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Quantum Leadership in Nursing: A Systematic Review and Data Synthesis

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Abstract

Background: Despite the limited research on quantum theory in nursing, the significance of this theory and the evolving nature of the nursing environment necessitates further exploration in this area. The present study aimed to describe and discuss the application of quantum theory in nursing and propose a model for its integration into nursing leadership.

Methods: A descriptive data synthesis was undertaken, reviewing articles related to leadership and quantum theory. Then, a model for quantum leadership in nursing was proposed. The literature search included ScienceDirect, Web of Science, PubMed, and Scopus databases, focusing on publications in English up to 2022.

Results: A total of 8 relevant articles were selected based on predefined inclusion criteria. Through content analysis, the findings were categorized into three themes including *quantum leaders*, *quantum organization*, and *quantum fluidity movement*.

Conclusion: By implementing the essential characteristics of the proposed model, nurse leaders can foster discipline and stability within the nursing system, addressing the challenges posed by contemporary healthcare environments characterized by instability and insecurity.

Keywords: Quantum theory, Organization, Administration, Leadership, Nursing

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Introduction

Quantum refers to a fundamental particle or discrete unit, signifying that certain quantities in physics are considered discrete values (1,2). The term was first used in modern physics in the 1920s to study subatomic particles (3). According to quantum theory, as reported by Einstein, Bohr, and Planck (4,5), there are no absolute predictions, only probabilities (6). Nothing is static; the associations among components and the extraction of order patterns are not straightforward. Nature is characterized as sophisticated, chaotic, constantly changing, turbulent, paradoxical, and unpredictable, rendering it impossible to control through direct human intervention (7-11).

Quantum theory has been adopted in various fields, including management, due to its relevance in addressing dynamic environments. Quantum management theory represents a modern approach, suggesting that managers collaborate with team members and employees to identify common goals, seize opportunities, and empower their workforce (12). As Selby argues, in today's dynamic work environment, managers should adopt a quantum mindset. This involves moving away from rigid understandings, habits, and ideologies, and instead cultivating preparation, alertness, and internal self-autonomy (13). In healthcare settings characterized by changing and unpredictable conditions, traditional management and leadership methods can be inadequate. Therefore, there is a pressing need for managers to adopt new theories of management (14).

The nursing system, as a vital subdivision of healthcare, needs to remain attuned to emerging management models and their implementation (15). One such model that has gained attention in recent years, particularly in unstable and changing conditions, is quantum theory. Using this theory enhances quantum skills, enabling leaders to implement more effective changes.

A review of the literature revealed a scarcity of articles focusing on quantum theory in nursing, indicating a significant gap in research in this area. Hasting suggested that nursing leadership has aimed to cultivate an environment that alleviates stress and supports professional advancement for nurses (16). Quantum theory appears to offer valuable insights for addressing such challenges. Therefore, the present study aims to explore the application of quantum theory in nursing leadership and propose a corresponding model.

Methods

This study employed a literature review using descriptive data synthesis, following the scientific methodologies described by Evans, Kmet et al, and Kraft et al (17-19). Given that quantum theory is relatively new in clinical sciences and that nurse leaders may have limited awareness of it, interviews with these leaders would not yield substantial data. The researchers investigated and reviewed relevant articles, utilizing qualitative content analysis and discussion among authors to develop a model for quantum management in nursing.

Search strategy and data extraction

To achieve the research objectives, a comprehensive search was conducted for relevant articles across library and internet sources. The review adhered to the Critical Appraisal Skills Program (CASP), which includes checklists for evaluating the structure and quality of studies. The search was conducted in ScienceDirect, Web of Science, PubMed, and Scopus scientific databased, using keywords such as *"Quantum", "Quantum theory", "Quantum medicine", "Quantum organization", "Nursing system", "Hospital medicine", "Hospital departments", "Nursing service", "Clinical administration", "Medical sciences", "Clinical sciences", "Personnel administration", "Medical staff privileges", "Management", "Leadership", and "Administration"*. The review encompassed studies published up to 2022, with no time limitation and restricted to articles in English.

The selection process involved three stages: 1) Selecting articles based on their abstracts, 2) Reviewing the texts for relevance, and 3) Conducting a full-text review of the articles. Each author independently identified relevant subjects, and the appropriate contents were precisely studied and briefly noted down. Data were extracted independently by two researchers, with any discrepancies resolved through discussion. Given the limited literature on quantum theory, particularly in medical sciences and nursing, the research team opted for a descriptive data synthesis of published articles in the fields of leadership and quantum theory. After identifying relevant articles, the texts were read multiple times, coded, and organized into subcategories and categories based on recurring themes.

Inclusion and exclusion criteria

The inclusion criteria were relevancy and adherence to the characteristics of a scientific paper according to the Critical Appraisal Skills Programme (CASP). Both review and descriptive studies were included in the study due to the paucity of research in this area. The exclusion criteria included inadequate data in studies and lack of access to the full text of articles, such as those presented at seminars and conferences.

Results

In the initial phase of the search, 98 articles were identified. Through a review of titles and abstracts, and considering their relevance to management, 18 articles were selected. The inclusion criteria were relevancy and availability of full texts. Finally, 8 relevant articles were selected (Figure 1). A summary of the included studies is presented in Table 1. During the qualitative content analysis stage, 538 codes were generated**.** After grouping synonymous and related codes under various themes, three categories emerged including *quantum leader, quantum organization*, and *quantum fluidity movement*. An overview of the explanatory categories as identified in the included studies is presented in Table 2.

Discussion

This section begins with a discussion of the characteristics of a quantum leader, followed by an overview of the quantum organization and quantum fluidity movement. Finally, the proposed model applicable to nursing is presented in the final section of the paper.

Quantum leader

Concerning the application of quantum theory, leaders need to have advanced skills and qualifications in conflict management, change leadership, risk-taking, innovation, coaching, and emotional intelligence (24). Balancing order and chaos and preventing over-control and authoritarian policies in favor of trust, flexibility, and minimal interference in organizational affairs, are essential aspects of quantum leadership. Quantum leaders are flexible and dynamic and act as coaches who cultivate their followers' leadership potential and foster innovative solutions instead of merely conflictive options (10). Such leaders estimate the probabilities of events based on themes and directions rather than engaging in precise predictions of events or phenomena (25). The primary mission of a quantum leader is to nurture individuals' potential by fostering communication (9). Characteristics of quantum leaders include having the power to influence others, investigative tendencies, strong communication skills, innovation, enthusiasm, vitality, dependability, and an explorative personality (8).

Self-awareness, concentration, open-mindedness, impulse control, humility, ingenuity, and optimism are the traits of a quantum leader, as indicated by Anderson. He argues that after attaining such skills, leaders are well-prepared to let others attain such skills to foster a culture of life-long learning (26). It should be noted that nursing system leaders are also expected to embody these qualifications. Given the rapid changes characterizing health and treatment environments, the potential for inter-organizational conflicts is heightened. Consequently, a quantum leader must effectively resolve such conflicts and create a conducive treatment environment for both healthcare providers and recipients (12).

Shelton and Darling identified seven essential quantum

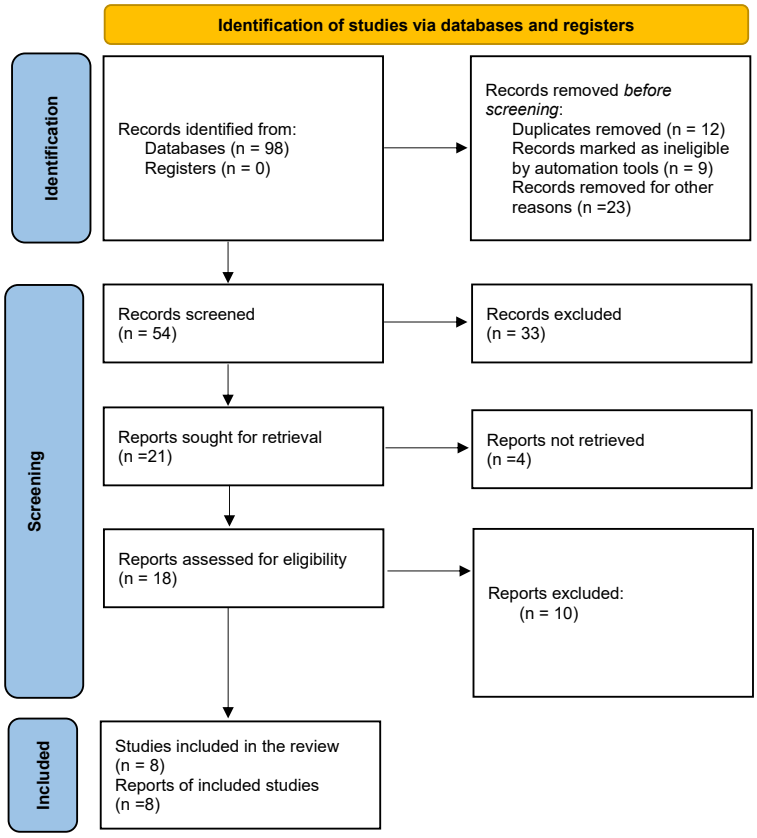

Figure 1. Screening process of papers obtained through searches

skills, the presence of which is also crucial for nurse leaders (3). Mastery of these skills is increasingly necessary as the world becomes more sophisticated and subject to constant change, rendering traditional management skills obsolete. Traditional management skills may suffice for organizations with predictable linear structures to survive. Nevertheless, the contemporary landscape's instability necessitates the adoption of quantum skills for effective leadership.

The first quantum skill, *Quantum seeing*, involves the ability to see purposively (3, 27). Quantum seeing is based on the logic that reality is intrinsically mental and appears according to the observers' expectations and beliefs. According to Wheatley and Kellner-Rogers, over 80% of what is seen in an external environment is shaped by our mental assumptions and beliefs (28). This skill empowers leaders to understand their objectives and foster participation among staff in vision and planning activities for the organization (7, 21).

The second skill, *quantum thinking*, refers to thinking that incorporates conflictual elements (3,29,30), acknowledging that the world often operates illogically and paradoxically (7). When organization leaders adopt quantum thinking, they can use conflictive differences to create the most innovative ideas (21).

The third skill, *quantum feeling,* encompasses the ability to experience a vivid and curing feeling (3). It suggests that the human heart is the center of energy that draws power from our thoughts and emotions. Positive emotions such as care, affection, and appreciation increase the integration of heart electromagnetic waves, while negative energies such as fear, suppression, conflict, and stress reduce the energy in the psychosomatic system. This skill enables the leaders to have a positive internal feeling independent of what happens outside. It enables them to manifest enthusiasm and vitality in their organization, resulting from seeing the strengths in weaknesses and opportunities in threats (7,21).

The fourth skill, *quantum knowing,* involves innovative and objective cognition. When leaders adopt this skill, they intend to make a new type of learning organization that promotes wise decision-making. This skill causes individuals to set aside dogmatic notions that claim absolute understanding of the world, leading to comprehensive information gathering and avoidance of simplistic interpretations of phenomena (3,7,21).

Quantum acting, the fifth skill, includes the ability to act with accountability (7). This principle asserts that everything in the world constitutes part of an internally sophisticated and interconnected whole, where every decision a person makes, affects others and the entire system. Leaders who apply this skill engage in actions that benefit both themselves and the system as a whole. Embracing this skill fosters a commitment to actions

Table 1. Overview of the included studies

Author(s)	Name of journal	Title of article	Year	Type	Major findings related to the study objectives
Valadez and Sportsman (11)	Journal of Professional Nursing: Official Journal of the American Association of Colleges of Nursing	Environmental management: principles from quantum theory	1999	Scientific review	Strategies such as shared governance, the process of delegation, and coordination of services can lead to increased competency in quantum management in a turmoil healthcare system.
Shelton and Darling (3)	Leadership & Organization Development Journal	The quantum skills model in management: A new paradigm to enhance effective leadership	2001	Scientific review	Seven quantum skills included quantum seeing, quantum thinking, quantum feeling, quantum knowing, quantum acting quantum trusting, and quantum being.
Shelton and Darling (7)	The Learning Organization	From theory to practice: Using new science concepts to create learning organizations	2003	Scientific review	- Leaders must have quantum skills. -Quantum leaders can create dynamic organizations with continuous improvement and collaborative learning. - Quantum leadership provides a new way of thinking about organizations.
Fris and Lazaridou (9)	Canadian Journal of Educational Administration and Policy	An additional way of thinking about organizational life and leadership: The quantum perspective	2006	Scientific review	Quantum leadership has several dimensions including the tendency to self-organize, working with uncertainty and ambiguity, inclusiveness, dialogue with experience, surfing the edge of chaos, fostering spirituality, etc.
Curtin (20)	Nurse Leader	Quantum Leadership: Succeeding in Interesting Times	2011	Scientific review	The most important quantum leadership strategies included facilitating the free flow of information, developing feedback loops and trust, seeing day-to-day events, supporting creativity, permitting consequent destruction, and articulating visions.
Dargahi (21)	Acta Medica Iranica	Quantum leadership: The implication for Iranian nursing leaders	2013	Descriptive study	Quantum seeing, thinking, feeling, knowing, trusting, and being are skills of quantum leaders. Quantum leaders can motivate the employees and help the organization reach a high level of performance.
Watson et al (22)	Nursing Science Quarterly	Quantum caring leadership: Integrating quantum leadership with caring science	2018	Descriptive study	The authors have introduced the "Quantum Caring Healthcare Leadership" model, the principles of which are: Nonlinear structures, Value-driven actions, Focus on connections-relatedness, Multisystems within systems, and Complexity-based models of design.
Root et al (23)	Nursing Administration Quarterly	Applying complexity science as a DNP quantum leader	2020	Descriptive study	DNP students who follow quantum theory can develop new processes, roles, and behaviors. They can identify problems, issues, or gaps in their organizations. A quantum leader requires self-knowledge, patience, curiosity, and a deep understanding of complex science.

Table 2. Quantum nursing management categories and subcategories

Categories					
Quantum manager		**Quantum organization**		**Quantum fluidity movement**	
codes	**Subcategories**	**codes**	**Subcategories**	**codes**	**Subcategories**
Quantum seeing, Quantum thinking, Quantum feeling, Quantum knowing, Quantum trusting, Quantum being	Quantum skills	Job Security, manager trust to stuff, Sense of belonging to system, Teamwork, Strong communication, flexibly	Quantum structure	Sense of peace, sense of love, sense of growth	Spirituality
Risk-taking, Ingenuity, Innovation, Research, Humility, Optimism, Coaching, Flexibility	personal characteristics	Self-awareness, accountability, self-management, Personality development	Quantum stuffs	need to know, want to know, acting to know	Learning
Conflict management, Chang management, Chaos management	Academic management knowledge	Process facilitation, integrated movement to achieve goals., discipline, creatively problem solving	Quantum act	Co-thinking, participation in making decision, Intimate dialogue, respect, compassion, motivation	value driven culture

rooted in compassion, integrity, and empathy (7,21,27,31).

Shelton and Darling identified *quantum trusting*, defined as trust in the life-long process, as the sixth skill. Quantum trusting shows chaos as an evolutionary prerequisite for progress (3). It seems to lead to the development of new organizational processes, such as creating open atmospheres and encouraging staff self-organization to achieve organizational goals. Quantum trusting reflects trust in natural life processes and prevents unnecessary interference from leaders (21).

The seventh skill, *Quantum being*, is the ability to maintain constant communication (3). This skill facilitates ongoing learning and fosters positive, unconditional attention. Leaders who cultivate quantum being recognize all communication events as valuable opportunities for learning and understand that these interactions do not

occur spontaneously. Quantum being represents a leader's ability to improve relational dynamics, with implications for subatomic particles. If leaders want to adopt quantum being in their organization, they should create an environment in which the staff can freely communicate with one another through both vertical and horizontal organizational structures. In quantum being, individuals integrate and consider others' shortcomings as their own (7,21,27).

The seven quantum skills discussed are achievable by nurse leaders. *Quantum seeing* encourages leaders to adjust their perspectives and involve other nurses in planning for patient care, aligning with the hospital's vision in a purposeful manner. *Quantum thinking* enables nurse leaders to break free from their past beliefs and limiting organizational structures, making them consider and accept suggestions from colleagues and clients to achieve organizational goals. *Quantum feeling* allows nurse leaders to foster positive emotions such as compassion, love, hope, and security, which are essential components of the nursing profession, both for themselves and their staff.

Quantum knowing encourages leaders to abandon the notion that no one knows the nursing system better than they do and no one can make better decisions. This prevents leaders from easily dismissing or neglecting important events. *Quantum acting* fosters a deep understanding among nurse leaders that they should make decisions beneficial to both staff and the organization, enabling them to act with love, compassion, and honesty.

Quantum trusting causes nurse leaders to seek, identify, and trust new processes and technologies, allowing the organization and staff to progress collaboratively. *Quantum being* is a vital skill for nurse leaders, particularly in today's chaotic world, where communication and learning play significant roles in the advancement of all professions. In nursing, *quantum being* is especially critical, as the ultimate objective of the nursing paradigm is to care for humans. It is essential for nurse leaders to consider others' shortcomings as their own and to establish effective horizontal and vertical communication.

Quantum organization

Another key concept addressed in the present study was quantum organization. It is clear that organizational function, whether managed through traditional or modern methods, is influenced by both internal and external environments (32). The primary distinction lies in that traditional organizations tend to operate along a balanced edge, while quantum organizations traverse the edge of chaos to achieve order (21). There are various definitions to describe a quantum organization. Deardorff and William stated that a quantum organization is characterized by its capacity for organizational learning, where staff members' personal values are equally respected, and an atmosphere of trust, security, and belonging empowers the organization (33). A defining characteristic highlighted by such definitions is organizational learning, hence considering constant improvement and continuous learning integral to quantum organizations (21,32) .In modern definitions, quantum organizations are those that empower the staff to reach their utmost potential in a quantum world (4, 32). In a quantum organization, staff members should be actively involved in designing official organizational systems (both strategic and structural), exhibit self-awareness and self-management, be committed to the organization, and enhance their self-awareness. Moreover, there should be a robust communication network among the staff, and they should have the ability to self-change, as this characteristic is crucial for the flexibility of the organization (34) .

Shelton believed when leaders adopt quantum skills, they foster the development of a quantum organization (32,35). He posited that the acquisition of these quantum skills alleviates challenges faced in the workplace, including issues related to quality, innovation, motivation, authorization, social responsibility, change, chaos, teamwork, and diversity which can be addressed through seeing, thinking, feeling, knowing, acting, trusting, and being quantum skills (7).

Deardorff and William outlined key components of an organization managed based on quantum principles (33). The first component is trust, emphasizing the importance of self-awareness and the willingness to work with others. The second component is value, which refers to the integration and accountability felt by individuals. Other components include co-thinking, which encompasses synergistic thinking, collective reasoning, and problem-solving; learning, which relates to the capacity for experiential learning; dialogue, indicating an open communication atmosphere; and spirituality, addressing issues such as personal growth (8,33).

Concerning other characteristics of quantum organizations, several points can be noted: personal atmospheres are replaced by collaborative team dynamics; processes are facilitated for efficiency; effective internal and external communication with clients and co-workers is prioritized; structures that speed up communication are deemed essential; and the organization is viewed as a whole, with flexibility considered a fundamental quality (36,37). Mapes identified five core values of a quantum organization, including respect, accountability, integrity, perseverance, and discipline (38). These values should be developed and internalized among all the staff. Thus, a quantum organization is founded on the interplay between the organization itself, the existing fluidity movement in the organization (trust, values, co-thinking, learning, dialogue, and spirituality), and management (39).

According to the authors, the aforementioned characteristics of a quantum organization are applicable to healthcare and treatment organizations, particularly within the nursing system. If nurse leaders, as Shelton stated, attain quantum skills and master them while promoting

the capabilities of their staff, they will take significant steps toward creating a quantum organization. Given the chaos often present in healthcare environments, relying on traditional methods and moving on the edge of balance and stability can result in unnecessary interventions in processes and increased workloads for both leaders and staff, leading to boredom and burnout. In this regard, Anderson argued that quantum theory enables leaders to resist a range of changes (26). The aforementioned principles of quantum theory and quantum organization suggest that leaders can cultivate discipline, one of the key principles of quantum organization, by leveraging quantum skills and the support of their staff while effectively resisting change.

Based on the results shown in Table 2, creating a quantum organization in the nursing profession necessitates the establishment and reinforcement of several factors, including the creation of a quantum structure that enhances job security, fosters trust between leaders and staff, cultivates a sense of belonging within the system, promotes teamwork, facilitates strong communication, and ensures flexibly in the nursing system; the training of staff in quantum skills, enhancing self-awareness, accountability, self-management, and personal development; and the implementation of quantum action in the organization through process facilitation, integrated movement toward goal achievement, discipline, and creative problem-solving.

Quantum fluidity movement

Most literature on quantum management emphasizes the characteristics of leaders and quantum organizations. However, can the vision and goals of an organization be achieved in today's chaotic environment solely through strong leadership and a quantum organization? The quantum fluidity movement encompasses a combination of spirituality, learning, and a valuable culture. This fluidity must not only exist at the individual level within an organization but needs to permeate its overall atmosphere. Yavaş Taşdelen and Polat identified the fluidity movement as a fundamental pillar of quantum organizations. Each organization possesses a unique atmosphere shaped by its management system (39). Quantum fluidity movement can be understood as a set of factors guiding a quantum organization toward effective quantum management. In the nursing system, three critical factors constitute the quantum fluidity movement, including spirituality, learning, and value-driven culture, as shown in Table 2. The qualitative analysis of the literature on the quantum fluidity movement identified several codes that appear achievable within the nursing context, including the sense of peace, sense of love, sense of growth, the need to know, the desire to learn, acting to know, co-thinking, participation in decision-making, intimate dialogue, respect, compassion, and motivation (40,41).

The proposed model

Based on a comprehensive literature review, the researcher's immersion in the data, and the extraction of categories from descriptive data synthesis of articles, a quantum management model was proposed (Figure 2).

In light of these insights, implementing quantum management in nursing is feasible but requires time, education, and an understanding of quantum

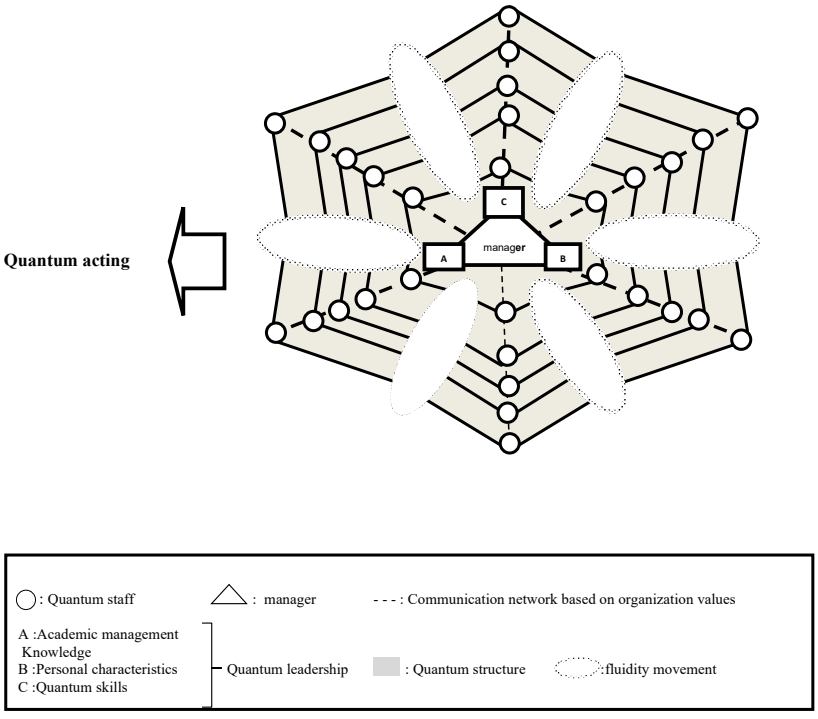

Figure 2. The proposed model for quantum leadership in nursing

management principles. Key strategies for creating an environment conducive to information fluidity throughout the organization include fostering strong, resilient relationships among staff, cultivating a climate of trust, facilitating consultations among diverse groups, promoting the synergy of ideas, and supporting creativity. These strategies can contribute to the development of effective quantum leaders (8,9).

The proposed model for quantum management in the nursing system is presented in Figure 2. As depicted, all individuals in a quantum organization engage in dynamic interactions. This model emphasizes extensive horizontal relationships between leaders and staff, complementing the vertical relationships typically present in hierarchical organizations. In addition, a strong communication network among the staff is crucial for a quantum organization. These relational dynamics, combined with an open-door policy for dialogue, facilitate co-learning among staff and enhance organizational processes. Staff members are encouraged to embrace accountability.

At the core of this model, three vertices, labeled A, B, and C, represent academic management knowledge, personal characteristics, and quantum skills, respectively. These concepts are derived from themes extracted from existing literature, as presented in Table 1. Surrounding the management triangle are lines corresponding to the five dimensions of quantum management, including worldview/paradigm, organizational design/modeling (both mental and physical), motivational value state, needs value state, and behavior (29).

Empty circles at the intersections of the broken and unbroken lines denote quantum staff, a theme intrinsic to quantum organizations. These quantum staff can be positioned at any point in the model, highlighting the importance of direct and immediate communication among themselves and with their leaders. Six broken lines, perpendicular to the unbroken lines of quantum management dimensions, show the communication network between leaders and staff, as well as among staff members, based on organizational values as one of the core themes of a quantum organization. Furthermore, the gray color of the model signifies the prevailing organizational structure. Quantum fluidity is represented by six ovals positioned at the intersection of the broken lines crossing the unbroken lines, symbolizing the schematic fluidity inherent in the quantum organization. Accordingly, when all the elements represented in the model prevail in the organization, the final requirement to complete the model is quantum acting.

Conclusion

The ultimate goal of nursing is to provide appropriate care to clients. Nursing systems that deliver high-quality care can significantly improve the overall health system in a country. Therefore, effective leadership is crucial for nursing systems to achieve this objective.

In the current chaotic and unstable world, coupled with uncertain working conditions likely to worsen, quantum theory presents a viable approach to fostering discipline and peace within the nursing system and its associated elements. Nursing professionals often experience stressful, unstable, and chaotic working conditions, necessitating the application of innovative leadership methods. According to Curtin, these methods facilitate the understanding of sophisticated systems in unstable environments (20). Therefore, it is recommended that the advantages of quantum leadership be used in nursing to enhance nurses' understanding of their unstable clinical settings, enabling them to evaluate their working conditions effectively and improve their overall performance.

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Conceptualization: Safoura Dorri.
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Funding acquisition: Safoura Dorri.
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Methodology: Safoura Dorri, Mansoureh Ashghali Farahani.
Project administration: Safoura Dorri.
Supervision: Mansoureh Ashghali Farahani.
Validation: Mansoureh Ashghali Farahani.
Writing–original draft: Safoura Dorri.

Competing Interests

None declared.

Ethical Approval

This research project was approved by Isfahan University of Medical Sciences under the ethics code IR.MUI.NUREMA.REC.1401.065.

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