






**A notion of nursing care from the perspective of complexity**

**Una noción del cuidado de enfermería desde la complejidad**

**Uma noção de assistência de enfermagem sob a perspectiva da complexidade**

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## ABSTRACT

**Objective:** To explore the notion of care from the perspective of complex thinking and complexity sciences. **Development:** This reflective essay arises from an in-depth examination of the scientific literature produced by other researchers on the subject. The authors start from the health-disease concept, where care is understood as a complex, dynamic, non-linear, and non-sequential process. Despite its apparent "disorganized" flow, this process positively contributes to the restoration of both health and well-being in care recipients. The discussion emphasizes the need to move beyond conceptions of causality rooted in Newtonian models. **Conclusions:** The complexity approach enables nursing professionals to adopt a reflective and active stance, moving away from linear causal conceptions of disease. It incorporates an understanding of the emerging reality that transforms all life scenarios and relationships. It is essential that academic training fosters these reflective and critical skills from a complexity perspective, which can contribute to a broader understanding of the flow between health and disease through a holistic, open, and adaptive approach.

**Keywords:** Systems Analysis; Nursing Care; Nursing; Holistic Health; Health-Disease Process.

## RESUMEN

**Objetivo:** Realizar una aproximación a la noción de cuidado desde el pensamiento complejo y las ciencias de la complejidad. **Desarrollo:** Este ensayo reflexivo se deriva de una profunda consideración al examinar la literatura científica generada por otros autores acerca de la temática de

interés. Los escritores parten del concepto de salud - enfermedad donde confluye la noción de cuidado vista como un proceso complejo que es dinámico, no lineal ni secuencial pero que en torno a este flujo “desorganizado” aporta contribuciones positivas en la restauración tanto de la salud como del bienestar de quien recibe el cuidado e intenta insistir en la importancia del cambio de concepciones de la causalidad proporcionada por modelos newtonianos. **Conclusiones:** La complejidad permite a los profesionales de enfermería ser reflexivos y activos dejando atrás la concepción de causalidad lineal de la enfermedad incluyendo esa realidad emergente que transforma todos los escenarios de vida y relaciones siendo así imperante que desde la academia se forjen estas habilidades reflexivas y críticas bajo el enfoque de la complejidad el cual podrá contribuir a ampliar los horizontes de comprensión de los flujos que emergen entre la salud y la enfermedad desde un enfoque holístico, abierto y adaptativo.

**Palabras claves:** Análisis de Sistemas; Atención de Enfermería; Enfermería; Salud Holística; Proceso Salud-Enfermedad.

## RESUMO

**Objetivo:** Abordar a noção de cuidado sob a perspectiva do pensamento complexo e das ciências da complexidade. **Desenvolvimento:** Este ensaio reflexivo deriva de uma profunda consideração da literatura científica sobre o assunto de interesse, gerada por outros autores. Os autores partem do conceito de saúde-doença, no qual a noção de cuidado se confunde com um processo complexo, dinâmico, não linear e não sequencial. No entanto, é nesse fluxo "desorganizado" que se contribui positivamente para a restauração da saúde e do bem-estar do receptor do cuidado. Eles tentam insistir na importância de mudar as concepções de causalidade fornecidas pelos modelos newtonianos. **Conclusões:** A complexidade permite que os profissionais de enfermagem sejam reflexivos e ativos, deixando para trás a concepção de causalidade linear da doença, incluindo essa realidade emergente que transforma todos os cenários e relações da vida. Torna-se, assim, imperativo que a academia forje essas habilidades reflexivas e críticas sob a abordagem da complexidade, o que pode contribuir para ampliar os horizontes da compreensão dos fluxos que emergem entre saúde e doença a partir de uma abordagem holística, aberta e adaptativa.

**Palavras-chave:** Análise de Sistemas; Cuidados de Enfermagem; Enfermagem; Saúde Holística; Processo Saúde-Doença.

## INTRODUCTION

In 1948, the World Health Organization (WHO) defined health as “a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.”<sup>1</sup> Although this definition has been widely adopted, it is worth noting that, despite including concepts such as “well-being,” health is still predominantly understood as the “absence of disease.” Consequently, both health and life sciences continue to approach health primarily from this perspective.<sup>2</sup> The introduction of concepts such as complexity and complex thinking into healthcare aims to clarify that the fluctuations within the health-disease process cannot be attributed solely to causal agents. On the contrary, factors such as ambiguity, uncertainty, and non-linearity play a central role, directly or indirectly shaping this process.<sup>3</sup>

From the perspective of life as a constant fluctuation of energy, information, and matter, Morin emphasizes that living beings are in a permanent state of self-organization, seeking stability within ongoing instability. It is from this dynamic exchange that states of health or disease emerge. The science of complexity acknowledges the limits to rationally understanding certain behaviors,

environments, and relationships, yet this "open rationality" allows for the exploration and deepening of new horizons.<sup>4</sup>

The nursing discipline, fundamentally oriented toward care focused on human health, has developed a vast body of philosophical, theoretical, and empirical knowledge, all of which is ultimately aimed at preserving and/or restoring health. However, by incorporating the principles of complexity science, the intention is for these foundations to coexist—without being merged—in such a way that their application contributes to goals oriented toward health, well-being, and quality of life.<sup>5</sup>

Throughout history, human beings have required care to safeguard their health and protect what is most valuable: life itself. Thus, care has evolved from an intuitive, observational, experiential, trial-and-error practice to a professional and standardized one. This has been reinforced by the production of evidence that has consolidated this knowledge into structured care practices.<sup>6</sup>

In this context, the following question arises: What is required to provide care? Possible answers include knowledge, praxis, vocation, and research. Indeed, one could argue that all of these are necessary. However, the act of care can be materialized through various perspectives, including self-care, the care a mother provides for her child, care within a family, care between siblings, and care for the sick, among many others. Providing holistic care is central to the philosophy of nursing, characterized by a positive interaction that offers companionship, comfort, trust, attention, and compassion.<sup>7</sup>

The intersection of these influential aspects within the act of care suggests that its flow is not linear. On the contrary, the concept of care has a complex and even disorganized behavior, as it adapts and evolves through its interactions and connections with different elements in response to emerging needs.<sup>8,9</sup>

Approaching care from the perspective of complexity science rejects the notion of cause-and-effect fragmentation. Instead, these elements converge and integrate harmoniously. Biomedical sciences, rooted in traditional approaches, tend to adhere to causal models, as identifying the origin of an event is considered essential for determining a solution. This is not to discredit the historical contributions of such approaches but rather to acknowledge that the non-linearity between cause and effect is inherently challenging to comprehend. Complexity science offers an opportunity to explain and understand these behaviors.<sup>10</sup>

From a theoretical and philosophical perspective, nursing care must be a foundation for living well, bolstering capacities for a healthy life that benefits both individual and collective well-being. This determines the very essence of nursing—care—which emerges from the pursuit of health and life.<sup>7</sup>

It follows that nursing care constitutes a humanized and complex process requiring multiple dynamic and interrelated components. Based on this premise, care models such as the one proposed by Jean Watson make it possible to identify conditions that are fundamental in care providers, particularly in processes marked by fluctuations between health and illness. Among these conditions are humanistic and altruistic training, the systematic use of creative problem-solving in the care process, and the recognition of phenomenological and existential forces, among others.<sup>11</sup>

This reflective essay explores concepts of nursing care from a perspective that integrates both the classical biomedical framework and the principles of complexity science. The aim is to provide a comprehensive and critical understanding, identifying points of convergence and divergence between these approaches. Ultimately, this work aims to approach the concept of care from the perspective of complex thinking and complexity sciences, contributing to new insights that support the advancement of nursing and its body of knowledge.

## DEVELOPMENT

### The complex interaction between health and life

It is relevant to address the interaction between health and life through the lens of complexity sciences, framing it as the study of phenomena, systems, and behaviors that cannot be explained or managed within the framework of a normal distribution. In other words, complex systems are unpredictable and fluctuating, which supports the notion that a living system is the most complex and unimaginable of all.<sup>12</sup>

Discussing complexity sciences implies embracing complex thinking, which is fundamentally rooted in challenging conceptual boundaries and rigid frameworks. This scientific approach seeks to understand, comprehend, and explain reality by integrating, through relational and interconnected reasoning, all those aspects that were traditionally considered unrelated. Within this non-linear dynamic, it aims to recognize and articulate the relationship between what is considered normal and abnormal, as well as between the concrete and the singular.<sup>13</sup>

For this reason, complexity sciences have been regarded as a new paradigm for research, as they help us recognize how the dynamic, chaotic, and non-linear interactions among the elements that make up a system allow for an understanding of variables and their self-organization. This understanding cannot be achieved solely through linear equations. In the health field, this paradigm has been progressively adopted, making significant contributions to the development of research processes. Nursing, in particular, has played an important role by incorporating advanced analytical methods.<sup>3</sup>

An approach to complex thinking inevitably requires shifting our gaze towards quantum theory. In this sense, regarding quantum mechanics, "it is not the equations that make it so difficult to grasp; it is the ideas themselves — they simply do not fit into our heads."<sup>14</sup> Consequently, understanding quantum mechanics requires going beyond the macroscopic vision of the world and focusing on the microscopic realm.<sup>14</sup>

While the idea of elementary particles and atoms presents both an intriguing and confusing challenge, many physicists have dedicated themselves to understanding and explaining their behavior through mathematical models, experiments, and theoretical frameworks.<sup>14</sup> Thus, life itself owes much to quantum mechanics, upon which the very existence of life as we know it depends.<sup>15</sup>

Health and life, therefore, interact with one another to such an extent that life, though not directly visible, is constantly conceived, imagined, and understood—much like health itself. Health is, consequently, a particular manifestation of life. However, life inherently implies uncertainty, indeterminacy, fluctuation, and instability—characteristics intrinsic to complex systems. From this perspective, the health-disease process is profoundly influenced by the tangible and intangible presence of dynamic, non-linear factors that can generate significant changes both at the individual level and within the broader systems that surround individuals. It is precisely this complex and multifaceted interplay that has fueled the need for a paradigm shift.<sup>12</sup>

Complexity science offers a pathway to understanding the world as an interconnected set of systems. Within this framework, life, health, and disease converge, generating profound implications that underscore the necessity for profound transformations and diverse forms of understanding, all of which necessitate a broad and inclusive perspective on human diversity. The act of nursing care, being inherently integrative and open to the principles of complexity science, must adopt a more reflective and proactive role. It is essential to recognize that care processes based solely on disease-centered approaches fail to provide satisfactory solutions. The role of nursing must, therefore, be one of adaptability and agility.<sup>16</sup>

## The complexity of health care

To address the complexity inherent in healthcare, it is first necessary to recognize that nursing remains governed mainly by a reductionist model characterized by linear, predictable, controllable, and fragmented systems. This perspective aligns closely with the prevailing biomedical model, which remains primarily disease-centered.<sup>17</sup> This reveals that knowledge segregation is not an effective method for educating health professionals. Consequently, there is an urgent need to restructure nursing training to break away from the current framework.<sup>8</sup>

To date, medicine, health sciences, and life sciences have focused almost exclusively on disease,<sup>2</sup> a perspective that has inevitably permeated the field of nursing. As a result, nursing care often becomes reduced to disease care. In light of this, a shift in thought is essential to expand our understanding of health towards a more complex perspective.<sup>2</sup> Breaking with this paradigm is necessary, as the static outcomes produced by traditional models have contributed to a stagnation in the advancement of health, quality of life, and well-being.<sup>17</sup>

Health is a phenomenon that begins before the individual, passes through them, but ultimately transcends them, continuing beyond each person.<sup>2</sup> It follows that health is interconnected with multiple non-linear factors that make life possible, and these factors are transmitted from one generation to the following, encompassing biological, social, and cultural dimensions. Therefore, to reflect on health is to reflect on life itself within a complex system. In this context, order, disorder, and reorganization are integral to a worldview that encompasses health, illness, and the safeguarding of life. In this way, complexity represents a framework of concepts that are constantly under construction, never static or definitive. Its purpose is to reconnect knowledge, to unite and disassemble in an ongoing attempt to comprehend the multiple dimensions that shape care practices.<sup>18</sup>

Thus, understanding health as a complex system has the potential to significantly change nursing practice and the role of nurses as health promoters, as they would move beyond exclusively focusing on biological aspects and would gain awareness of the multiple factors that influence an individual's health, quality of life, and well-being.<sup>8</sup> Such an approach contributes to dignified, health-centered care, promoting a more holistic model.<sup>19</sup> In this context, it is essential for nursing professionals to engage in critical reflection regarding their practice, acknowledging its very complex nature.<sup>8,9,18</sup>

From the standpoint of complexity science, health must be regarded as a phenomenon that cannot be confined to conventional frameworks. Consequently, health care is influenced by various elements, including the professional who delivers it, the individual's care needs, environmental factors, culture, beliefs, and the broader social context. For this reason, care cannot be standardized or constrained by notions of normality, as it depends on the intricate interplay of these multiple factors. Nursing care, grounded in human needs, is thus associated intrinsically and extrinsically with those factors and their interaction, generating processes of imbalance and self-organization.<sup>2</sup>

The act of nursing care cannot adhere to a linear, deterministic structure based on certainty and task-oriented, unidimensional solutions.<sup>18</sup> As the outcome of a holistic assessment process, nursing care demonstrates that it is the interaction of multiple dynamic factors that positively or negatively influence health recovery. Adopting this philosophical approach implies that holistic care requires not only the active commitment of nursing as a discipline but also emphasizes the central role of relationships and interactions among patients, nurses, and other health professionals. It entails viewing the patient as a whole, acknowledging the interconnections between different dimensions of health, and promoting communication, collaboration, and integration of care through the active participation of all stakeholders within the health system.<sup>19</sup>

Thus, implementing holistic nursing care goes beyond mere intention; it requires a solid foundation that includes advanced academic training, appropriate infrastructure to meet individuals' health needs, comprehensive and integrative health policies, adequate funding, continuous research, and interdisciplinary support. Nevertheless, it is essential to acknowledge that while nursing plays a central role in promoting holistic health, the success of this philosophy depends on a collective effort.<sup>16</sup>

By interweaving systems analysis—which frames the processes of identifying diagnostic labels supported by complexity science—with nursing care knowledge and practice, it becomes possible to formulate more realistic, useful, and personalized actions. This synergy can generate various scenarios that allow us to appraise the impact of interventions and make informed decisions. However, it is crucial to emphasize that care systems go far beyond the mere step-by-step execution of an action list. Care is a profoundly human experience—personal, comprehensive, intuitive yet grounded in knowledge, respectful yet responsible. Likewise, care is embedded within a complex network of interactions, meanings, and knowledge. Therefore, from the perspective of complexity science, nursing care cannot be reduced to a linear sequence of actions dictated by protocols or isolated interventions; rather, it must be understood as a dynamic, emergent, and relational phenomenon that arises from the encounter between individuals, contexts, and systems.<sup>20</sup>

It is noteworthy that complexity science has provided an integrative and innovative perspective, particularly for the discipline of nursing. This approach enables a broader and more enriching understanding of the health-disease process, fostering dynamic professional practice that adapts to each unique individual and context.<sup>8</sup>

Nevertheless, healthcare models have been designed under principles of standardization, aiming to unify evidence-based operations. These models have provided effective responses and solutions to challenges in the health-disease process. In this regard, incorporating complexity science into such models could introduce greater variability in care practices, making it more challenging to evaluate, measure impact, and ensure quality. Thus, traditional biomedical models continue to be valued, as they produce more predictable prognoses and greater safety in healthcare delivery.<sup>18</sup>

Undoubtedly, complexity has successfully integrated multiple disciplines, with nursing occupying a fundamental place within this care construct by incorporating humanistic, biomedical, and biopsychosocial elements, as well as the metaparadigms of the discipline itself. Incorporating complexity into nursing professionals' care processes enables us to reflect on the importance of the multidimensional interaction of care and, in particular, to accept that unpredictability and disorganization are inherent aspects of life's flow, to the extent that achieving complete control may be impossible.<sup>14</sup>

Complexity science reveals that individuals materialize within countless networks and emergent patterns; therefore, nursing, as a holistic and inherently sensitive discipline, can generate and develop truly effective interventions that promote health and well-being.<sup>7,9</sup>

## CONCLUSIONS

To effect change in nursing care practice, which is currently centered on a deterministic, disease-focused model, it is necessary to adopt a broader vision of care based on the interaction between health and life through complex thinking. It is essential to recognize that although all human beings share the same biological and physiological functions that sustain life, each one is fundamentally different, unique, and unrepeatable. For this reason, care should not be normalized or standardized, as there will always be situations that fall outside the scope of what is already known, requiring

interpretation and action from an indeterminate perspective—that is, from the very essence of complexity.

The contributions generated by standardized care protocols are not disregarded; however, the constant reliance on such protocols by nursing professionals fosters a homogeneous way of thinking and acting, which contradicts the very principles of the discipline, structured around integrality and holism.

Similarly, achieving holistic and comprehensive health care for the entire population necessitates emergent and inclusive macro-level policies that genuinely aim to mitigate both economic and health-related outcomes. Continuing to rely on classical models will neither generate nor contribute positively to this objective.

Finally, academia must incorporate this model, which is grounded in analysis and reflection—fundamental factors for transforming the schematic and rigid approach that currently characterizes care practices in the healthcare sector and, consequently, in nursing.

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