims to reflect on the new possibilities of thinking and knowledge in nursing brought about by the impact of biotechnologies, digital artifacts, and IT systems on care processes.

Development

Aesthetic knowledge and empathetic relationship

The ability to establish an empathetic relationship is a specific form of aesthetic knowledge in nursing (Carper, 2006) and is particularly challenging in hyper-technological care settings.
The ability to understand and give existential meaning to nurse/patient "encounters" implies that the nurse is able to transform the experience of "what is" into the experience of "what could be" (Chinn & Kramer, 2011, p. 133). This includes an *intuitive element* based on professional expertise and a structured, consistent sensitivity. In other words, nurses may not be able to instantly and completely understand what a specific moment of care delivery means to the patient or family being cared for. However, through their sensitivity, they may intuitively identify elements of the ongoing process that call for an immediate response and act spontaneously according to the patient/family's needs (Billay, Myrick, Luhanga, & Yonge, 2007). Understanding care as a genuine intersubjectivity, in which the interpersonal relationship relies more on the *presence* than on the *object*, involves a high level of risk and unpredictability. In this process, the original fact is not the "logos" but the "pathos", that is, the sentiment, the capacity for empathy, dedication, and care for "the other" (Boff, 2008, p. 33).
In a qualitative study on the therapeutic modalities used by nurses in the care process, Santos (2013) argues that the *therapeutic presence* is characterized by the nurses' *centering* through the intentional use of all their innate resources in the act of caring (emotions, knowledge, body, mind) and the adoption of a *way of being* that is conscious of and attentive to the patient as an *integral being*. In this study, which involved processes of ethnographic observation of the nurse-patient care interaction in cancer units, the nurses' therapeutic presence in some of the moments observed "was so strong that it could be heard", being described as "an ability to connect to the patient's experience that was so intense that often led to alienation" from external factors in the hospital environment (Santos, 2013, p. 162).
Nurses' *active presence* is a way of *being* that requires *being with* or a *being there* while focusing the attention on the patient and being fully aware of the other at the specific time and place (Paterson & Zderad, 2008).
In hyper-technological environments, *nursing care* involves the therapeutic gesture based on technical competence and handling of sophisticated equipment, the ability to make timely decisions taking into account scanned information and algorithms for possible solutions. It also translates into a deeper understanding of the *other*, the his/her experience, creation, and sharing of suffering through the transfiguration of an objectified, fragmented body that is connected to all sorts of life sustaining utensils and materials.
This proximity between nurses and patients is not limited to physical and spatial proximity, nor even to the use of necessary invasive techniques in the territory of the body.
An existential intimacy process between those who care and those who are cared for is particularly challenging in an aggressive

technological environment. The redefinition of the aesthetic knowledge in nursing makes it possible to put the "other" at the center of care. This "other", who is irreducible, invisible, uncontainable, and nonthematizable (Levinas, 2012, p. 162), is the target body of the most aggressive health care technology, on the threshold of life and death, permanently connected to biomechanical and computer artifacts, reduced to scanned metadata and often presenting an altered state of consciousness (sedated or in a coma) and, therefore, completely unable to communicate independently without mediation. From "the other to the one" there is always a relationship, even if it is a relationship without attachment (Levinas, 2012, p. 163). According to Levinas, this encounter with the other is the ultimate experience, the ultimate event. The face of the *other*, in its nakedness, its vulnerability of a unique being exposed to death, is the first step to experience a radical alterity, which resists to any approach that leads to a definitive categorization.

From a phenomenological perspective, a *humanized nursing* is experienced and characterized by an existential, intersubjective, transactional relationship between nurses, as care providers, and patients, as care recipients. Caring also means nurturing, i.e. a care that encourages the other's growth and development.

The empathetic competence, as a form of aesthetic knowledge, enables nurses to establish a bond, a deep connection with the person in a situation of vulnerability, risk, or dependence. It requires "a synchrony of narrative and movement", a precise timing and a fluid process between all those involved in the care situation (Chinn & Kramer, 2011, p. 134).

> A nurse may be going through her daily activities, …, when suddenly she is stopped by something in the patient, perhaps a look of fear, a tug at her sleeve, a moan, a reaching for her hand, a question, emptiness. In a suspenseful pause two persons hover between their private worlds and the realm of intersubjectivity. Two humans stand on the brink of the between for a precious moment filled with promise and fear. With my hand on the doorknob to open myself from within, I hesitate—should I, will I let me out, let him in? Time is suspended, then moves again as I move with resolve to recognize, to give testimony to the other presence. (Paterson & Zderad, 1988, p. 30)

Caring also implies an understanding of this prearticulation of meaning as the virtual field of expressibility that precedes expression as such and that exists in the feltness of language, in the movement before the saying, in the space between the words. It can be gesture, rhythm, movement. It can be the laughter, stuttering, silence (Manning, 2013, p. 158).

An aesthetic knowledge in nursing includes, therefore, the knowledge about the reality experienced by the patient. This implies the ability to listen to what is said, but also to listen to the multiple forms of the "unspoken", whether this be something "not yet spoken" or "what must remain unspoken", in the sense that it is "beyond the reach of speaking" (Heidegger, 1996, p. 407) but must be heard nevertheless.

What is said is not as important as the *act of saying* it and, therefore, the aesthetic knowledge in nursing allows creating this possibility for patients to talk about their various modes of existence - in illness, healing, recovery, or dying processes.

Person-centered care is an *asymmetric relationship* in the sense of a genuine reciprocity in the intersubjective relationship, rather than a hierarchy of nurse-patient subalternity. Caring is assuming full responsibility for others. In a caring relationship, the caregiver is fully responsible for the other and, according to Levinas (2012), this full responsibility accounts for all the others and for the other as a whole, even for the other's own responsibility.

Aesthetic knowledge and hyper-technology

In some health areas, especially those that do not require an immediate, direct interaction with patients, the advances in artificial intelligence have proved to significantly increase

clinical productivity, and will, eventually, lead to the full automation of care in the very near future (Ford, 2016, p. 197).

The use of new technologies and the exponential advances in biomedical research have significantly increased health care efficiency. More accurate clinical diagnoses resulting from algorithms and big data analysis are already being used in hyper-complex clinical settings, either for diagnoses or proposals of therapeutic intervention. These areas are rapidly integrating nursing care. For example, the use of automated robotic systems in storage processes, accurate preparation and administration of drugs, preparation of injectable medicines, preparation of highly toxic drugs for chemotherapy, and also in the instrumental support in operating rooms (Ford, 2016, pp. 199-200).

Outside hospital settings, it is possible to monitor essential clinical data of patients at risk or with long-term diseases in an accessible and cost-effective way, namely through the use of implantable micro-sensors, or contact lenses that allow assessing the level of glycemia in people with diabetes. These devices are connected to mobile applications that are easily available. These data allow for the therapeutic management of complex clinical situations in real time by facilitating the daily lives of these people, and reducing risk factors and the rates of acute admissions and mortality in critical situations (Ghassemi, Celi, & Stone, 2015).

However, digital distance is always greater than analogical distance and the delivery of hyper-technological care based on computer platforms may lead to "the current urgency in rescuing the way-of-being through care with its essential corrective." (Boff, 2008, p. 33).

The plurality of existing and potential knowledge in nursing requires a reaffirmation of the so-called local knowledge, i.e. the knowledge produced in context. Some studies show that nurses working in hyper-technological environments put more emphasis on ecological aspects, and on *high touch* environments rather than on *high tech* environments. Nurses acknowledge that, even in extreme circumstances of aggressive technology, patients require human interaction, engaging care, recognition of their own value, and ability to participate in therapeutic decisions (Meierhoffer, 1995). Nurses seem to be aware that the therapeutic milieu where they intervene (a sum of material relationships in a given time and space) involves an integration of *hard technologies* into the art of care.

The idea of *person-centered care* must be reconfigured in the relational spaces of *technology embodied* in nursing clinical practice. It goes beyond transforming the use of health technologies into a person-centered practice. This approach would imply maintaining a sterile dualism. Technology, as a *way of being*, can help nurses to address patients' basic needs and acknowledge their incorporated and contextualized experiences. However, the dynamics of the *nurse/patient/hyper-technology* triad, in an interpersonal space, needs to be seen as one horizon, taken as a whole. When the health team focuses on technological artifacts, on "things" due to technicians' lack of experience or the tendency to repair the "mechanical" functioning in the disease process, the triad is fragmented and the patient is at risk of becoming one more "thing" (Whelton, 2015, p. 31).

Things can be adjusted, manipulated, controlled, moved around, and organized. But the person, the human body, is not a thing. A human body cannot be reduced to an object, even as a connection of technological interfaces or hospital equipment. A body feels and can be felt. Hyper-technology transforms bodies into unfinished projects, in what is yet to come, through a metamorphosis that has existential meaning even in cases of organic dematerialization (the body seen in laboratory data and imaging reports, the body translated into autopsy results). The libertarian fabrication of the body in the project of modernity, the chemical and cosmetic industry of the body performance outline new mechanisms for the reappropriation of the body and construction of composite identities that legitimize the creation of hybrid, frontier bodies.

Due to biotechnological advances, human bodies have become increasingly bionic, with rechargeable and replaceable parts. Human and non-human (xenotransplantation) biological materials and organs are

being transformed structurally, chemically, and functionally to be used as mechanical replacements for body parts.

Far beyond the fanciful and futuristic images of the 1990s, when the concept of human hybridism/technology gained a new impetus, and as a result of the biomedical revolution and digitalization of suffering, the *cyborgization of the human* has recently invaded our everyday lives, simplifying and turning into routine the use of high-intensity technology in the health area. The increasing digitalization of nursing care will make way for low-cost, high-tech, and easily accessible solutions that can be widely used. In a universe of digital nursing care, patients may lose their identity and turn (or be turned) into a set of standardized data. The digital revolution, which is essential to the effectiveness of therapeutic interventions, health promotion, and management of health issues on a global scale, leads to innovation in care practices.

Technology can be the bridge that allows overcoming the physiological limitations related to disease processes and finding new forms of expression of the *self*. In these new forms of expression, the integrality of the human being, which has been reconfigured and is open to the possibility of a *post-human* world, does not completely abandon the fundamental identity matrix. On the contrary, through a process of *aggiornamento*, this being who is (still) human, by turning to itself, can create and (re)discover his sense of *being-care*. The very nature of essential care, expressed in the sentiment, the capacity to feel emotion, to involve oneself, to affect and be affected (Boff, 2008), becomes part of hard technologies.

Conclusion

The work of nursing care is primarily reconfiguring the *other*, the affirmation of an egalitarian co-presence (as simultaneity and contemporaneity). This implies the awareness of the incompleteness of knowledge, including nurses' professional knowledge about the body, illness, and the possibility of a cure for people facing illness or death.

This notion, which breaks away from reductionist ideas and care practices focused on technicality, can lead to a conscious and critical integration of person-centered care in a technological care setting in relational threshold spaces. The construction of interidentity care relationships based on the intersubjectivities in the intersection of existential processes of health/disease transition or throughout the lifecycle may help to overcome the dichotomies between techno-sciences and the performative act of caring. There lies the place of true listening, a repertoire of ways to build relational contexts, as well as narrative structures, memories, and acts of therapeutic effectiveness anchored in *hard technologies*. In nursing, it is precisely the aesthetic component of care, as an organizing anchor, that provides meaning and support to clinical nursing practice in contexts of technological hybridism, thus allowing them to interconnect. A new notion of aesthetic knowledge in nursing care involves the assumption of a new hybrid and mixed human condition in a functional symbiosis with technology while integrating a repertoire of modes of saying, thinking, and doing. In this way, the *objects* of technological care in nursing (the daily cyborgs) go beyond the mere anthropomorphization to turn themselves into personalization. The aesthetic dimension in nursing care presupposes the full acceptance of the cyborg ontology in its frontier. The idea of *embodied technology* points to another way of systematizing knowledge that allows overcoming the dichotomy between aggressive technology and humanized nursing care. The dichotomous divide is seen as artificial, fragmentary, and contrary to the notion of nursing care. We need to transform the concept of *artisanal knowledge* into *artisan knowledge* in nursing and transfigure the use of technological artifacts, the digitalization of care, going beyond the concept of *artificiality* to assume their full integration into caring for a person, a hybrid body. It means excluding oneself from any pattern of expectation of fragmentation between the logics of techno-sciences and humanized care.

This does not reflect any adherence to pseudoscience or the uncritical rejection of positivist scientific knowledge, with its experimental roots in evidence-based knowledge, or even the depreciation of the technological and digital component in the nursing diagnostic evaluation and clinical intervention processes. Only the aesthetic dimension allows integrating a *hermeneutics of the encounter* into the care relationship, by incorporating the relational contexts in the target phenomena of nursing intervention. It is in these contexts that technological processes of health and disease are effectively built and experienced.

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