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Ecological care in nursing practice: a Walker and Avant concept analysis

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Abstract

Background Today, the human population faces an increasing array of emerging environmental challenges. Despite its importance, nurses often neglect ecological issues, which can compromise patient health. While the ecological nursing perspective has the potential to lead to innovative care approaches that benefit patients, the nursing profession, and the environment, the concept of ecological care lacks a clear definition and its dimensions remain unclear. This study aimed to analyze and clarify the concept of 'ecological care' in the nursing discipline.

Methods Walker and Avant's analysis method was used to identify descriptions, antecedents, consequences, and empirical referents of the concept of 'ecological care' in nursing. We searched the databases (PubMed, Scopus, PsycINFO, CINAHL, ERIC, SID, and IranDoc) using the keywords "ecological," "nurse," and "nursing" using Boolean operators "AND" and "OR" in the title and abstract fields both in English and Persian to identify relevant literature on ecological care in nursing.

Results Ecological care, as a multidimensional concept, encompasses ecological thinking, ecological attitude, ecological awareness, ecological sensitivity, and ecological literacy. This entails the optimal utilization of environmental factors to provide patients with high-quality care and preserve ecological sustainability through environmentally friendly behaviors.

Conclusions The findings highlight the need to elucidate, endorse, and solidify ecological thinking in all aspects of nursing care including nursing management, education, and research, which can lead to improved care quality, patient safety, and sustainability. Within this framework, nursing educators could play an essential role in integrating ecological care into nursing education. The study emphasizes the need to integrate ecological thinking into all aspects of nursing.

Keywords Ecological care, Nursing, Ecosystem, Environment, Concept analysis

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Background

Ecology, the study of interactions between living organisms and their environments, encompasses physical and social surroundings that impact all living beings. From a human science perspective, ecology emphasizes these interconnected relationships, fostering a deeper understanding of nursing and caring practices [1]. Currently, environmental concerns are considered significant threats to public health. However, healthcare professionals often lack sufficient awareness of the importance of ecological issues [2].

As the largest group of healthcare professionals, nurses play a crucial role in decisions regarding product use, energy consumption, and chemical selection in healthcare settings. However, they face a significant challenge: balancing environmental concerns and ecological principles with their professional duties [3]. Although nurses can advocate reducing exposure to harmful chemicals and adopting less toxic products, their work environments often require high energy consumption and generate substantial medical waste [4]. This medical waste encompasses both hazardous (infectious, pathological, chemical, pharmaceutical, cytotoxic, and radioactive) and non-hazardous or general waste, posing potential risks to patients, communities, and broader ecological health [5]. Multiple studies have highlighted the critical role of ecological considerations within healthcare in the overall health of ecosystems [6–9]. Consequently, ecological issues have become a high priority for nurses, demanding attention and action [10].

The importance of environment, ecosystems, and ecology in nursing practice has been recognized by pioneers like Florence Nightingale as the founder of modern nursing (published in 1992, originally written in 1959) [11] and subsequently by Fawcett (1984) [12]. This vision is further reflected in the International Council of Nurses (ICN) Code of Ethics, which states that "nurses contribute to the population's health and work to achieve the sustainable development goals." By adopting sustainable practices, nurses can significantly reduce their environmental footprint and contribute to achieving the UN 2030 Agenda for Sustainable Development [9]. Recognizing this crucial role, nursing organizations such as the American Nurses Association actively promote nurses' participation in environmental protection initiatives [13].

The concept of ecological care in nursing, as a multidimensional concept, encompasses several aspects. Lausten (2006) proposed a nursing ecological theory to broaden nurses' perspectives by incorporating concepts of global ecosystems, communities, and interrelationships from the ecological sciences. This theory recognizes that human interactions with the environment extend beyond the personal sphere and encompass professional activities. Consequently, nurses can integrate ecological principles into their practice, fostering new directions in care that benefit patients, healthcare professionals, and the environment [14]. Dahlberg et al. (2016) conducted an empirical study to explore how a phenomenological life-world theory could expand the concept of holistic care into "ecological care." They argued that the traditional approach to holistic care has neglected environmental and ecological dimensions. Their findings suggested that ecological care goes beyond fighting illnesses. It emphasizes understanding patients within the context of their world, a world that they both influence and are influenced by. This approach helps patients reintegrate into their rhythm of existence [1].

Al-Shamaly (2021) highlights "ecological awareness," which emphasizes creating a safe and comfortable patient environment through noise, light, color, and temperature control [15]. Sattler (2013) adds another dimension, suggesting that nurses can act as catalysts for transforming hospitals into environmentally sustainable spaces. This can be achieved through practices such as adopting environmentally friendly purchasing policies (e.g., waste management strategies, reduced chemical use, and proper disposal of hazardous materials such as batteries), promoting healthy food options, and favoring mercury-free products [16].

Although ecological factors could influence the quality of care, patient safety, individual and community health, resource preservation, and sustainable practices [16–19], nurses' awareness of ecological care and its dimensions remains limited [2]. Moreover, there is no universally accepted definition of ecological care as a complex concept [20]. Therefore, this study aimed to analyze and clarify the concept of 'ecological care' within the nursing discipline.

Methods

Design

Walker and Avant's concept analysis method was used as a rigorous and systematic approach to identify descriptions, antecedents, consequences, and empirical referents of the concept of 'ecological care' in nursing. Ecological care is a widely applicable concept that extends beyond the confines of nursing care. Therefore, the literature review encompasses all the various applications of ecological care, including both implicit and explicit aspects. The stages of the concept analysis method are as follows: (A) selecting a concept, (B) determining the aims or purposes of the analysis, (C) identifying all uses of the concept that you can discover, (D) determining the defining attributes, (E) identifying a model case, (F) identifying borderline, related, contrary, invented, and illegitimate cases, (G) identifying antecedents and consequences, and (H) defining empirical referents [21].

Literature search

A systematic literature review was conducted using multiple health databases, including PubMed, Scopus, PsycINFO, CINAHL, ERIC, SID, and IranDoc. The concepts "ecological," "nurse" and "nursing" were searched using Boolean operators "AND" and "OR" in the title and abstract fields of each database. No temporal limits were applied and articles published in either English or Persian until July 2023 were retrieved.

Initially, 1083 records were identified by searching the titles and abstracts of these databases. Subsequently, 16 additional records were manually included, resulting in a total of 1099 records. Duplicate records were removed, leading to an initial selection of 1068 records. The titles and abstracts of these records were screened, and the eligibility criteria were applied to the full text of the selected records. Eventually, 36 records met the criteria and underwent a comprehensive review of concept analysis (Fig. 1). A detailed overview of the included studies,

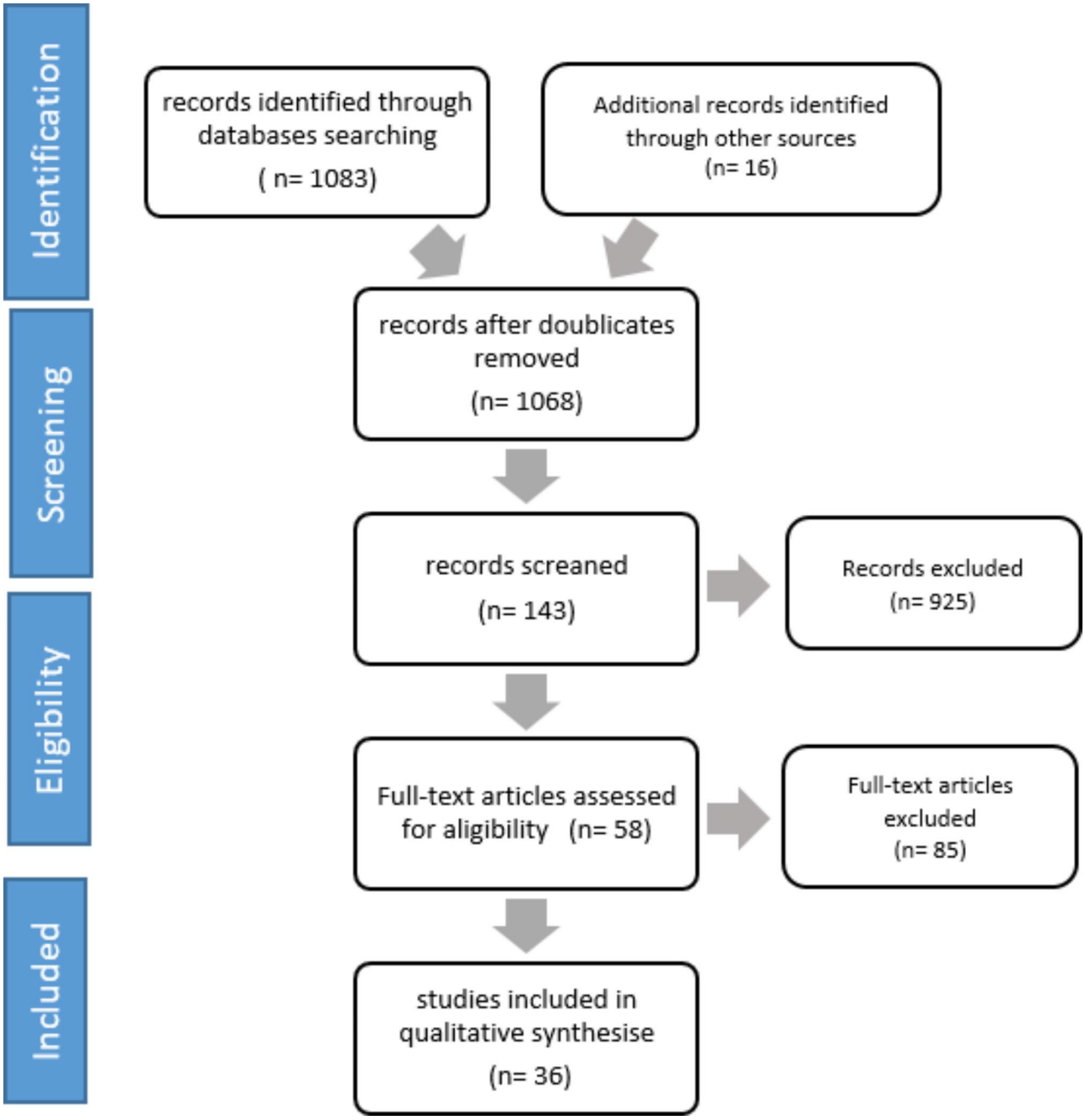

Fig. 1 Flow diagram of the study (data search and selection process)

including publication year, title, country, and key findings, can be found in Appendix A.

Results

Concept selection

The importance of a specific concept is influenced by a variety of factors both within and outside its field over time. Consequently, concepts lacking clear definitions warrant further analysis [21]. Considering the interconnectedness of ecosystems and human health, as well as the imperative to maintain environmental sustainability, particularly within healthcare, the concept of ecology has gained prominence in nursing and other health professions. Nightingale's emphasis on the environment underscores this importance. Given the increasing significance of ecological care in healthcare and the lack of a clear, unified definition, this concept was selected for analysis to elucidate its dimensions and characteristics.

Determining the aims of the analysis

The concept of "ecological care" has been insufficiently analyzed within the healthcare context, resulting in a lack of a clear definition. This study aims to refine the meaning of ecological care in nursing by identifying its descriptions, antecedents, consequences, and empirical referents.

Identifying the use of the concept

To explore the concept of ecological care, it is crucial to understand the distinct meanings of each word from a variety of sources such as dictionaries, thesauruses, websites, and scholarly literature.

Ecological

According to the Merriam-Webster dictionary, the term 'ecological' is an adjective related to the science of ecology. This refers to the environment of living things or the relationships between living things and their environments [22].

Care

According to the Merriam-Webster dictionary, the term 'care' functions both as a noun, representing responsibility for or attention to health, well-being, safety, or solicitude, and as a verb, meaning to feel interest or concern and to provide care [23].

Ecological care in nursing literature

The concept of ecological care, originating from the theory of biological ecology, aims to offer solutions that effectively minimize the adverse impacts of nursing care on the ecosystem [14]. Ecological care can be classified into two types: individuals and professionals. The individual approach focuses on raising public awareness, shaping attitudes and behaviors, and promoting responsible actions regarding energy consumption, the production of toxic substances (such as greenhouse gases), chemical usage, and healthy and organic diet adoption. Conversely, the professional approach emphasizes the importance of sensitivity, awareness, attitude, behavior, and responsible actions among individuals when carrying out their professional responsibilities [9, 24].

Clinical environments require ecological care, which can be achieved through two distinct approaches: environmental and organizational care. Environmental care involves maintaining equipment and machines, ensuring workplace safety, minimizing risks, managing noise levels, optimizing lighting conditions, regulating temperature, and employing creative designs to create a comfortable and relaxing environment. It also involves facilitating visits from family members and pets and improving patients' sleep quality. Additionally, the use of digital technology helps ensure a healthy and safe treatment environment for patients in the Intensive Care Units (ICU). On the other hand, organizational care focuses on time and resource management. This includes strategies such as reducing paper and ink consumption by utilizing electronic records, which aids in efficient time management. Organizational care aims to streamline nurses' tasks and improve overall work efficiency by minimizing their workload and improving access to patient information. Finally, waste management practices play a crucial role in maintaining an environmentally conscious approach in healthcare settings [15].

Determining the defining attributes

Ecological thinking

According to Balgopal and Wallace (2009), ecological thinking is a combination of ecological understanding and ecological awareness [25]. Understanding ecology involves understanding concepts such as biotic, abiotic, and biological interactions. This serves as the initial stage of ecological thinking, which is further developed by comprehending the impact of human activities on the ecosystem [26]. Ecological understanding can be conceptualized as a continuum, with one end representing the capacity to identify problems and propose ecological decisions, considering their potential consequences. On the other end of the continuum is a lack of understanding, where the ability to explain the impact of human actions on the ecosystem is insufficient [25].

Ecological thinking causes a transformation in people's presuppositions and attitudes towards the surrounding world, enabling them to recognize that we are interconnected and evolving alongside nature. Embracing an ecological perspective requires acknowledging ourselves as integral components of nature rather than being superior to it. This encompassing concept embodies various

underlying principles such as ecology, wholeness, interdependence, diversity, partnership, energy flows, flexibility, cycles, and sustainability [17, 27]. Hes and de Plessis (2014) refer to this set of principles as the 'ecological worldview.' Shifting towards an ecological perspective entail altering our perspective on the world and ourselves. The fundamental essence of this transformation involves moving away from egocentric and anthropocentric thinking, which emphasizes separateness, and instead adopting a holistic perception that aims to counterbalance environmental damage. Enhancing ecological thinking can be achieved through the instruction of ecological concepts and behaviors [28].

Ecological attitude

Ecological attitude is a complex construct that encompasses various key components such as emotions, perceptions, personal norms, values, and relationships with the environment. The emotional dimension of ecological attitude plays a pivotal role in preparing individuals to address environmental issues and cultivate ecological behaviors in all aspects of life [29–31], as it determines the extent to which individuals will act in environmentally responsible ways [32].

Predicting a specific behavior entails possessing a specific attitude towards that behavior, as attitudes alone do not guarantee behavior, but predict or influence it [2, 33]. Ecological behavior can be defined as the actions taken by a nurse to protect the environment, and it varies depending on the individual's context and circumstances. Achieving the goal of ecological behavior can be challenging in certain situations, but it is crucial to promote sustainable living and preserve the planet's natural resources [31].

Ecological awareness

Ecological awareness refers to knowledge, attitudes, and behaviors related to the environment. Its focus is on increasing responsibility toward achieving ecological sustainability [34]. One of its important characteristics is the perception of natural objects from a subject's perspective [35]. As a theoretical and practical science, ecological awareness includes two stages: awareness of environmental changes, and feelings of concern about environmental problems and trying to solve them. People with ecological awareness try to be actively responsible for their interactions with the environment and exhibit positive behaviors towards the surrounding environment [9, 20].

Ecological awareness is also a level of cognitive thinking that enables nurses to focus on protecting the environment while providing nursing care. This concept requires nurses to pay attention to the potential of nature and the surrounding environment that promotes, maintains, and restores human health [9, 14]. This raises important questions about whether nurses are aware of the positive effects of recycling medical equipment and materials, or the harmful effects of greenhouse gases (CO2, NO, etc.) caused by fossil fuels and smoke from medical waste incinerators. It also highlights how much nurses are aware of the impact of their care activities on ecosystem damage and public health [9, 19, 36]. The role of nurses with ecological awareness is crucial in raising awareness among colleagues, managers, patients, and students [8, 37–39].

Ecological sensitivity

Ecological sensitivity refers to the inclination to actively address environmental threats and the extent to which healthcare providers demonstrate awareness of hazardous and protective circumstances [40]. Individuals with varying psychological traits, such as extroversion or introversion, exhibit distinct levels of sensitivity to environmental health [41].

Ecological sensitivity is a multidimensional concept that contributes significantly to sustainable development. This serves as an emotional foundation for cultivating an ecological worldview and establishing personal norms for pro-environmental actions. This dynamic framework takes shape within families during childhood and is strengthened throughout professional life. Therefore, an essential initial step in enhancing ecological sensitivity among healthcare providers is to impart ecological education and raise awareness levels [42–44]. The development of ecological sensitivity is influenced by various factors, including families, educational institutions, mass media, and non-governmental organizations [45–47]. In general, nurses who actively engage in staying informed about ecological news and trends, participate in ecological protection activities and events, and demonstrate awareness of ecologically detrimental behaviors, both in themselves and their colleagues exhibit higher levels of ecological sensitivity [42, 43].

Ecological literacy

Ecological literacy is a crucial concept that includes three core components: cognitive, emotional, and behavioral. According to UNESCO, there are five key characteristics of ecological literacy: awareness and sensitivity to the environment; comprehension of environmental issues; having values and sentiments towards environmental concerns; possessing skills, desire, and commitment; and actively engaging in identifying and resolving ecological problems. Generally, ecological literacy can be defined as the integration of environmental sensitivity, knowledge, skills, attitudes, values, responsibilities, and active engagement, which enables nurses to make informed and responsible decisions to promote environmental sustainability [48, 49].

Model and additional cases

A model case serves as a paradigmatic illustration of the application of a concept encompassing all its defining elements. In addition to the model case, two other types of cases are presented: (A) the borderline case, which shares most of the essential characteristics of the concept but exhibits some differences; and (B) the contrary case, which presents an apparent example that contrasts with the concept, highlighting what it is not [21].

Model case

A 65-year-old woman was admitted to the neurology ward with a diagnosis of transient ischemic attack during the night shift. The attending nurse approached the patient's bedside and introduced herself and the inpatient department. During the evaluation, the nurse observed the patients' uneasiness, homesickness, and concerns regarding sleep disturbance due to changes in sleeping arrangements. She addressed the situation by repositioning the patient's bed next to the window, aiming to provide a more comfortable environment and alleviate feelings of homesickness. Careful attention was paid to ensure that the bed and equipment were securely locked. During medication administration, the nurse utilized a tablet for dosage calculations, opting for a paperless approach to reduce waste. Proper disposal procedures were followed after medication administration, with empty vials discarded in the chemical waste bin, and needles placed in a safety box. During the initiation of infusion, the nurse noticed loose screws on the electronic infusion device and promptly sought assistance from a colleague to rectify the issue. Toward the end of her tasks, the nurse dimmed unnecessary lights in the ward and adjusted the alarm range of the device to an audible level for more comfort. Immediately before leaving the ward, the nurse noticed a leaking water tap and promptly contacted the facility manager to initiate immediate remedial action.

Borderline case

The head nurse of the pediatric ward conducted a clinical round when she heard the cries of a hospitalized 4-year-old child who was upset due to the absence of her cherished doll. Regrettably, the nurses disregarded the situation and continued down the corridor. Several months later, the nurse was invited to join a committee responsible for making decisions regarding hospital equipment procurement. Drawing from the recent knowledge acquired through a TV program highlighting the hazards of mercury to human health, she recommended the acquisition of mercury-free medical equipment.

Contrary case

A nurse, aged 35, with ten years of experience in surgery, approached the patient who had undergone laparotomy to perform a dressing change. The nurse inadvertently wore a pair of sterile gloves instead of non-sterile gloves while removing the contaminated dressing and disposed of it in the general waste bin. Subsequently, sterile gloves were replaced with a fresh pair, the wound was cleansed using six sterile gauzes, and an additional seven gauzes were applied to dress the surgical site, although a smaller quantity would have sufficed. During the hand washing process, the nurse's mobile phone rang, and without turning off the water tap, he engaged in a conversation until the patient's family intervened and turned off the tap. Finally, despite the patient expressing mild pain at the surgical site, the nurse chose to administer a painkiller instead of utilizing non-pharmacological methods to alleviate pain.

Identify antecedents and consequences

Walker and Avant (2011) provided a clear definition of antecedents as events or attributes that precede the occurrence of a concept, whereas consequences refer to events that ensue from the concept's occurrence [21]. In this study, it was crucial to identify and examine the associated antecedents and consequences (Fig. 2). Therefore, the antecedents and consequences investigated are as follows:

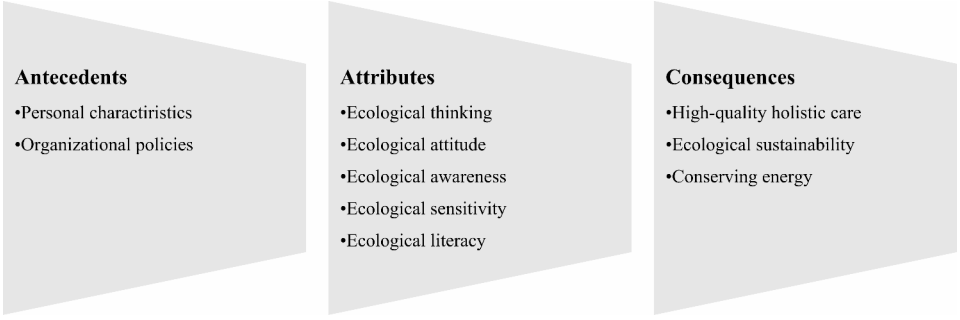

Fig. 2 Attributes, antecedents, and consequences of ecological caring in nursing practice

Antecedents

The ecological care provided by nurses can be influenced by both personal characteristics and organizational policies. Personal characteristics include creativity, innovation, responsibility, environmental friendliness [41], kindness, empathy, and strong communication skills [9]. Meanwhile, organizational policies encompass the establishment of a supportive organizational culture, provision of training courses [14], and design of a creative and humanitarian environment within hospitals and healthcare facilities. Moreover, ensuring a safe environment equipped with adequate resources, services, technology, and competent human resources is essential for delivering ecological care in therapeutic settings [15].

Consequences

Ecological care yields numerous benefits to patients, their families, healthcare providers, healthcare systems, and the environment. Among these benefits, one of the most significant is the provision of high-quality holistic care, which leads to increased patient satisfaction. Additionally, ecological care contributes to patient and staff safety by minimizing hospital infections, conserving energy (electricity, gases, and water), optimizing equipment and time utilization, reducing employee workload, managing hospital procurement costs, and eliminating hospital waste. It also plays a vital role in preventing the entry of pathogens, chemical pollutants, and radioactive substances into the water, soil, and air. Furthermore, ecological care promotes ecological sustainability, safeguards the ecosystem, and helps protect food and agricultural resources by preventing food waste in the hospital setting. These considerations highlight the wide-ranging positive consequences of ecological care [14, 41].

Empirical referents

According to Walker and Avant (2011), the final step in concept analysis is to identify the empirical referents of attributes. Empirical referents do not directly serve as instruments for measuring a concept, but they provide illustrations of how defining characteristics or attributes can be recognized or measured. By presenting real-world examples, empirical referents assist in measuring the concept and validating its significance [21]. Although this study did not identify a specific independent instrument for measuring ecological care in nursing, the following examples demonstrate instruments that measure the defining characteristics or attributes of the concept.

The Nurse's Environmental Awareness Tool (NEAT) was developed by Schenk et al. in 2015 to measure nurses' awareness of and behaviors associated with the environmental impact of their practices. The NEAT consists of 48 two-part items in six subscales and three paired subsets as follows: nurse awareness scales, nurse professional ecological behaviors scales, and personal ecological behaviors scales [9].

The Ecological Risk Perception Scale, developed by Slimak and Dietz in 2006, examines not only the attributes of the risk itself but also the characteristics of individuals perceiving the risk. Consisting of 24 ecological risk items, the scale encompasses four subscales: ecological, chemical, global, and biological [50].

The Environmental Literacy Questionnaire (ELQ) was derived from part of Michigan State University's project and was originally used by Kaplowitz and Levine (2005) [51]. Later, Kahyaoğlu (2011) revised the ELQ. The revised version consisted of four components: knowledge (11 items), attitude (12 items), uses (19 items), and concern (9 items) [52].

Definition

Based on the current analysis, ecological care is a multidimensional integration of thinking, attitudes, awareness, sensitivity, and literacy to deliver high-quality holistic care while maintaining environmental sustainability and promoting energy conservation.

Discussion

Analysis of the concept of ecological care has significant implications for the nursing profession. Given the limited exploration of ecological care within nursing practice, conducting an analysis can empower nurses to utilize ecological factors in delivering high-quality care and embracing environmentally friendly behaviors. The objective of this study was to present a comprehensive and practical definition of ecological care, thereby establishing a shared platform for not only nurses but also other healthcare professionals to promote pro-environmental behaviors.

Backes et al. (2011) conducted a study aiming to comprehend the meaning of ecological care from the perspective of students and teachers in the healthcare field at a Public Institution of Higher Education. The study revealed several categories, including (a) ecological care as a result of relationships, interactions, and communication with the global environment (main category); (b) the development of ecological awareness (causal conditions); (c) the connection of ecological care with different systems (context); (d) the perception of human-environment-health interaction (intervention); (e) the need to foster ecological consciousness through new references (strategy); and (f) a sense of motivation to understand ecological care (result). While this study acknowledged ecological awareness and conscience as integral components of ecological care, other attributes of the concept, such as adopting an ecological perspective; ecological literacy; and the impact of values, beliefs, and

organizational culture on providing holistic care, were not extensively explained [20].

The findings of a study conducted by Dahlberg et al. (2016) revealed how ecological care facilitates patients to rediscover their place in a world characterized by interconnectedness. The role of ecological care extends beyond perceiving patients within a web of relationships; it encompasses assisting patients in re-establishing their sense of self and comprehending the world anew. Ecological care entails not only combating illness but also acknowledging patients as individuals influenced by and influencing the world. Such care endeavors to facilitate rhythmic movement and create space for activity and rest, being cared for and actively participating in one's recovery, withdrawing from the world, and re-engaging with it. This study also highlights the use of the term ecological perspective to enhance the understanding of optimal care for patients. In this study, the novel attributes of the concept of ecological care are introduced. However, the potential impacts of constructive and destructive human activities on ecosystems remain unexplored [1]. In contrast, we refer to ecological sustainability and energy conservation as significant consequences of ecological care in nursing.

In a focused ethnographic study, Al-Shamaly (2021) explored the culture of multidimensional "caring-for" practice among ICU nurses. The inclusive nature of this culture encompasses caring for oneself, patients and their families, and colleagues (including nurses and other team members) as well as ecological consciousness within the ICU environment and organization. Ecological consciousness involves caring for equipment and machines, ensuring workplace safety, reducing hazards, transitioning towards a paperless unit, maintaining thorough documentation, and demonstrating commitment and concern for the organization's budget regarding staff and resources [15]. While this study comprehensively addresses the practical aspects of the concept, it constrains the concept of ecological care solely to ecological consciousness. However, our study revealed that ecological care is a multidimensional, and complex phenomenon that extends beyond ecological consciousness. In another study, religious values were identified as a crucial factor in promoting an ecological care orientation that can be incorporated into daily life through religious education, considering the religious and cultural context of each country. These values are instilled into individuals from childhood to adulthood through various learning activities. Therefore, religious education plays a pivotal role in shaping individuals' commitment to ecological care [53]. According to this study, religious values significantly contribute to the development of ecological thinking and the manifestation of ecological behavior.

Moreover, a previous study by Akkuzu (2016) introduced ecological intelligence as a new type of conscience, defined as a combination of environmental awareness and the sensitivity of human beings towards adverse global alterations in nature. This understanding empowers individuals to recognize the perils faced by their communities and comprehend the underlying causes. Furthermore, it equips them with the knowledge necessary to address these perils collectively and devise effective solutions [54].

Implications for nursing practice

While our analysis primarily focused on the ecological perspective, we contend that a profound understanding of this concept is imperative for establishing cultural and political frameworks within the healthcare system. This study contributes to the limited body of research on nursing by highlighting the essentiality of ecological and holistic thinking in the domains of caregiving, treatment, management, and education. Consequently, it has the potential to yield substantial impacts in ensuring the safety of patients and healthcare providers, enhancing the quality of care, and improving patient and family satisfaction.

Limitations

The conceptual analysis is subject to several limitations. Firstly, the literature search was confined to studies published in English and Persian, potentially limiting the diversity of perspectives from other countries, cultures, and languages. To mitigate this limitation, future studies should conduct a comprehensive search in multiple languages to ensure a more holistic understanding of ecological care in nursing practice. Secondly, the analysis is susceptible to selection bias, extraction bias, and analysis bias. To address these limitations, the study selection process, data extraction, and analysis were independently conducted by two researchers. Despite these limitations, the studies were described accurately and systematically, contributing valuable insights into the concept of ecological care in nursing practice.

Conclusions

The results of the present analysis provide a definition of ecological care in nursing that may guide the profession to new directions of care, striving for the greater good of the patient, the profession of caring, and the environment. It is clear that more research is needed to discover the neglected importance of the environment in holistic care and to identify phenomena related to this concept in practical nursing. The literature review shows that the educational field, as the most effective factor, plays a significant role in the formation of ecological literacy and worldviews and the creation of the perceptions, attitudes,

and behaviors of ecological care. In this regard, nursing professors and instructors, as the most important role models, significantly contribute to the development of the identity and character of ecological care for today's students and future nurses.

Abbreviations

CO2	Carbon dioxide
NO	Nitric oxide
UNESCO	The United Nations Educational, Scientific and Cultural Organization
NEAT	Nurse's Environmental Awareness Tool
ELQ	Environmental Literacy Questionnaire
ICU	Intensive Care Unit

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

GM, AS: original concept and study design; GM, HA, ShS: data collection; GM, HA, AS, MGh: data analysis and interpretation; GM, HA, AS, MGh, ShS: manuscript preparation and final critique; GM, MGh: study supervision.

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Data availability

The data supporting the findings of this study are available upon request from the corresponding author. The data were not publicly available because of privacy or ethical restrictions.

Declarations

Ethics approval and consent to participate

This study was approved by the ethics committee of Tabriz Tehran University of Medical Sciences (code of ethics: IR.TBZMED.REC.1402.614). All methods were carried out in accordance with relevant guidelines and regulations of Walker and Avant's concept analysis method and qualitative research.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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