

selected, two other of the quantitative type and two revision and analysis articles that establish proposals to develop the knowledge patterns when providing nursing care.

Knowledge Patterns

A definition of the terms "patrón" (pattern) and "conocimiento" (knowledge) by the Real Academia Española allows us to understand their meaning. "Patrón" refers to a model that serves as a sample to obtain something that is always the same, while "conocimiento" allows us to know or to have a notion of something. "Conocer" (from latin cognoscere -learn) means to find out by the exercise of intellectual faculties the nature, qualities, and relations of things (6).

Devlin in 1999 said that knowledge is not an object, it requires a knower. He thinks that it is an intrinsically human activity that allows someone to obtain information to use it for a particular purpose. It also contains beliefs, values, commitments, experience, contextual information, expert perceptions, and intuition; therefore, it becomes a deliberate action that deals with meanings, depending on the specific contexts where it is obtained from or produced in (7). According to the knowledge hierarchy proposed by Bende and Fish (2000), when individuals process the information, they do it through the personal application of values and beliefs. Thus, knowledge is conceived as a continuous flow that goes from obtaining data (through documents or databases) and then compressing it for a particular purpose (meaning, relevance, and purpose are added) becoming knowledge (7).

For the nursing discipline this hierarchy of knowledge is relevant because it implies a conscious act, a particular and individual way of visualising the complexities of a situation, and to gather the internal resources already experienced to give it meaning. It represents the practical use of abilities, skills, and knowledge to provide integral nursing care, consciously and deliberately, and particularising each situation as a unique care experience for the nurse and the patient (1).

Barbara Carper's Nursing Knowledge Patterns

Barbara Carper in 1978 described what she called fundamental nursing knowledge patterns and stated that the body of knowledge that supports nursing is shown through patterns, that is, through characteristic ways of external and internal expression that show the way that a phenomenon is thought of (5). These patterns were published on the first edition of *Advances in Nursing Science*, based on her doctoral work, where she created a nursing knowledge pattern typology that she called: empirical/nursing science, aesthetic/the art of nursing, the personal component of nursing knowledge, and ethical/the moral component of nursing knowledge (8).

The introduction to this typology somehow allowed organising, clarifying, and exploring various situations where nursing exercises its care practice. Each knowledge pattern makes significant contributions to the nursing discipline in specific areas of its development. Duran de Villalobos said that they are intertwined and indivisible, they enable to focus the discipline development by guiding its practice and that they emerged from the analysis and structure of the nursing knowledge. In addition, she said that each pattern is different from

the whole of nursing, but in turn it contributes to the total knowledge and it is equally important (9).

Carper's knowledge patterns, from their beginnings, were incorporated to the nursing teaching and practice because they were deemed key elements to provide evidence of the discipline knowledge, because each pattern represents a type of knowledge that can be understood and believed (9). In addition, they increase the epistemological complexity and diversity of nursing (10). It is important that all the knowledge patterns be incorporated as a whole, so as to contribute to nursing clinical decision-making deliberately and rationally. Failing to do so can hinder effective choices and produce negative results in the care provided (11).

Description of Carper's Knowledge Patterns

The empirical pattern was designated as the science of nursing. It refers to the use of general laws and theories with the aim of describing, explaining, and foreseeing phenomena of particular concern for the discipline. It provides empirical evidence that can be used for the organisation and classification of the nursing knowledge (4). The advancement in scientific theories and conceptual models has allowed the development of the nursing science and practice, paradigmatic changes, explanation and prediction of facts that produce new perspectives to approach the familiar phenomena of health and illness in relation to the human life process (12). The literature allows claiming that the empirical pattern has been the one that has contributed objective and tangible evidence to nursing the most. It provides the theoretical basis to go on developing its own knowledge and allows the development of research in various areas of interest. Its results contribute a range of theoretical and practical elements that allow laying the foundations of the professional practice in order to improve the quality of the care provided. In relation to this pattern, Jacobs and Chinn said that the empirical knowledge represents the knowledge accrued through sensorial experience. It involves knowledge acquired and passed on through understanding (11). They suggest questions such as: What does it represent? and How does it become representative? The answers allow to provide methodological theoretical support by laying the foundations of the professional practice, implementing theories and models proper of nursing on the basis of the issue to be approached, developing proposals to improve the nursing care, and contributing findings to show the disciplinary development (11).

The aesthetic pattern or the art of nursing is not the result of the empirical research. Carper argued that therefore, there can be conscious reluctance to include it as a nursing knowledge. It could be described as a tacit admission that nursing is partially an art at least. She also said that she had made no sufficient effort to elaborate this knowledge or make it explicit, where so many think of art as a general category of technical and manual abilities developed in the nursing practice (4). An aesthetic experience implies the creation and/or appreciation of singular or particular expressions of subjective possibilities, imaginary or real, that emerge from a discursive projection of language (4). In this sense, it

is necessary to develop communication abilities, be creative, empathise and establish a humanised therapeutic relationship with the patient/family in order to identify objective and subjective aspects that enable detecting the real needs of the patients going through a health-illness experience so as to create an environment that favours their recovery (13). The main role of nurses is to act as sensitive and proactive human beings that distinguishes them from other health professionals, because their professional conduct will reflect "the art" present in all aspects of the nursing practice (5, 14). Developing the aesthetic creation in nursing is complex, it requires abstraction, which shows through the interactions, care interventions, and the attitudes that nurses develops in response to the people. It allows the transformation of the immediate patient-nurse encounter in a perception that is significant in itself, it provides meaning, and it shows in the action taken by the nurse (7, 15). In care, aesthetics not only implies applying scientific knowledge, but showing that priority and key measures are taken so that the patient recovers or develops the capacity to face the situation. This change allows the well-being of the patient and will be the reflection of the actions taken by the nurse.

Empathy is an important mode in the aesthetic knowledge pattern. Putting it into practice allows getting to know the other person in singular and particular situations. "That is the experience of feeling through empathic knowledge". Nurses have many abilities to perceive and empathise with other people's lives, they have a wide range of knowledge that allow them to identify and understand various ways of perceiving the reality and to effectively provide care. Because of the above, it is important that nurses ask themselves the following questions: Do I know what I do? and Do I do what I know? On the basis of these questions the nurses will develop the art in their professional performance as assertively as possible (11).

The personal knowledge pattern expresses the knowledge of oneself (in relation to others). From the intrinsic perspective, it is considered fundamental; it requires the development of "personal knowledge". That is why it is the most problematic to command and teach, but at the same time it is the most fundamental in order to understand the meaning of health in terms of individual well-being (11, 16). For nursing, the interpersonal process that involves interaction, relations, and exchanges between the nurse and the patient is fundamental. This is achieved by getting to know oneself and understand others in order to establish therapeutic relations that favour the individual's health (4, 11). The complexity of developing and showing this knowledge pattern is due to the fact that it involves the "experience of the self", which is obtained by developing personal realities and potentialities facilitating the processes of experiencing, finding oneself, and focusing involved in the ongoing task of knowing oneself. If the nurses do not know themselves, it will be difficult to establish a relationship with other human beings, understand them or face them as persons, thus creating barriers in the care relationship provided. It is important to develop authenticity as a fundamental element in the relationship with others, it implies revealing the "personal self" (what we are in reality is known in private) at any moment or in any situation, while the "external self" is the one most commonly shown and it can easily

be revealed to others. But it does not necessarily mean that the interaction relationships are authentic. Jacobs and Chinn said that this pattern shows "authenticity through the development of the self" (11). Developing this potentiality is achieved through a rich and full inner life. That nursing is sensitised through the use of art, poetry, literature, storytelling, and all those techniques that allow making an effort to understand the human being (person) is a priority (8). It is important that nurses ask themselves Do I know what I do? and 'Do I do what I know?', which allow analysing what is really done in the practice by identifying the true self, acting with authenticity or not and allowing a reflection that is congruent with our professional performance (11).

The ethical knowledge pattern is the moral component of the discipline. It allows showing the duties of the discipline on the basis of personal, professional, and institutional humanistic values (17). Furthermore, it establishes the commitment and respect to human life, it supports personal decision-making in difficult and complex situations of the present world of healthcare, it allows making choices when questioning about moral rights and mistakes in the actions relative to care, treatment of illnesses, and health promotion (4, 15). In order to rule ethical conduct, there are moral and ethical codes proper of the profession, which allow guiding the ethical-professional conduct of nurses based on the compulsory primary principles of preserving life, alleviating suffering, promoting health. However, these do not provide answers to moral issues of difficult personal choice. At present, these situations are very common in the health systems. Nurses have to face these facts by using and applying principles and duties of the discipline (15). This pattern must show that nurses' performance is in line with a morally accepted conduct, adding elements such as virtue, empathy, and compassion when making individual decisions consciously and deliberately on the basis of the empirical knowledge that every professional must show as an individual, with feelings of totality and integrity, which is explained from the epistemological point of view (what is known that a nurse must do) (10). The ethical pattern in nursing implies understanding the different philosophical stands in order to answer Jacobs and Chinn's questions What is good? What is right? 'What is fair?' in the situations of care that nurses implement in the patient or when facing ethical or bioethical dilemmas (4, 5, 11). It allows nurses to establish therapeutic relationships of respect, execute nursing interventions based on an informed consent by considering people in their integrity and totality, as inalienable individuals, with rights as persons and patients. In addition, Martínez stated that they also need the capacity to show sensitivity in particular situations, establish links with the family and health team to manage care, show commitment to the profession, act with respect, tolerance, and solidarity, promote autonomy, justice, and above all, protect the patient by causing no harm whatsoever (14, 18).

After the publication of these nursing knowledge patterns, ten years after, Jacobs and Chinn published in 1988 a nursing knowledge model based on the four knowledge patterns originally named by Carper, consisting in a proposal to present the dimensions that were present in each knowledge pattern, which allowed understanding them. These are: a) the

creative one, which enables understanding how knowledge is created, b) the expressive one, which grasps how the pattern is shown and recognised, and c) the evaluative one, which allows examining knowledge by means of key critical questions, within a development context, and using credibility indexes to prove the knowledge developed. Table 1 shows the dimensions of the Nursing Knowledge Model proposed (11).

Table 1. Dimensions of the Nursing Knowledge Model

DIMENSIONS	CHARACTERISTICS
Creative	It understands how knowledge is created and spread through use. It implies the interaction of the product process, it implies movement.
Expressive	It grasps how the knowledge pattern is shown and recognised.
Assessment	It provides a knowledge examination through: <ol style="list-style-type: none"> 1. Asking critical questions about the types of knowledge 2. Within a process context 3. Using a specific credibility index pattern

Source: Jacobs-Kramer M, Chinn P. Perspectives on knowing: A Model of Nursing Knowledge (1988)

The model proposed by Jacobs and Chinn has allowed identifying the elements considered as key and that must be present when developing each nursing knowledge pattern. It facilitates understanding each one of them and allows analysing whether each pattern is being adequately developed by evaluating them.

Another pattern incorporated to the existing nursing knowledge is the one developed by White in 1995, called socio-political pattern. Considered as the fifth knowledge pattern, it allowed learning the socio-political context of the patient and the socio-political context of the nurse by taking into account the environments where people developed and their interactions, being fundamental to understand them in their entirety. This pattern allows understanding the relevance of nursing in society and vice versa without neglecting the policies socially established (8, 17). White said that the other patterns answer the questions: Who? How? and What? of the nursing practice, while the socio-political context answers 'Where?' thus answering what the situation where the nurse establishes relations with the patient is, by approaching the context where nursing and health care take place (8).

Table 2 Shows what Jacobs and Chinn included as key elements in the Nursing Knowledge Model for each of Carper's patterns according to their dimensions (8, 11).

Table 2. Elements of the Nursing Knowledge Model by Dimension

DIMENSION		EMPIRICAL	ETHICAL	PERSONAL	AESTHETIC
Creative		Describing Explaining Predicting	Valuing Clarifying Advocating	Encountering Focusing Realising	Engaging Interpreting Envisioning
Expressive		Facts Theories Models Descriptions to impart understanding	Codes Standards Normative- ethical theories Descriptions of ethical decision making	I: Authentic and revealing	Art-Act
Assessment	Critical Question	What does this represent? How is it representative?	Is it right? Is it just?	Do I know what I do? Do I do what I know?	What does this mean?
	Context/ Process	Replication	Dialogue	Response and reflection	Criticism
	Credibility Index	Validity	Justness	Congruity	Consensual meaning

Source: Jacobs-Kramer M, Chinn P. Perspectives on knowing: A Model of Nursing Knowledge (1988)

On the other hand, the incorporation of the emancipatory knowledge pattern by Jacobs and Chinn allowed learning the social and political context of the nursing and health care practice by recognising that there are serious social barriers that affect people's health and well-being. This pattern highlights the capacity to show social injustice. Knowledge is necessary to critically examine situations, because injustices are not shown. It is necessary that they are approached through critical reflection and action. The emancipatory knowledge process is developed through practice (15).

The nursing knowledge patterns previously developed support the nursing discipline. Each one of them can be approached individually, but all of them must reflect the professional conduct because they are intertwined and indivisible. Carper said that knowledge patterns can be enunciated as a culture or intellectual philosophy of nursing, but they are not part of theory and they allow answering the questions What is nursing? and What is the nursing

practice? (12).

RESULTS

The results from scientific evidence on Carper's knowledge patterns in nursing education, clinical practice, and research are the ones described below.

In the scientific literature review we found that the typology supports the reference frameworks of several researches that provide the epistemological and ontological foundations, which have been cited over 1800 times in the scientific literature because of their great influence in nursing (19). In this respect, Laura Alberto argued that the practice generated by research develops the empirical pattern, though other authors could argue otherwise. She claims that the ethical, aesthetic, and personal knowledge patterns are subjects to be investigated (20). Most of the literature reviewed, which tries to show the development of knowledge patterns in education or assistance, develops the qualitative research by looking into care situations of the phenomenological type, using storytelling as a technique to explore the individual's experiences when providing care. Fawcett and Lee recognised the importance of developing the production of knowledge in nursing, from undergraduate through to PhD studies to show it in the nursing practice. It is important to involve all the nursing staff, teachers and researchers to create new theories and assess the existing ones. They mention the importance of not only developing the nursing sciences, but also of incorporating all its specific areas because knowledge needs theory based on practical evidence. However, Carper's knowledge patterns are to be included as the result could produce new theories derived from each pattern (21).

In education some researchers have used storytelling as a tool to show knowledge patterns in various learning fields. Gómez et al. measured the perception of care in first term students using tools that approached some of the knowledge patterns, based on nursing theories. The results show that the personal and aesthetic patterns were perceived less frequently (22). Landeros used storytelling in a critical incident, while providing care to a patient, in undergraduate students in order to reflect on the situations students have to face in their clinical practice (23). On the other hand, Bautista measured nursing students' knowledge and relevance of informed consent in nursing care actions by identifying that the aesthetic patterns showed high variations, thus reflecting on aspects related to the function of design of care starting with the cultural baggage that students contribute reaching its highest expression all through their professional exercise and bringing their own individual and differentiating hallmark (13). Muñoz, Morales, and Torres presented the use of cinematographic material in an educational activity to improve the implementation of the care methodology by illustrating aspects related to experience of the illness, the relationships with the health professionals, and their own image in the existing films. They also said that cinema is a valuable resource in education because of its capacity to understand human experience like no other art manifestation (24).

In the field of nursing education, it was found that in the 21st century education in this discipline has had a great transformation because of the theoretical development supporting

it. At an educational level, taking students into account in the type of learning they acquire is a priority. The incorporation of knowledge patterns is part of most nursing programmes, because it somehow allows supporting the epistemology of the discipline; therefore, teaching them is a must in undergraduate programmes (9). In order to promote the development of abilities and skills in undergraduate programmes, it is necessary to establish a syllabus that involve the students and the teachers so as to produce the self-reflective, critical, and analytical capacity of the students and thus favour intellectual development, art appreciation, oral and writing skills, decision-making, acquisition of values, problem solution, introspection, and research from the very beginning (25). The relevance of incorporating art and humanities in nursing education as well as the use of an approach that integrates its knowledge patterns becomes apparent (10). For a student to develop a better sensorial perception, it is necessary to promote the development of the creative capacity (imagination/visualisation) not only for technical activities or procedures, but also for interaction with other people. The development of the cognitive dimension of other fields of interest (historical, linguistic, technical, or cultural) that favours the acquisition of knowledge in a globalised fashion and of a baggage to improve their oral and body expression must be motivated. It is necessary to promote the expressive dimension in order to favour the personal and aesthetic patterns, so that the nurses learn to express their feelings, desires, and emotions through various art techniques (feelings are expressed through painting, body expression, dramatization, poetry, literary expression, music, recording and filming experiences, the use of state of the art technology) among others. The development of the ethical knowledge pattern must be promoted by establishing learning strategies that allow the students to analyse clinical situations that lead them to experience ethical-moral decision making.

In the nursing care clinical practice the contribution shows that there is sufficient scientific evidence that this discipline uses the knowledge patterns to show the development of care in various health areas. Muñoz and Casique tell a care experience in the nurse-patient relation (a boy with neurological and motor sequelae) that involved the feeling of "tenderness". They showed that Carper's patterns are a tool of great importance in the development of the disciplinary knowledge with its epistemological and ontological approach since they allow studying the nurse's knowledge as a person (26). On the other hand, Gómez-Palencia analysed the nursing storytelling technique in an adult patient with cardiovascular disease in an emergency room who was taken care of by nursing students and their teacher. She used knowledge patterns when describing the nursing care experience to identify the health phenomenon of the patient, which facilitated the nursing staff's duty of providing care holistically (27). In turn, Briñez analysed a nursing storytelling derived from an interview with a caretaker in the home of a patient with chronic degenerative disease. She used Kirsten Swanson's care theory and assessed six knowledge patterns: personal, empirical, ethical, aesthetic, socio-political, and emancipatory underscoring that nurses require to develop ethical and aesthetic values as skills to provide the art of care of "listening" (10). Pech used storytelling to analyse knowledge patterns through communication and establish a relation of affection between an

elderly patient and a nurse, showing that the affection shown by nurses to the people under their care is of great importance and fundamental for their recovery (28). Likewise, Hernández used storytelling about the care experience of an elderly chronic patient with communication problems and identified that the ethical and aesthetic values must be developed by the nurses in order to develop the art of care of "listening" (17). This is why the aesthetic knowledge is a key element for the nursing practice, but unfortunately it is perceived as imaginary in the profession, ever more distant from the social meaning of nursing. On some occasions, the art of nursing is related to the search for professional identity or the search for an integrating practice by developing technique the most (doing things right) than showing the necessary sensitivity according to the situations that arise with the patient. Establishing an interpersonal subject-object relationship as the essence of nursing will allow the development of personal knowledge. However, experience is required to achieve it (29).

In nursing research, Espitia analysed the nursing care in the field of plastic surgery from the perspective of knowledge patterns to show how the care practice is expressed, developed, and supported through them, highlighting as relevant that the ways of acquiring each knowledge pattern range from the simple to the complex and must be a personal task that improves the quality and significance of every care act (18). Table 3 shows the summary of the articles selected.

CONCLUSIONS

The use of Carper's knowledge patterns in nursing has served as philosophical support for this discipline ever since they were proposed. They emerged at a very early stage in the incipient development of the nursing science and after decades they still are a fundamental pillar for epistemology (knowledge proper of nursing) and ontology (the essence of being). Carper's knowledge patterns typology was a proposal that allowed organising and grouping the knowledge of the discipline. Each nursing knowledge pattern has essential dimensions and elements that make its understanding easier. They are all indivisible; they can be used individually, but they are integrated as a whole when the practice of care is developed. The four patterns can be shown through creativity, expression, and can be assessed in the provision of nursing care. The hardest pattern to prove, but very important one, is the personal one, as it is necessary that the nurses get to know themselves as persons so as to establish authentic therapeutic relationships between them and the patients they provide care to, in order to favour the individuals' well-being.

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Annex

Table 3. Summary of selected articles

AUTHOR, YEAR	DESIGN	METHODOLOGY
Gómez RO, Daza CL, Zambrano C, Vladimir M. (2008).	Quantitative	Survey to first term nursing students to describe the perception of care they have, approaching Carper's knowledge patterns.
Muñoz TT, Casique CL. (2013).	Qualitative	Storytelling of a care experience with a paediatric patient with neurological and motor sequelae involving the feeling of "tenderness" in the nurse-patient relationship.
Gómez-Palencia I. (2012).	Qualitative	Storytelling technique in a patient with cardiovascular disease in the emergency room using knowledge patterns.
Bautista EG. (2015).	Quantitative, Descriptive, Cross-sectional.	Identified nursing students' knowledge and relevance of informed consent applied to actions proper of nursing care through the application of knowledge patterns in nursing.
Muñoz F, Morales J, Torres L. (2009).	Reflective Review	They present the experience in the use of cinematographic material in an academic activity to improve the implementation of the care methodology and strategies used for the integration of theoretical and practical contents. In order to incorporate all of Carper's knowledge patterns as an educational proposal.
Bríñez AK. (2014).	Qualitative	Storytelling of a care situation in order to analyse the knowledge patterns in an adult caretaker of a father with diabetic amputation at home.
Pech GM, Casique CL. (2014).	Qualitative	Storytelling of an experience about affection as a feeling, to identify the creation of an <u>affective</u> relationship between an elderly Alzheimer's patient in a nursing home and the nurse.
Hernández D. (2013).	Qualitative	Storytelling of a care experience of an elderly chronic oncological patient as a "nursing situation".
Espitia CL. (2009).	Reflection Analysis	Analysis of nursing care in the field of plastic surgery from knowledge patterns to show how the practice of care is expressed, developed, and supported through them.

Source: Escobar-Castellanos (2017)