

KUHN'S REVOLUTIONARY THEORY AND ITS INFLUENCE ON THE CONSTRUCTION OF NURSING KNOWLEDGE

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This is a theoretical reflection, grounded in the ideas of "revolution theory" and its influence on the nursing profession. According to authors, many nursing schools have assimilated progress theory and embraced the claim that nursing follows the same revolutionary developmental model as the other sciences analyzed by this model. Thus, this reflection addresses the thesis that the existence of a single paradigm is not acceptable, especially in nursing, which works, assists and cares for human beings who present different perceptions of health/illness events. It argues that, for nursing, the existence of multiple paradigms indicate a strong dynamic science that encourages creativity, fosters the debate of ideas and is open to questioning.

DESCRIPTORS: knowledge; nursing theory; models, nursing

LA TEORÍA REVOLUCIONARIA DE KUHN Y SU INFLUENCIA EN LA CONSTRUCCIÓN DEL CONOCIMIENTO DE LA ENFERMERÍA

Se trata de una reflexión teórica formulada a partir de las ideas sobre la "teoría de la revolución" y su influencia en la profesión de enfermero. Según algunos autores, varias escuelas de enfermería asimilaron la teoría del progreso y adhirieron a la posición que afirma que la enfermería sigue el mismo modelo revolucionario de desarrollo que las demás ciencias analizadas por ese modelo. Así, esta reflexión se refiere a la tesis de que la existencia de solamente un paradigma no es aceptable, principalmente para la enfermería, que trabaja, asiste y cuida de seres humanos que presentan distintas percepciones acerca de las situaciones de salud y enfermedad. Señala que, para la enfermería, la existencia de múltiples paradigmas indica una ciencia fuerte y activa, que incentiva la creatividad, estimula el debate de ideas y se muestra abierta a cuestionamientos.

DESCRIPTORES: conocimiento; teoría de enfermería; modelos de enfermería

A TEORIA REVOLUCIONÁRIA DE KUHN E SUA INFLUÊNCIA NA CONSTRUÇÃO DO CONHECIMENTO DA ENFERMAGEM

Trata-se de reflexão teórica, formulada a partir das ideias acerca da "teoria da revolução" e sua influência na profissão enfermagem. Segundo autores, várias escolas de enfermagem assimilaram a teoria do progresso, aderiram à posição de que a enfermagem segue o mesmo modelo revolucionário de desenvolvimento como as demais ciências, analisadas por esse modelo. Desse modo, essa reflexão remete à tese de que a existência de apenas um paradigma não é aceitável, principalmente para a enfermagem, que trabalha, assiste e cuida de seres humanos que apresentam diferentes percepções sobre as situações de saúde e doença. Aponta que, para a enfermagem, a existência de múltiplos paradigmas indica uma ciência forte e ativa, que encoraja a criatividade, estimula o debate de ideias e se mostra aberta para questionamentos.

DESCRIPTORES: conhecimento; teoria de enfermagem; modelos de enfermagem

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INTRODUCTION

Many philosophers and scientists have investigated scientific development over time⁽¹⁻³⁾. Different theories have been put forward to describe models of scientific advancements based on retrospective analyzes of advancements, both in natural and physical sciences, as well as in social sciences.

The question "how does science develop?" has occupied the mind of philosophers and scientists and was also present in the search for a sound theoretical grounding in nursing. Which process or processes, or paths, has nursing gone through to achieve the current level of development? Nurses have used epistemic frameworks, that is, pre-existent scientific models to answer this question. The use of these theoretical references has certainly influenced the growth and development of the nursing discipline.

During recent years, nursing managed to build significant and connected knowledge of care, interaction, and health, for instance. However, it is necessary to continuously re-think the development of the foundation of nursing, especially the theoretical progress, so as to permit the evaluation and organization of future knowledge.

Theories have had and still have a very important role in the development of nursing. However, knowledge encompasses much more than theories, namely, research, common sense, philosophy and also nursing practice. In this way, nursing's theoretical development can be classified through the theories of revolution, evolution and integration⁽⁴⁾.

The theory of evolution describes changes in a given direction, following from the smallest to the largest, from the simplest to the more complex. In the theory of integration, the construction of nursing knowledge is seen as an evolutionary process that has passed through several crises, where different ideas and theories can exist side by side⁽⁴⁾.

In this context, this study aims to provide a reflection on the development of science described in the book *The Structure of Scientific Revolutions*⁽⁵⁾ published in 1962 and ideas proposed^(4,6) by the "theory of revolution" and its influence on the nursing profession.

We understand that the thoughts put forward here coincide with the concerns and suggestions of scholars and hope they help professionals assume new attitudes, new practices, new ways of thinking

and being, even submitting emergent nursing models to scientific analysis so as to achieve superior knowledge, accepted by the scientific community, and also to achieve better results in care practice⁽⁷⁻⁹⁾. As professionals who deliver care, teach and research, nurses need to consider several kinds of knowledge, practices and cultures, always seeking the "human political ability to know how to critically think and intervene in an immanent quest for increased autonomy"⁽¹⁰⁾.

METHOD

This is a reflective study. *The Structure of Scientific Revolutions*⁽⁵⁾ and *The Road Science Structure*⁽¹¹⁾ were thoroughly studied and their central concepts scrutinized so as to provide a more solid theoretical base. Following, the book was read both in English, its original language^(6,12), and in its German translation⁽⁴⁾, seeking to understand the genesis of nursing as science and its theoretical development based on the theory of revolution and how it has influenced nursing.

THE REVOLUTIONARY THEORY AND ITS INFLUENCE ON NURSING

Thomas Kuhn began his academic career as a theoretical physicist and came into contact with scholars who studied the history of science, which he considered a very fertile field of study. In a long interview held at the University of Athens in 1995 he talked about himself, "here is a man who has never trained as a philosopher, who has been an amateur learning ever more about the subject by himself, of interactions, etc. – but not a philosopher. A physicist who became a historian to answer philosophical purposes"⁽¹¹⁾.

He was probably one of the first scientists to describe the evolution of scientific thinking as a contradictory process in which scientific development does not occur simply by the constant accumulation of knowledge, but rather, is essentially evolutionary and occurs through ruptures and is marked by *revolution*. This theory is based on and corresponds to this concept because "when members of a profession can no longer dodge the anomalies that subvert the existent tradition of scientific practice –

then, extraordinary investigations are carried out and finally guide the profession to a new set of commitments, to a new basis for the practice of science"⁽⁵⁾.

In 1981, 20 years after the publication of his book⁽⁵⁾, he wrote an article in which he shows that revolutionary changes are different and more problematic because they involve discoveries that cannot be accommodated within the limits of the concepts used so far. "One cannot move from the old to the new simply by adding to what was already known [...] nor one can fully describe the new in the vocabulary used by the old and vice-versa"⁽¹¹⁾.

In philosophy, the term revolution can be understood as "radical change of any cultural situation"⁽¹³⁾. He stated that "the central change cannot be experienced in a fragmented way, it involves a relatively sudden transformation"⁽¹¹⁾.

Science develops in leaps and "crises are a necessary pre-condition for the emergence of new theories" that compete with each other, and anomalies and deficiencies emerge, leading to the rejection of a theory and adoption of another⁽⁵⁾. Crises "need only to be the usual prelude, providing a mechanism of self-correction, capable of ensuring that the rigidity of normal science does not remain forever without a challenge"⁽⁵⁾.

Despite other basic facts that can be addressed so as to understand his scientific activity, we focus on the concepts of paradigm and scientific community, as well as on the five periods proposed in the Structure of Scientific Revolutions⁽⁵⁾ that characterize scientific development. He calls the periods: pre-paradigm, normal science, anomalies and crises, the revolutionary and the new period of normal science, also called post-revolutionary.

The phase preceding the formation of science is characterized by different activities and by the disorganization that is found when a paradigm is adopted. Normal science is the period when one acts within a given paradigm accepted by a scientific community. In this period scientists advance within the problems the adopted paradigm permit resolving, but then experience difficulties, called anomalies, which the current paradigm cannot resolve. As these anomalies multiply, a crisis is reached and is resolved by the emergence of a new paradigm, that is, scientific revolution, and a new period of normal science begins.

A paradigm is composed of "universally acknowledged scientific realizations, which provide,

for some time, model problems and solutions for a community of practitioners of a science."⁽⁵⁾ According to him, this term appears in an "inherently circular" form, because it is what scholars share in a scientific community, which in turn is composed of people who share a paradigm⁽⁵⁾. In one of his last works, he mentions that "paradigm was a perfectly good word, until I ruined it"⁽¹¹⁾.

Thus, after several critiques, he adds in 1969 a postscript to his work where he notes, "one quickly realizes that the term *paradigm* is used in most of the book with two different meanings. On the one side, it indicates the whole constellation of beliefs, values, techniques, etc. shared by members of a given community. On the other side, it denotes a type of element of this constellation: concrete solutions to puzzles which when employed as models or examples, can replace explicit rules as basis for the solution of remaining puzzles of normal science"⁽⁵⁾.

The term paradigm was then replaced by the term "disciplinary matrix: disciplinary because it refers to the common possession of practitioners of a particular discipline, is composed of ordered elements of several species [...] they work as a set"⁽⁵⁾.

These ideas influenced the development of nursing knowledge, especially the concept paradigm, understood as a comprehensive repertory of beliefs, values, laws, principles, theoretical methodologies, and ways to implement it. They had the function of guiding theoretical propositions, the fundamental nature of the discipline and methodological strategies. They also provided a level of consensus on theoretical methods and techniques. The paradigm contains questioning of particular area of knowledge and "puzzle" solutions that aid the scientific community to solve problems in the discipline and also serve as examples of its maturing process^(4,6).

Another nursing scholar uses the term nursing paradigm when she puts forward the representation of contemporaneous knowledge. She believes that the paradigm works as a framework that limits the unit, the set, in which structures can develop. Hence, nursing scientists and theorists can use theoretical references from another science but they need to clarify their understanding of: human being, environment, health and nursing, being allowed to add others they deem necessary. Because the concepts and propositions of a paradigm are broad and global, they do not offer any orientation to concrete activities in either nursing research or practice.

Different theories have key points that converge and more recent theories, that is, new theories, do not aim to refute or overthrow older theories⁽¹⁴⁻¹⁵⁾.

A paradigm has several functions and one of them is to identify the nursing domain so that the used concepts and propositions offer their own perspective to the discipline's research and practice, making a distinction from the domains of remaining disciplines. A paradigm needs to precisely involve the phenomena relevant to a discipline – this requirement is only valid when the concepts and propositions are global and there is no redundancy in their information⁽¹⁴⁻¹⁵⁾.

A paradigm has to have a neutral perspective – this requirement is only valid when concepts and propositions do not present a specific perspective, that is, when they do not favor a given model. It has to have international validity – this requirement is only valid when concepts and propositions do not represent any national or cultural beliefs or ethical particularities. Finally, the nursing paradigm is like a framework, so that nurses focus on human beings' integral health, aware that they progressively interact with the environment, whereas the medical paradigm guides physicians in diagnosing and treating diseases⁽¹⁴⁻¹⁵⁾.

Paradigms are found in all periods of scientific activity in which the community does research and investigations. A paradigm previously accepted and that once guided research can present failures or anomalies, triggering crises. Crises might be close to a revolutionary period, the point at which a science passes from one paradigm to another. These periods are called pre-paradigmatic, because the community does not yet possess new theories to guide scientific activities that can establish a proposal of systematic work⁽⁵⁾.

For a paradigm to be accepted, it should be more plausible than its competitors but does not need to explain all the facts it is confronted with. After revolution, a new paradigm emerges and starts to guide all the scientific practice of a given community. The scientific community is "composed of practitioners of a scientific specialty. These were submitted to similar professional initiation and education, to an extent without parallel in most of other disciplines [...] in general each community possesses an object of study [...] are always competing and most of the time these competitions end rapidly [...] they see themselves and are seen by others as the only

responsible for seeking a set of common objectives, which includes training successors [...] communication within the group is relatively broad and professionals' judgments are relatively unanimous [...] though professional communication between groups is sometimes difficult, resulting in misunderstandings, evoking significant and previously unsuspected disagreements."⁽⁵⁾

Techno-scientific development activities are not novel to nursing. Many times, this scientific activity occurred in an unconscious and informal way and not only through research and theorization. Also, concepts and theories, that is, the structuring of nursing knowledge, are developed during nursing practice. There is a considerable scientific production in nursing generated from work processes and concrete realities, which permit grasping contradictions and dynamics that contribute to strategies aimed to change reality⁽¹⁶⁾.

The oldest Western example of theorization is found in the history of the nurse who used her experience accumulated in the Crimean war, relating health and environmental factors, care and systematic data collection, hygiene and well being. A conceptual view of patients as physical, spiritual and intellectual beings who need warmth, food and a calm environment resulted from her efforts. She observed the environment, composed of air, water, sewage, light and cleansing as an external factor related to the patient. Her writings contain components of theories of data collection, and analysis of charts and statistics as well as theories on health and disease, which were evaluated by epidemiologists. Despite critiques, several aspects such as the relation between health and a healthy environment described by this nurse were used in the development of other theories^(4,6,14).

Over time, several authors have criticized revolutionary paradigmatic thinking and all of them converge on the idea that different and competing paradigms can harmoniously co-exist. Rivalry is an ongoing process, and in science several research traditions coexist. Some questions emerge: Would it not be possible for similarities and differences as well as rivalry and cooperation to exist in each historical moment in a given discipline? Paradigms compete with each other and always present extremes, a crisis, absolute differences, that is, a revolution followed by a period of normal science⁽⁴⁾.

In his book postscript, he states that "several critics questioned whether crises (common awareness

that something went wrong) precede revolutions so invariably as I implied in my original text. However, no important part of my argument depends on the existence of crises as an essential pre-requirement for revolutions; they only need the usual prelude so as to provide a mechanism of self-correction⁽⁵⁾.

Several nursing schools assimilated the theory of revolution and adopted the position that nursing follows the same revolutionary model of development as the other sciences analyzed by him. Hence, nursing progress was measured with criteria established by him, which resulted in a critical-negative evaluation through the lenses of revolutionary development, such there is a predominant paradigm that should be assimilated by the whole nursing⁽⁴⁾.

Based only on this premise, nursing as science, does not develop and remains in the pre-paradigm period, since it would not have periods of normal science. Thus emerges the thesis that the existence of a single paradigm is not acceptable in science, especially in nursing, which works with, assists and cares for human beings who present different perceptions of health and disease situations^(6,17).

This thesis that a single paradigm is not acceptable to nursing is also discussed and expanded by authors when they state that the integration of qualitative and quantitative methods is advancement for nursing science. They argue that the existence of multiple paradigms in nursing indicates a strong and active science. They reveal a healthy scientific community that encourages creativity, the debate and change of ideas, promotes a diversity of views, ideas and productivity, and is always open to questioning⁽¹⁸⁾.

The periods of scientific development "can be productive in their capacity to exercise questioning and logic of the critical movement, translated in the concepts of crises and rupture". The proposed model should respect each reality so as to meet the needs of human beings, be coherent and open so that failures can be acknowledged, faced and reorganized⁽¹⁹⁾.

It is worth observing that the development of nursing knowledge should be based on cooperation, avoiding a reductionist view and dogmatic posture when competing for the domain of a paradigm to the detriment of another. The creation of new paradigms in science should allow free expression of art, science and knowledge with a view to recover the essence of nursing phenomena⁽²⁰⁾.

SOME CONSIDERATIONS

The discussion above permitted elaborating several ideas. The course of revolutionary theory in nursing development focused on giving this discipline the status of science, though, it does not encompass the description of the magnitude of science: Nursing. If, in one's analysis, one perceives that the theory of revolution assigns to a scientific community an aggressive feeling during crises, the interaction takes on several aspects: it occurs through competition with the objective of dominating through defeat; the revolutionary process develops through replacement, elimination and discontinuity knowledge development is only approximation, argumentation is confrontation, which necessitates a decline in one party and finally, evaluation is critical and destructive, resulting in a competitive and critical environment.

Competition *per se* should not be encouraged among nursing professionals, but rather cooperation so that the development of its knowledge achieves a higher purpose, which is the multidimensional transformation of the context to which it belongs.

Nursing as science, discipline and profession, seeks the truth, in the sense of constructing a consistent theoretical framework, so as to contribute to individual and collective evolution, whether individuals belong to a scientific community or not. A scientific community committed to changing a given paradigm, or nursing foundations, can be identified in groups of nurses who work in practice or academia – through teaching, research, multiprofessional groups, because the acknowledgement of different sciences can be applied in nursing.

These scientific communities seek maturity, which does not necessarily imply the presence of a paradigm, because transition permits us to achieve a developed science that possesses paradigms that identify challenging puzzles, providing clues to solutions, assuring an intelligent practice.

A revolution is a kind of change involving a given type of re-construction of the group's commitment, which does not necessarily need to be a great change, but needs to be understood as opposed to cumulative changes.

Many of the currently generated conflicts result from shocks between people who have antagonistic perspectives because when one is prisoner of a paradigm one hardly accepts another

competing paradigm. It is worth highlighting that it is important to gain intellectual flexibility to be able to change a paradigm, carefully analyzing it, seeking the ability to appropriately opt for universes into which we are inserted.

Nursing seeks, among other things, integrality, perception, experiences, multiple realities,

the emergence and existence of multiple phenomena, thus, the role of nursing as science is to keep seeking knowledge, bearing in mind that "what one sees depends both on what one looks at and also on what one's previous visual-conceptual experience taught one to see. In the absence of such training, there can only be [...] stunning and intense confusion"⁽⁵⁾.

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