

REVIEW ARTICLE

Diagnostics of care about environment: A systematic review through nursing taxonomies

Alexandra González Aguña^{1,2,3}  | Marta Fernández Batalla^{1,3,4} |
Enrique Monsalvo San Macario^{1,5} | Juan Antonio Sarrión Bravo⁶ |
María Lourdes Jiménez Rodríguez^{1,7} | José María Santamaría García^{1,3,8}

¹Research Group MISKC, University of Alcalá, Madrid, Spain

²Henares University Hospital, Community of Madrid Health Service, Madrid, Spain

³Hospital de Emergencias Enfermera Isabel Zendal, Community of Madrid Health Service, Madrid, Spain

⁴Torres de la Alameda Health Centre, Community of Madrid Health Service, Madrid, Spain

⁵La Garena Health Centre, Community of Madrid Health Service, Madrid, Spain

⁶Eastern Area of Primary Care, Community of Madrid Health Service, Madrid, Spain

⁷Computer Science Department, University of Alcalá, Madrid, Spain

⁸Meco Health Centre, Community of Madrid Health Service, Madrid, Spain

Correspondence

Alexandra González Aguña, Research Group MISKC, Department of Computer Science, University of Alcalá, Polytechnic Building, University Campus, Barcelona Road Km. 33,6 Alcalá de Henares, Madrid, Spain 28871.

Email: alexandra.gonzalez@uah.es

Abstract

Aim: To analyse the representation of the environment in nursing diagnostic taxonomies.

Design: Systematic scoping review through nursing taxonomies.

Methods: The first phase identified nursing diagnostic taxonomies by systematic review. The diagnoses were associated with the environment by analysis of terms into the diagnosis label and definition. Data analysis was quantitative with frequency measurements. The second phase mapped the identified diagnoses to establish equivalences using analysis by terms in the diagnostic labels. Finally, the findings obtained in the first phase were compared with the OMAHA System.

Results: The bibliographic search identified 112 studies and 16 standardized languages for diagnoses. NANDA-I and ICNP were the most frequent taxonomies; ATIC, the most recent; and OMAHA, the oldest. 2,062 diagnoses from four diagnostic taxonomies were analysed, and 361 associations corresponding to 352 environmental diagnoses were identified. All taxonomies included the environment but with different weight relative to the interpersonal and geopolitical category.

KEYWORDS

Diagnosis, Environment, Nursing, Risk, Standardized Nursing Terminology

1 | INTRODUCTION

During recent years, there has been growing global concern for the environment and its impact on health. In 2015, the United Nations approved the Sustainable Development Goals (SDGs), a framework for joint action by all countries that addresses the social, environmental, economic and political determinants of health (Rosa, 2019; United Nations General Assembly, 2015). This framework of SDG includes elements such as housing, water, sanitation, unemployment or education to promote

prosperity and protect the planet from climate change (United Nations, 2019).

On the other hand, during the last year the COVID-19 pandemic has affected millions of people around the world. The lack of a known effective treatment to cure the SARS-CoV-2 disease has focused efforts on implementing measures to slow the spread of the virus. Control of environmental factors and social relationships are key elements (World Health Organization, 2020a).

Nursing has proven to be the backbone of any healthcare system (World Health Organization, 2020b). The World Health

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *Nursing Open* published by John Wiley & Sons Ltd.

Organization estimates that nursing accounts for approximately 59% of health professionals, of which 19.3 million are professional nurses with at least three years of university training. One of the competency roles of these professional nurses is the promotion of a safe environment, either in hospitals or in communities (World Health Organization., 2020c). However, nursing services are still invisible, and therefore, the impact on health outcomes does not have enough evidence to show its value to society (All-Party Parliamentary Group on Global Health (APPG), 2016).

Standardized nursing theories and languages offer a framework to investigate and demonstrate the scope of the discipline of care. Previous studies analysed the environment and some nursing diagnoses (Green, & Polk, 2009, 2012; Green et al., 2003; Polk & Green, 2007). However, no study has been found that analyses one or more taxonomies in relation to the environment in a global and systematic way as part of care. In this sense, even today there are few articles that apply theory and language of care, compared

with the volume of nursing publications. An example is the numerous publications about the COVID-19, focused on describing and analysing the impact of the pandemic in the nursing work environment compared with two articles that involve standardized nursing diagnoses (González Aguña et al., 2020; Moorhead et al., 2020).

2 | BACKGROUND

The environment is an element of the nursing disciplinary meta-paradigm, together with person, health and care (Alligood, 2018; Hernández Conesa et al., 2003). Conceptual and professional models collect data from the environment to explain what, why and how care occurs (Green et al., 2003; Hernandez Conesa et al., 2003). Caring for the person and the community requires attending to the environment (Green & Polk, 2009).

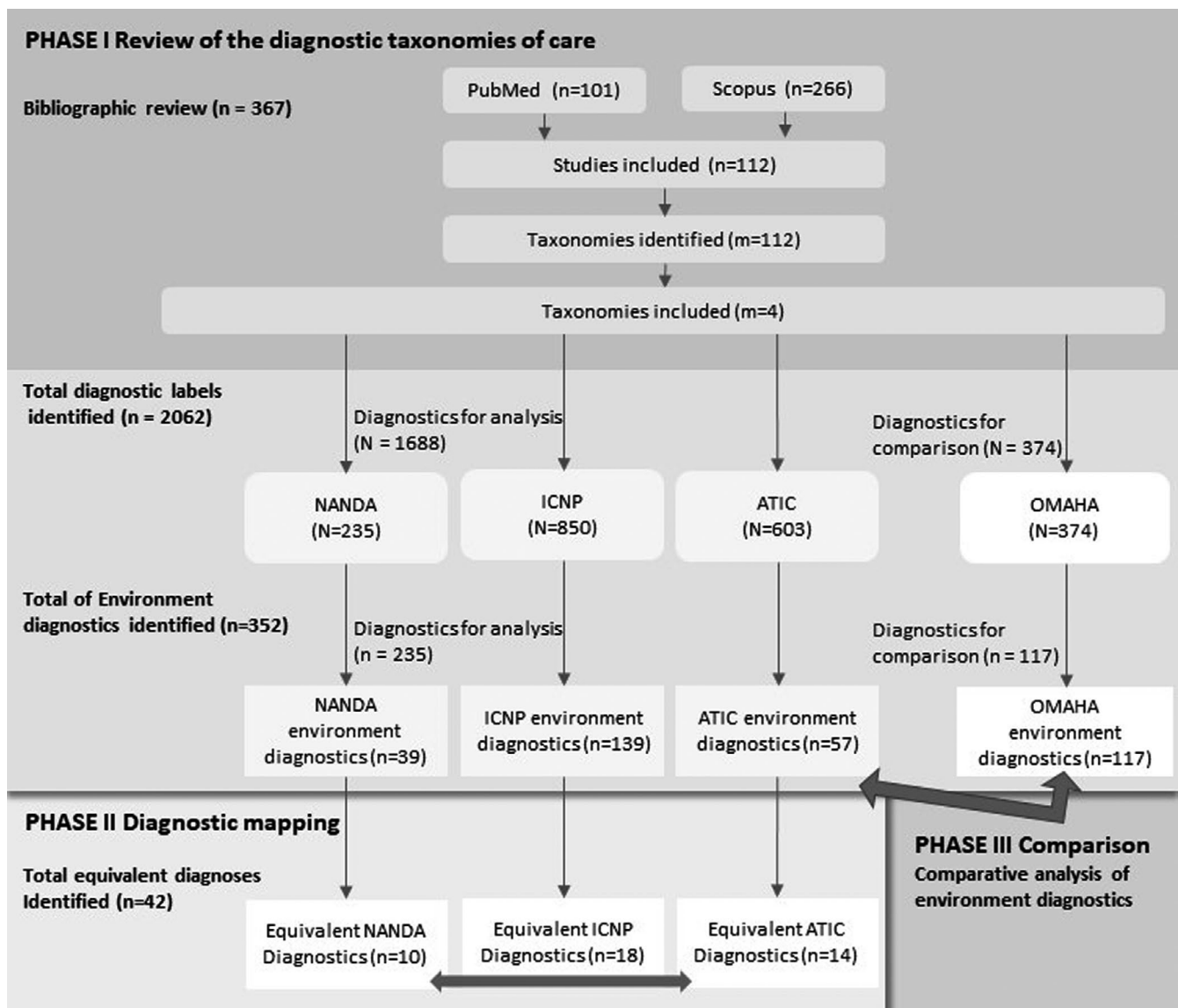


FIGURE 1 Flow chart of procedure

Environment has been present in nursing since its origins as a modern discipline with Florence Nightingale and her book "Notes of Nursing," and later, several models were published that address or include the environment in order to understand the patient care (Alligood, 2018; Nightingale, 2012).

Orem (1993) includes the environment within the basic conditioning factors in self-care theory. Environmental factors include physical, chemical, biological and social space and, on the other hand, family and community. When the person requires professional care, the environment includes the particularities of the health system. Rogers described the person as an open system in constant mutual interaction with the environment (Alligood, 2018; Rogers, 1970). Both systems, person and environment, configure specific recognizable and pan-dimensional patterns. Neuman describes this environmental system through internal and external forces that influence the individual's client system (Alligood, 2018; Neuman, 1995). Leininger understood the environment as a complex and multifaceted dimension of all cultures. The environment includes geophysical, spiritual, technological or social aspects that express different meanings and that affect the culture of care, health and well-being (McFarland & Wehbe-Alamah, 2015).

While the person describes himself/herself in care from vulnerability, the environment represents the risk to face. The care situations appear as a consequence of the convergence of these two meta-paradigmatic elements (Jiménez et al., 2008).

In this sense, research from theories and languages of care is essential to validate the impact on health from an independent perspective and based on care diagnosis (Alligood, 2018).

From the mid-twentieth century, nursing began to generate standardized languages in order to describe their professional performance. Standardized nursing taxonomies were considered as intermediate theories to represent the phenomenon of care (Oliveira Lopes et al., 2017). Currently, more than a dozen standardized languages, terminologies or taxonomies are recognized that have the representation of care as an object of interest (Echevarría Pérez, 2016). Any standardized language offers a set of terms to express the concepts of nursing practice. The terms range from nursing interventions to the diagnosis of care problems (Echevarría Pérez, 2016; Hernández Conesa et al., 2003).

A nursing diagnosis is defined as a clinical judgement about care situation that a person, family or group may present, about responses to actual or potential health problems (Herdman & Kamitsuru, 2017). This diagnostic ability is a clinical reasoning competence, internationally recognized as a professional qualification (European Parliament, 2013).

Taxonomies represent clinical judgements through diagnostic labels, which are terms or concise phrases where the idea or concept of the care problem is condensed. The labels thus provide a common name that the whole community can use to express themselves, record in clinical records and investigate (Herdman & Kamitsuru, 2017).

The structure of nursing diagnoses in taxonomies has evolved over time and they currently apply a standard as a common basis, regardless of where and how it was created. ISO standard 18,104:2014

entitled, *Categorial structures for representation of nursing diagnoses and nursing actions in terminological systems* that specify the structural characteristics of nursing diagnoses and actions, provides a data structure for clinical records (Committee ISO/IEC JTC 1/SC7, 2011). This standard allows the management and interoperability of different standardized languages, even between different disciplines, which allows the content of each one to be analysed and compared.

2.1 | Research questions

The aim of the study was to analyse the representation of the meta-paradigmatic element *environment* in the nursing diagnostic taxonomies.

The study starts with the questions.

- Do nursing taxonomies include care diagnoses focused on the environment?
- Does the environment represent a similar proportion in all taxonomies?
- Are there common environmental diagnoses among nursing taxonomies?

The initial hypothesis assumes that standardized languages are models that represent the complete reality of care, and this includes the social and environmental context. Taxonomies include diagnoses related to the environment, but to a different extent depending on their origin. The ability to represent the context may vary depending on the origin of the analysed language.

3 | THE STUDY

3.1 | Design

Systematic scoping review of the environment in nursing diagnostic taxonomies.

3.2 | Procedure: Method and analysis

The study included three phases to identify the diagnoses related to the environment and compare their presence in the different taxonomies. The procedure is summarized in Figure 1.

3.2.1 | Phase I. Search and review of the diagnostic taxonomies of care

This phase identifies the taxonomies related to the nursing service, selects a sample of diagnostic taxonomies and, subsequently, analyses their content through a systematic review of the language.

TABLE 1 Analysis strategy

Category	Element	Description	Keywords
Interpersonal	Familiar	Group of related people who habitually live together.	Family, familiar
	Parental	People who exercise the role of parents	Parents, parental
	Social	Group of people identified as a group, community or society.	Group, community, society, social.
Geopolitical	Physical environment	Physical-chemical characteristics of the place that surrounds the person.	Environment, ambient, water, air, sanitation.
	Resources	Material, economic and temporary assets	Resource, time, money, economic
	Health service	Characteristics derived from the context of professional health care	Hospital, therapy, treatment, medication, surgery, procedure, diagnosis.

First, a bibliographic review was carried out in PubMed and Scopus following the PRISMA statement of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group; 2009). This phase was carried out by the main researcher, a nurse with university training in data analysis.

The terms used were "Nursing taxonomy" in any part of the text and "Standardized Nursing Terminology" as a keyword. The search was limited in time from the initial records of the databases until December 2019, inclusive. Exclusion criteria were not having an abstract for the screening phase, different language to English or Spanish. The final choice used as an eligibility criterion that the studies included taxonomies for the diagnosis phase. Articles that only included taxonomies for outcome and / or interventions criteria were excluded in the last phase.

The records were analysed by a systematic review to identify the nursing diagnostic taxonomies and select the study sample. This phase was carried out by the main researcher and by a university professor, with a PhD in Computer Science with experience in research in care.

The analysis applied a procedure based on the PRISMA flow chart (Moher et al., 2009). While the first phase carried out a search for records, this second phase carried out a search for taxonomies. The exclusion criteria were interdisciplinary taxonomies, with origin and application other than nursing (eg computing and laboratory) and taxonomies without availability of the full version. The taxonomies evaluated for eligibility had to be nursing taxonomies for diagnosis with application in clinical care assistance. The final selection of the sample to be analysed was carried out by convenience technique with the following criteria: the two most frequent taxonomies in the analysed literature, the most recently created taxonomy and the oldest taxonomy originating from community care.

The environment in the taxonomies was analysed by applying a first division into two categories and these in turn divided into three elements, each one. This division into categories was designed from the synthesis of theoretical nursing models that address the environment, which presented common elements such as the distinction between social and physical, geographic, structural or material environment (Alligood, 2018; McFarland & Wehbe-Alamah, 2015; Orem, 1993; Rogers, 1970). Consequently, the main categories of the environment were defined as interpersonal and geopolitical.

The interpersonal category includes the set of social networks that surround and integrate the person and the geopolitical category includes the set of physical circumstances that accompany the person, regardless of their temporal extension. Both categories are subdivided into three specific elements. The interpersonal category is organized by degree of extension to the individual and is divided into family, parental and social. The geopolitical category is divided into an environment related to physical and chemical conditions in which the person lives, resources that include material goods, economy and availability of time and, finally, health services as the community's ability to meet a person's health needs.

The analysis technique used a set of terms to associate each diagnosis to one or more categories. The analysis strategy is summarized in Table 1.

Each term of the different environmental elements was searched in the diagnosis, both in the label and in the definition. The same diagnosis can be identified with one or more elements. When two associations appear, it is linked to both elements. For example, in International Classification for Nursing Practice (ICNP), "Knowledge of Community Services" is linked to the social element and resources (International Council of Nurses, 2018).

The associations found in the analysis were validated by a panel of clinical experts and teachers. The panel of experts was made up of four specialist nurses in family and community care, with teaching experience, and two university professors who are experts in artificial intelligence and had experience in community care.

Data analysis used measures of absolute and relative frequency to analyse all taxonomies and identify care diagnoses relative to the environment. The two most frequent and the most recent taxonomies were analysed first, and subsequently, the set of results was compared with the oldest taxonomy used as a standard of comparison.

3.2.2 | Phase II. Mapping of common diagnoses

The diagnoses identified in the previous phase were analysed to find equivalences of clinical judgements about the environment.

This phase used a mapping technique that combines two strategies.

On the one hand, the study used the mapping of equivalences presented in the book annexes of ATIC (acronym for "Architecture, Terminology, Interface, Knowledge" in Spanish) (Juvé, 2016). The ATIC book for diagnostics offers a validated mapping between different diagnostic taxonomies, including the NANDA-I (acronym for *North American Nursing Diagnosis Association-International*), ICNP and OMAHA, which allows to establish links between the identified environmental diagnoses (Herdman & Kamitsuru, 2017; International Council of Nurses, 2018, 2019; Martin, 2019).

On the other hand, the study carried out a specific analysis of the diagnostic labels. The diagnoses were compared according to the focus and judgement of the diagnostic label, that is the central element or core that describes the human response and the descriptor that specifies its meaning. The sum of both reviews formed a mapping of equivalences between common environmental diagnoses among the taxonomies analysed.

The mapping was carried out by a group of seven expert nurses, five with experience in family and community care (two of them

specialist nurses) and two nurses with experience in analysis of standardized nursing languages.

3.2.3 | Phase III. Comparison with OMAHA System

The last phase of the study compares the results obtained for each set of diagnoses with the OMAHA taxonomy. OMAHA System presents a Problem Classification Scheme where it lists the diagnoses that are analysed, following the same technique and categories described in the first phase. The taxonomy analysis was carried out by the same panel of experts from phase I, and the data comparison was carried out by two nurses from the research team.

OMAHA System is used as a comparison reference because this taxonomy is one of the oldest standardized nursing languages that is still in force and comes from visiting nurses who attended at home and in the community (Martin, 2019; Topaz et al., 2014).

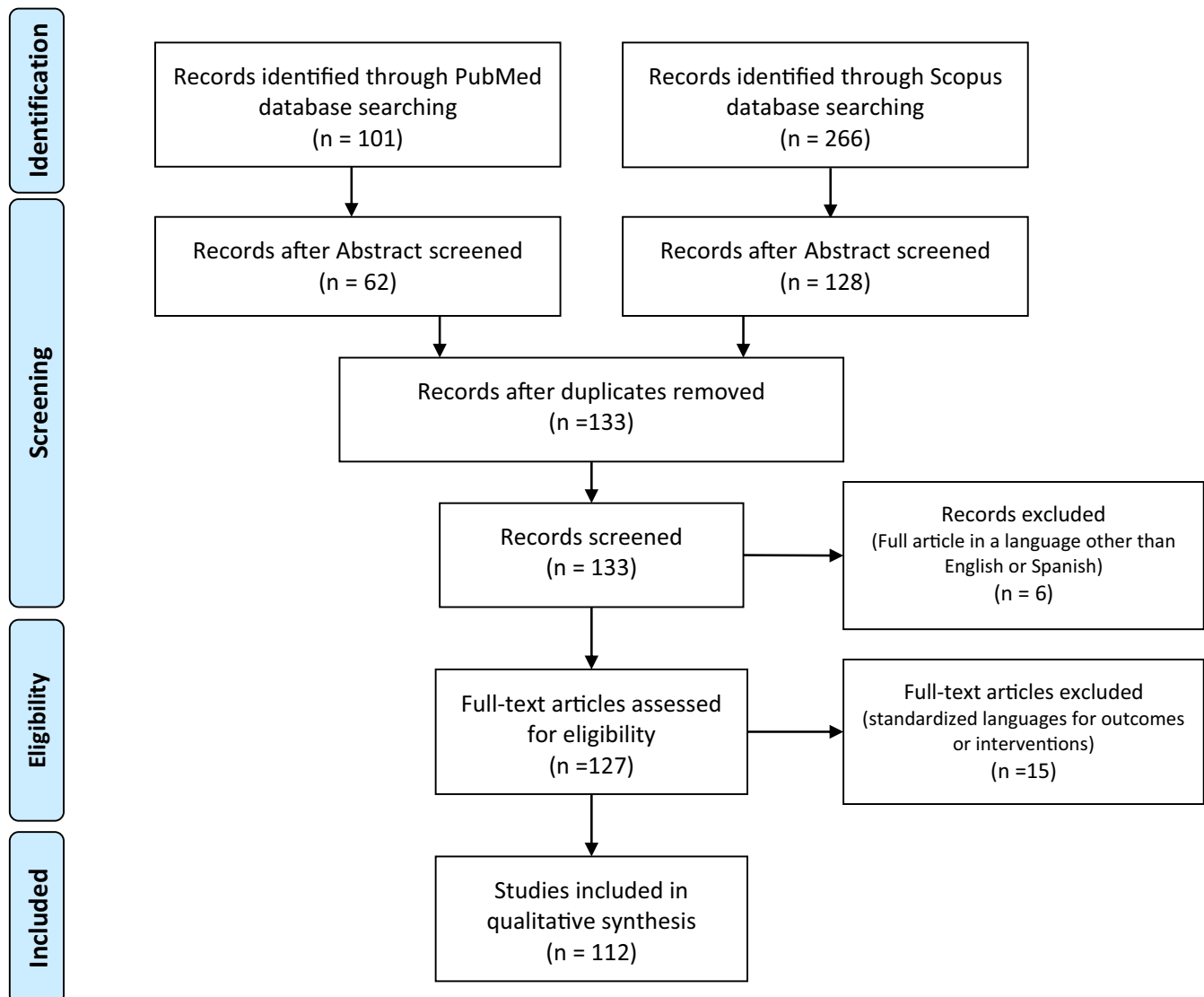


FIGURE 2 Flow diagram of searching for record selection

3.3 | Ethics

Research Ethics Committee approval was not required. All participants in the expert panel were informed of the study objective and process, and all gave their consent for participation. No participant of the expert panel left the studio.

4 | RESULTS

The study analysed a total of 2,062 diagnoses and identified 235 diagnoses related to the environment, which presented 361 links to the established categories.

The results are shown following the description of the study phases.

4.1 | Phase I. Search and review of the diagnostic taxonomies of care

The process of the bibliographic review is summarized in the PRISMA flow diagram in Figure 2. The 112 records identified were analysed to find standardized languages. The systematic review found 16 standardized languages for care diagnoses, and their analysis process is

summarized in Figure 3. Some of these standardized languages have a primary reference source, and others have only been found in articles (American Psychiatric Association, 2013; AORN, 2018; Henry et al., 1994; Herdman & Kamitsuru, 2017; International Council of Nurses, 2018; Juvé, 2016; LOINC, 2020; Martin, 2019; Saba, 2019; SNOMED International, 2020; Strudwick & Hardiker, 2016; Thoroddsen, 2005; Thoroddsen & Thorsteinsson, 2002; Werley et al., 1991; World Health Organization, 2019).

The NANDA-I, ICNP and ATIC taxonomies were analysed in this first phase (Herdman & Kamitsuru, 2017; International Council of Nurses, 2018; Juvé, 2016; Martin, 2019). The OMAHA System taxonomy was used in the third phase as a comparison reference (Martin, 2019).

The analysis of the NANDA-I, ICNP and ATIC taxonomies is summarized in Table 2.

ICNP included 142 associations that represent 16.706%. This amount drops to 139 diagnoses (16.353%) after filtering those cases where there is more than one relationship for the same clinical judgement label. In addition, ICNP is the only one of the three taxonomies able to provide representation for all item elements.

NANDA-I obtained 45 associations to the environment from 39 diagnostic labels (16.596%). This taxonomy showed the highest proportion for the interpersonal category. However, no label was associated with resources and health services. The diagnosis “Inefficient

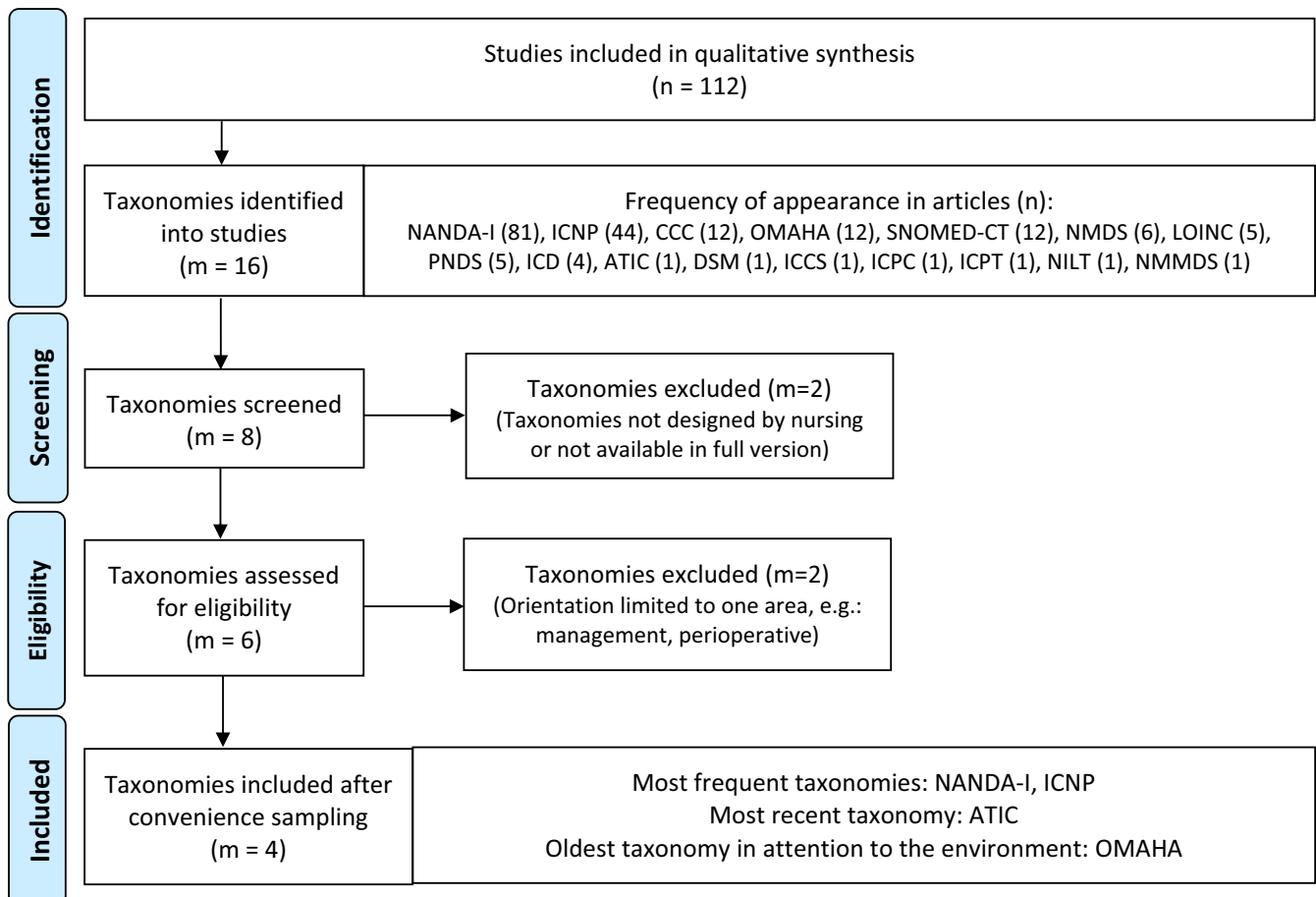


FIGURE 3 Flow diagram of analysis process for nursing diagnostic taxonomy selection

TABLE 2 Distribution of diagnostics about environment

Category Element	NANDA-I		ICNP		ATIC	
	N = 235		N = 850		N = 603	
	a(n)	%	a(n)	%	a(n)	%
Interpersonal	29	12.340	77	9.059	55	8.955
Familiar	8	3.404	17	2.000	23	3.814
Parental	4	1.702	13	1.529	28	4.643
Social	17	7.234	47	5.529	4	0.663
Geopolitical	16	6.809	65	7.647	2	0.332
Physical environment	16	6.809	18	2.118	2	0.332
Resources	0	0.000	13	1.529	0	0.000
Health service	0	0.000	34	4.000	0	0.000
Total	45 (39)	19.149 (16.596)	142 (139)	16.706 (16.353)	57	9.453

Note:: N: sample universe, total number of diagnoses of the taxonomy

a: number of associations between diagnoses and environmental categories or elements

n: number of diagnoses, once duplicates have been eliminated.

TABLE 3 Mapping of common diagnoses

Element	Status	NANDA-I	ICNP	ATIC
Familiar	Actual	<i>dysfunctional family processes</i>	<i>Impaired family process</i>	<i>Impaired family dynamics</i>
Parental	Actual	<i>impaired parenting</i>	<i>Impaired parenting</i>	<i>Impaired parental dynamics</i>
Physical environment (NANDA-I)				<i>Impaired parental role</i>
				<i>Parental discrepancy</i>
Familiar	Actual	-	<i>Impaired family process</i>	<i>Risk of impaired family dynamics</i>
Parental	Risk	<i>Risk of impaired parenting</i>		<i>Risk of impaired parental dynamics</i>
Physical environment (NANDA-I)			<i>Impaired parenting</i>	<i>Risk of impaired parental role</i>
Familiar	Actual risk	<i>Caregiver role strain</i>	<i>Caregiver stress</i>	<i>Risk of caregiver compassion fatigue</i>
Social		<i>Compromised family coping</i>		<i>Risk of parental compassion fatigue</i>
Social	Actual risk	<i>Impaired social interaction</i>	<i>Lack of social support</i>	<i>Risk of unintended self-exclusion</i>
Element	Type	NANDA-I	ICNP	ATIC
Social	Actual risk	<i>Risk of loneliness</i>	<i>Impaired socialization</i>	<i>Risk of exclusion</i>
Social	Actual risk	<i>Risk of other-directed violence</i>	<i>Risk of violence</i> <i>Risk to be victim of intimate Partner violence</i> <i>Victim of intimate partner Violence</i> <i>Victim of sexual assault</i>	<i>Risk of violence</i>
Physical environment	Risk	<i>Risk of contamination</i>	<i>Risk of contamination exposure</i> <i>Risk of environmental injury</i> <i>Risk of radiation exposure</i> <i>Risk of radiation injury</i>	<i>Risk of radiation exposure</i>
Physical environment	Risk	<i>Impaired home maintenance</i>	<i>Impaired homemaking</i>	<i>Household infestation</i>

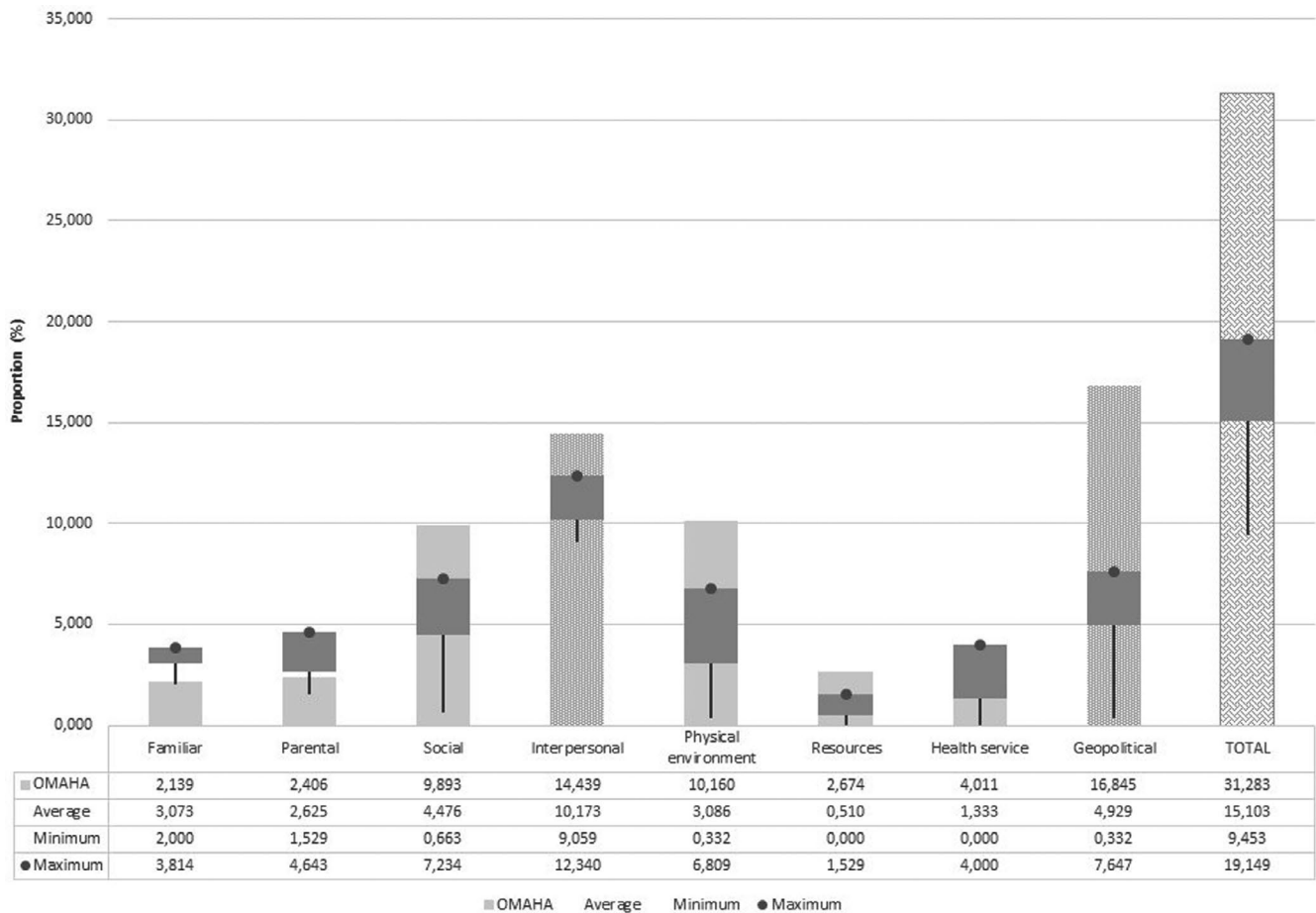


FIGURE 4 Comparison of findings about diagnoses and environment between NANDA-I, ICNP and ATIC versus OMAHA

planning of activities" (00199) can be related to the resource of time because its definition and characteristics include this idea.

ATIC shows a similar distribution, although with a much smaller sample of diagnoses. Only two diagnoses ("Household infestation" and "Risk of radiation exposure") were identified to geopolitical category, specifically for the physical environmental element. Neither the resources nor the health service obtained representation.

4.2 | Phase II. Mapping of common diagnoses

The 235 diagnoses identified obtained 42 equivalence diagnoses: 10 from NANDA-I, 18 from ICNP and 14 from ATIC. Common diagnostic labels are matched as shown in Table 3.

All the elements that have associated diagnoses in the previous phase concerning the three languages (all but resources and health system) obtain at least two equivalences. The links between languages are one to one, but also from the same label to and from several.

NANDA-I differentiates the caregiving role of family coping, while ICNP offers a single label and ATIC proposes as equivalence family or parental claudication, two similar but different labels. In general, ATIC breaks down more diagnostic statement options for

the same focus of clinical judgement. However, in the environmental category ICNP is the language that offers more options in the equivalence with the five diagnoses. In addition, it should be noted that NANDA-I refers to the environment with diagnoses related to the parental role because its definition includes the creation, maintenance and recovery of an environment that promotes optimal growth and development.

4.3 | Phase III. Comparison with OMAHA System

The OMAHA Problem Classification Scheme offers 374 labels, of which 117 are related to some of the elements of analysis. The results are compared with the mean and range (minimum and maximum) reached by NANDA-I, ICNP and ATIC, as shown in Figure 4.

The interpersonal category includes 54 diagnoses (14.439%) distributed accordingly: 8 family (2.139%), 9 parental (2.406%) and 37 social (9.893%). The geopolitical category reaches 63 diagnoses, that is 19.845% of the whole. The physical environmental element has linked 38 labels, 10 in resources and 15 in health services.

Only "Familiar" and "Parental" elements have fewer linked diagnoses than any of the three standardized languages that have been analyzed. The rest of the elements ("Social", "Interpersonal",

“Physical environment “and” Resources”) find more diagnoses in the OMAHA taxonomy. The “Interpersonal” element reaches the highest score.

In addition, the “other” labels were not included in the analysis even though they appeared as an option in divisions of the taxonomy such as “income” or “sanitation.”

5 | DISCUSSION

The study answers the questions initially posed. The results show that all the taxonomies analysed include problems of care about the environment, for either the geopolitical or social category. However, the proportion or relative weight of representation varies between standardized languages. The OMAHA taxonomy shows a greater proportion of attention to the environment, which may be related to the origin of its design. In this sense, the analysis of results shows that the ATIC taxonomy, originated from clinical practice in hospitals, is the taxonomy with the least representation of the environment.

The environmental diagnoses of the NANDA-I, ICNP and ATIC taxonomies have equivalences that show common areas of interest.

Regarding the first phase of the study, the bibliographic search found records on nursing taxonomies since the eighties, the most frequent being NANDA-I and ICNP. The review found only a few articles that included multiple taxonomies (Lundberg et al., 2008; Saranto et al., 2016; Strudwick & Hardiker, 2016).

The analysis by category shows greater importance of the social context in the three analysed taxonomies. NANDA-I reaches the highest proportion followed by ICNP and ATIC. However, ICNP achieves the maximum score for geopolitical category, which results in a relative weight like that of NANDA-I, but ATIC barely manages to represent this part of the environment.

The most frequent element in a joint analysis is social, with 68 associations. However, this position changes when broken down by taxonomies. While ICNP and NANDA-I achieve greater frequency, in ATIC the most frequent is the parental element. ATIC offers various diagnoses that are like each other, with an identical focus and judgement, which it adds to different types of people. The same idea appears as several labels when the individual, parental or family level is explicitly stated. This pattern is visible within the focus of coping, self-esteem or grieving.

The publication of articles about language models or nursing diagnoses related to the environment is not abundant, although the findings reveal the importance of this element in public health nursing and the sustainable development goals (Rosa et al., 2019).

The diagnoses have evolved parallel to the evolution of society and its problems. Green et al. (2003) proposed to expand the NANDA-I diagnoses for the environmental element in both social and environmental categories. After the attacks in New York in 2001, the diagnosis “Impaired religiosity” (00,169) was included in 2004, and after disasters such as the 2004 Indonesian tsunami and Hurricane Katrina in 2005, the diagnosis “Pollution” (00,181) appeared in 2006 (Herdman & Kamitsuru, 2017; Polk & Green, 2007).

Rivera and Parris (2002) studied the frequency of NANDA-I diagnoses recorded in clinical records by public health nurses in California and revealed the emphasis on promotion and prevention. The diagnoses related to contamination had not yet been approved, but they already included aspects such as family, household maintenance, risk of infection or violence.

Diagnostics of the social category have been studied with different orientations. Manguera and Lopes clinically validated the diagnosis of dysfunctional family processes in relation to alcoholism (de Oliveira Manguera & de Oliveira Lopes, 2016). In the 1990s, the diagnosis of altered family processes was validated in relation to the illness of one of the family members (Brewer & Warren, 1994). On the other hand, oriented to computational modelling, Jiménez et al. (2008) analysed the representation of the “Caregiver role strain” (00,061) diagnosis for the construction of expert care systems.

Regarding the geopolitical category, Polk and Green (2007) analysed the diagnoses, outcomes and interventions related to pollution in order to describe the implications of the environment on health. One of the interventions identified was “Environmental management: Community” (6,484) that describes the monitoring and management of physical, social, cultural, economic and political conditions that affect the health of the group (Butcher et al., 2018). This intervention appears in the article “Environmental justice screening tools: Implications for Nursing” (Amiri & Zhao, 2019), which shows its usefulness in identifying areas of social and economic disadvantage. The diagnosis related to the surrounding element makes it possible to identify risk situations early and act upon them. Sentinel events or natural disaster emergencies are especially relevant to this field (Green & Polk, 2009). Studies by Goodwin and colleagues have deepened the nurse’s role in radiation treatment, nuclear disasters or Zika infection in pregnant women (Lavin et al., 2019; Veenema et al., 2019; Veenema & Thornton, 2015).

OMAHA System has been used in studies to describe favourable and unfavourable aspects of public health. Kerr et al. (2019) described the strength levels of five countries, regarding community including the environmental (income, health, residence, neighbourhood), psychosocial (communication, resources, social contact, interpersonal relationship, spirituality) and health behaviour (nutrition, use of substances and healthcare supervision) domains. The study showed the differences between countries such as Norway and Turkey. These differences imply an unequal starting situation for care (Kerr et al., 2019). Considering this, OMAHA taxonomy can also be applied to determine problems in vulnerable populations such as Syrian immigrants. The study identified problems of personal care (eg low vaccination rate), housing, lack of employment, communication with health resources and mental health processes (Ardic et al., 2018).

At present, care situations such as migratory movements have been included in the latest NANDA-I edition with the diagnosis “Risk of complicated migratory transition” (00,260) that is linked to risk factors such as cultural barriers, language, economic resources, housing or parental conflicts (Herdman & Kamitsuru, 2017; Rifà Ros et al., 2019). This diagnosis had not been included in the study

when it was published after the extraction of knowledge. However, it should be noted that the focus of the diagnostic label has not been found in the other languages studied.

On the other hand, this research can support nursing practice in different ways.

The identified taxonomies provide a tool to make nursing knowledge visible from the language of the discipline. The findings of this research can be used in university and professional training to improve the diagnostic capacity of nurses and midwives and, consequently, help to record these problems in the clinical history. Standardized nursing languages make it possible to record care problems related to the environment of population groups in the clinical records and help to generate an epidemiology of care that identifies geographic areas or populations at higher risk of the achievement of health goals. In this sense, the study of environmental diagnoses has special relevance in current nursing practice. The coronavirus disease pandemic (COVID-19) has focused on the environment, the identification of populations and risk areas and prevention measures. An example of this interest is the identification of the defining characteristic "Biologicals: Pulmonary effects of biological exposure" (Herdman & Kamitsuru, 2017; Moorhead et al., 2020).

Also, diagnostic mapping allows the interrelation of studies with different taxonomies and knowledge management in health information systems.

5.1 | Limitations

The main limitations of the study are the choice of the four standardized languages compared with all existing health and nurses standardized languages. Other nursing taxonomies that could be analysed are the Clinical Care Classification System or the Perioperative Nursing Data Set; however, these were ruled out because they did not conform to the ISO norm or due to their limited scope (AORN, 2018; Saba, 2019). Likewise, internationally known taxonomies of other disciplines, such as the International Classification of Diseases (ICD-10), include categories such as "Transport accidents (V00-V99)," "Assault (X92-X09)" or "Factors influencing health status and contact with health services (Z00-Z99)" (World Health Organization, 2019).

Furthermore, the bibliographic search may not reach all the existing terminologies. Other sources of search in future reviews could include oral communications in congresses and language development research projects in the field of computer science applied to health care.

6 | CONCLUSION

Nursing taxonomies about diagnosis include clinical judgements about the meta-paradigm element *Environment*. A key element in the current circumstances of concern about climate change, the fight to reduce social inequalities or the emergency to stop the coronavirus pandemic. However, the importance and development of the

element *Environment* are variable, and it depends on the origin of the terminology design.

The study offers nurses and midwives a set of diagnoses to represent care problems related to the environment, both social and geopolitical. Likewise, the results allow translating clinical judgements into different taxonomies.

There are studies about the environment and its impact on the person from different theoretical models. Some of these researches are carried out by nursing, but do not use or develop their own approach from the discipline of care. The research area in nursing taxonomies has been addressed partially or specifically for the validation of clinical trials but requires a systemic and systematic approach that allows to delve into the strengths and weaknesses of terminologies.

ACKNOWLEDGEMENT

The authors would like to thank the support of Research Group MISKC of the University of Alcala and the Official College of Nursing of Madrid.

CONFLICT OF INTEREST

No conflict of interest has been declared by the author(s). All authors have approved the manuscript and declare that this manuscript has not been published before and have not received funding source.

AUTHOR CONTRIBUTION

Alexandra González and José María Santamaría conceived the study, analysed the data and drafted the manuscript. Marta Fernández and Enrique Monsalvo analysed the data and made substantial contributions. Juan Antonio Sarrión and Lourdes Jiménez made a critical review of the manuscript with substantial contributions. As corresponding author, I confirm that all named authors have approved the manuscript and agree with its submission.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no data sets were generated or analysed during the current study.

ORCID

Alexandra González Aguña  <https://orcid.org/0000-0001-9991-6980>

REFERENCES

- Alligood, M. R. (2018). *Nursing Theorists and Their Work*, 9th ed. : Elsevier.
- All-Party Parliamentary Group on Global Health (APPG) (2016). *Triple Impact - how developing nursing will improve health, promote gender equality and support economic growth*. APPG. Retrieved from: https://www.who.int/hrh/com-heeg/digital-APPG_triple-impact.pdf?ua=1&ua=1
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. Retrieved from <https://www.psychiatry.org/psychiatrists/practice/dsm>
- Amiri, A., & Zhao, S. (2019). Environmental justice screening tools: Implications for nursing. *Public Health Nursing*, 36(3), 411–421. <https://doi.org/10.1111/phn.12593>

- AORN (2018). *Introduction to the Perioperative Nursing Data Set: The Perioperative Nursing Vocabulary*. Retrieved from <https://www.aorn.org/education/individuals/continuing-education/online-courses/introduction-to-pnds>
- Ardic, A., Nihal Esin, M., Koc, S., Bayraktar, B., & Sunal, N. (2018). Using the Omaha System to determine health problems of urban Syrian immigrants. *Public Health Nursing, 36*(2), 1–8.
- Brewer, N. W., & Warren, A. M. (1994). Altered family processes related to an ill family member: A validation study. *International Journal of Nursing Terminologies and Classifications, 5*(3), 115–120. <https://doi.org/10.1111/j.1744-618X.1994.tb00444.x>
- Butcher, H., Bulechek, G., Dochterman, J., & Wagner, C. (2018). *Nursing interventions classification (NIC), 7th ed.* Elsevier.
- Committee ISO/IEC JTC 1/SC 7 (2011). *ISO 18104:2014 Health informatics – Categorical structures for representation of nursing diagnoses and nursing actions in terminological systems*, Vol. 1/SC (p. 7). International Organization for Standardization. Retrieved from <https://www.iso.org/obp/ui/#iso:std:iso-iec:25010:ed-1:v1:en>
- de Oliveira Lopes, M. V., da Silva, V. M., & Herdman, T. H. (2017). Causation and validation of nursing diagnoses: a middle range theory. *International Journal of Nursing Knowledge, 28*(1), 53–59. <https://doi.org/10.1111/2047-3095.12104>
- de Oliveira Manguiera, S., & de Oliveira Lopes, M. (2016). Clinical validation of the nursing diagnosis of dysfunctional family processes related to alcoholism. *Journal of Advanced Nursing, 72*(10), 2401–2412. <https://doi.org/10.1111/jan.12999>
- Echevarría Pérez, P. (2016). *Investigación en metodología y lenguajes enfermeros*. Elsevier.
- González Aguña, A., Jiménez Rodríguez, M. L., Fernández Batalla, M., Herrero Jaén, S., Monsalvo-San Macario, E., Real Martínez, V., & Santamaría García, J. M. (2020). Nursing diagnoses for coronavirus disease, COVID-19: identification by taxonomic triangulation. *International Journal of Nursing Knowledge, 31*(1), 1–10. <https://doi.org/10.1111/2047-3095.12301>
- Green, P. M., & Polk, L. V. (2009). Contamination: Concept analysis and nursing implications. *International Journal of Nursing Terminologies and Classifications, 20*(4), 189–197. <https://doi.org/10.1111/j.1744-618X.2009.01134.x>
- Green, P. M., & Polk, L. V. (2012). A nursing conceptual model for contamination. *International Journal of Nursing Knowledge, 23*(1), 10–17. <https://doi.org/10.1111/j.2047-3095.2011.01195.x>
- Green, P. M., Polk, L. V., & Slade, D. S. (2003). Environmental nursing diagnosis: A proposal for further development of Taxonomy II. *International Journal of Nursing Terminologies and Classifications, 14*(1), 19–29.
- Henry, S. B., Holzemer, W. L., Reilly, C. A., & Campbell, K. E. (1994). Terms used by nurses to describe patient problems: Can SNOMED III represent nursing concepts in the patient record? *Journal of the American Medical Informatics Association: JAMIA, 1*(1), 61–74. <https://doi.org/10.1136/jamia.1994.95236137>
- Herdman, T., & Kamitsuru, S. (2017). *NANDA International nursing diagnoses: Definitions and classification, 2018–2020*. Thieme.
- Hernández Conesa, J., P. Moral de Calatrava, & M. Esteban Albert (Eds.) (2003). *Fundamentos de la Enfermería. Teoría y método*. McGraw-Hill Interamericana.
- International Council of Nurses (2018). *ICNP Download*. Retrieved from <https://www.icn.ch/what-we-do/projects/ehealth/icnp-download>
- International Council of Nurses (2019). *About ICNP*. Retrieved from <https://www.icn.ch/what-we-do/projects/ehealth-icnp/about-icnp>
- Jiménez, M. L., Santamaría, J. M., Barchino, R., Laita, L., Laita, L. M., González, L. A., & Asenjo, Á. (2008). Knowledge representation for diagnosis of care problems through an expert system: Model of the auto-care deficit situations. *Expert Systems with Applications, 34*(4), 2847–2857. <https://doi.org/10.1016/j.eswa.2007.05.039>
- Juvé, M. E. (2016). *ATIC. Eje diagnóstico*. Author-Editor.
- Kerr, M. J., Gargantua-Aguila, S. D. R., Glavin, K., Honey, M. L. L., Nahcivan, N. O., Secginli, S., Martin, K. S., & Monsen, K. A. (2019). Feasibility of describing community strengths relative to Omaha system concepts. *Public Health Nursing, 36*(2), 245–253. <https://doi.org/10.1111/phn.12558>
- Lavin, R. P., Veenema, T. G., Langan, J. C., Charney, R. L., Zimmerman, R. S., & Bender, A. (2019). Zika and flint water public health emergencies: Disaster training tool kits relevant to pregnant women and children. *The Journal of Perinatal & Neonatal Nursing, 33*(3), 229–237. <https://doi.org/10.1097/JPN.0000000000000418>
- LOINC (2020). *LOINC Table, Reports, and Users' Guide*. Retrieved from: <https://loinc.org/downloads/loinc-table/>
- Lundberg, C., Warren, J., Brokel, J., Bulechek, G., Butcher, H., Dochterman, J., & Giarrizzo-Wilson, S. (2008). Selecting a standardized terminology for the electronic health record that reveals the impact of nursing on patient care. *Online Journal of Nursing Informatics, 12*(2), 1–20. Retrieved from: http://ojni.org/12_2/lundberg.pdf
- Martin, K. S. (2019). *The Omaha System*. Retrieved from: http://omaha-systemmn.org/OmahaSystemVisualization/OmahaSystem_v9.html
- McFarland, M. R., & Wehbe-Alamah, H. B. (2015). *Leininger's Culture Care Diversity and Universality: A Worldwide Nursing Theory*. Jones & Bartlett Learning.
- (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med, 6*(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- Moorhead, S., Macieira, T., Lopez, K. D., Mantovani, V. M., Swanson, E., Wagner, C., & Abe, N. (2020). NANDA-I, NOC, and NIC Linkages to SARS-Cov-2 (Covid-19): Part 1. Community Response. *International Journal of Nursing Knowledge*. Online ahead of print. <https://doi.org/10.1111/2047-3095.12291>
- Neuman, B. (1995). *The Neuman systems model In B. Neuman, The Neuman systems model* (3rd ed., pp. 3–61). : Appleton and Lange.
- Nightingale, F. (2012). *Notes of Nursing. What it Is, and What is Is Not*. Start Publishing LLC.
- Orem, D. (1993). *Modelo de Orem. Conceptos de enfermería en la práctica*. Masson-Salvat.
- Parliament, E. (2013). *Directive 2013/55/EU of the European Parliament and of the Council of 20 November 2013 amending Directive 2005/36/EC on the recognition of professional qualifications and Regulation (EU) No 1024/2012 on administrative cooperation through the Internal Market Information System ('the IMI Regulation')*. European Parliament. Retrieved from: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0132:0170:en:PDF>
- Polk, L. V., & Green, P. M. (2007). Contamination: Nursing diagnosis with Outcome and Intervention linkages. *International Journal of Nursing Terminologies and Classifications, 18*(2), 37–44.
- Rifà Ros, R., Espinosa Fresnedo, C., Alcázar París, M., Raigal Aran, L., & Ferré Grau, C. (2019). Risk for complicated immigration transition: New diagnosis for NANDA-International. *International Journal of Nursing Knowledge, 30*(2), 68–72. <https://doi.org/10.1111/2047-3095.12206>
- Rivera, J. C., & Parris, K. M. (2002). Use of nursing diagnoses and interventions in Public Health Nursing Practice. *Nursing Diagnosis, 13*(1), 15–23. <https://doi.org/10.1111/j.1744-618X.2002.tb00160.x>
- Rogers, M. (1970). *An introduction to the theoretical basis of nursing*. F.A. Davis Company.
- Rosa, W. E., Schenk, E., Travers, J. L., & Nicholas, P. K. (2019). Climate change and health consequences: Engaging public health nursing within the framework of the United Nations Sustainable Development Goals. *Public Health Nursing, 36*(2), 107–108. <https://doi.org/10.1111/phn.12598>
- Rosa, W. E., & Squires, A. P. (2019). No One Left Behind: Public health nursing in a time of inclusion, equity, and sustainability. *Public Health Nursing, 36*(1), 1–2. <https://doi.org/10.1111/phn.12581>
- Saba, V. (2019). *Clinical Care Classification System*. Retrieved from: <https://www.sabacare.com/>

- Saranto, K., Saba, V., Dykes, P., Kinnunen, U. M., & Mykkänen, M. (2016). Milestones and experiences of standardized documentation. *Studies in Health Technology and Informatics*, 225, 748–749.
- SNOMED International (2020). *SNOMED International Leading healthcare terminology worldwide*. Retrieved from: <http://www.snomed.org/>
- Strudwick, G., & Hardiker, N. R. (2016). Understanding the use of standardized nursing terminology and classification systems in published research: A case study using the International Classification for Nursing Practice®. *International Journal of Medical Informatics*, 94, 215–221. <https://doi.org/10.1016/j.ijmedinf.2016.06.012>
- Thoroddsen, A. (2005). Applicability of the Nursing Interventions Classification to describe nursing. *Scandinavian Journal of Caring Sciences*, 19(2), 128–139. <https://doi.org/10.1111/j.1471-6712.2005.00332.x>
- Thoroddsen, A., & Thorsteinsson, H. S. (2002). Nursing diagnosis taxonomy across the Atlantic Ocean: Congruence between nurses' charting and the NANDA taxonomy. *Journal of Advanced Nursing*, 37(4), 372–381. <https://doi.org/10.1046/j.1365-2648.2002.02101.x>
- Topaz, M., Golfenshtein, N., & Bowles, K. H. (2014). The Omaha System: A systematic review of the recent literature. *Journal of the American Medical Informatics Association*, 21(1), 163–170. <https://doi.org/10.1136/amiajnl-2012-001491>
- United Nations (2019). *Sustainable Development Goals*. Retrieved from <https://www.un.org/sustainabledevelopment/>
- United Nations General Assembly. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*, A/RES/70/1. UN General Assembly.
- Veenema, T. G., Lavin, R. P., Schneider-Firestone, S., Couig, M. P., Langan, J. C., Qureshi, K., Scerpella, D., & Sasnett, L. (2019). National assessment of nursing schools and nurse educators readiness for radiation emergencies and nuclear events. *Disaster Medicine and Public Health Preparedness*, 13(5–6), 936–945. <https://doi.org/10.1017/dmp.2019.17>
- Veenema, T. G., & Thornton, C. (2015). Understanding nursing's role in health systems response to large-scale radiologic disasters. *Journal of Radiology Nursing*, 34(2), 63–72. <https://doi.org/10.1016/j.jradnu.2014.11.005>
- Werley, H. H., Devine, E. C., Zorn, C. R., Ryan, P., & Westra, B. L. (1991). The Nursing minimum data set: Abstraction tool for standardized, comparable, essential data. *American Journal of Public Health*, 81(4), 421–426. <https://doi.org/10.2105/ajph.81.4.421>
- World Health Organization (2019). *International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)*. Retrieved from: <https://icd.who.int/browse10/2016/en>
- World Health Organization (2020). *Draft landscape of COVID-19 candidate vaccines 31 July 2020*. Retrieved from: <https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines>
- World Health Organization (2020). *WHO and partners call for urgent investment in nurses*. Retrieved from: <https://www.who.int/news-room/detail/07-04-2020-who-and-partners-call-for-urgent-investment-in-nurses>
- World Health Organization (2020c). *State of the world's nursing 2020: Investing in education, jobs and leadership*. Geneva: World Health Organization. Licence: CC BY-NC-SA 3.0 IGO. Retrieved from: <https://www.who.int/publications/i/item/9789240003279>

How to cite this article: González Aguña A, Fernández Batalla M, Monsalvo San Macario E, Sarrión Bravo JA, Jiménez Rodríguez ML, Santamaría García JM. Diagnostics of care about environment: A systematic review through nursing taxonomies. *Nurs Open*. 2021;8:2272–2283. <https://doi.org/10.1002/nop2.829>