



Application of Jean Watson's Theory in Nursing Practice: A Quasi-Experimental Study

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Abstract

Background: Empathy and its practice in nursing is a fundamental component in the care of patients, especially children with epilepsy. This study aimed to investigate the impact of empathetic nursing care, based on Jean Watson's model of Human Caring, on the happiness and anxiety of mothers and their children with epilepsy.

Methods: This quasi-experimental study with a non-equivalent control group involved 100 participants (50 mothers and 50 children) at Tehran Children's Medical Center, recruited via convenience sampling after obtaining ethical approval. Participants entered the study based on pre-determined inclusion and exclusion criteria. The intervention included two 14-hour virtual training sessions for nurses, focusing on key components of empathetic care such as active listening and emotional support. Data collection utilized validated instruments: the Oxford Happiness Inventory, Hospital Anxiety and Depression Scale (HADS), Spence Children's Anxiety Scale (SCAS), Children's Happiness Scale, Jefferson Scale of Empathy, and a performance observation checklist. Statistical analysis was conducted using SPSS version 21, employing descriptive statistics, t-tests, Chi-square, and Fisher's exact tests with a significance level set at $P < 0.05$.

Results: The findings showed a statistically significant difference between children's happiness in the intervention group (2.99 ± 0.21) in comparison to the control group (2.77 ± 0.32). Also, a similar trend was observed for mothers' happiness (39.32 ± 5.79 versus 33.40 ± 13.36 ; $P = 0.048$). Besides, the mean of children's anxiety scores (32.40 ± 11.07) was significantly lower than the control group ($P = 0.015$). Mothers' anxiety in the intervention group (7.68 ± 2.05) was significantly different from the control group ($P = 0.022$).

Conclusion: Empathetic nursing care, guided by the Caritas Processes, plays a crucial role in improving the happiness of mothers and children with epilepsy, while reducing the anxiety levels. This highlights the importance of implementing empathetic care strategies in clinical settings. To enhance this positive impact, it is essential to develop training programs for healthcare professionals focused on empathetic care techniques, as well as to establish support groups for mothers and children to promote community engagement and the exchange of coping strategies. Additionally, ongoing research is needed to explore the long-term effects of empathetic care on mental health outcomes in families affected by epilepsy.

Keywords: Nursing, Theory, Empathy, Quasi-experimental study

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Introduction

Empathy has long been recognized as an essential component of high-quality patient care, particularly for vulnerable populations such as children. This acknowledgment arises from the recognition that children, owing to their developmental stages and their restricted capacity to express their emotions and needs, frequently necessitate a more sophisticated and empathetic approach to caregiving (1). Evidence highlights that demonstrating empathy can result in increased patient satisfaction and better adherence to treatment (2). In the field of nursing, empathy encompasses more than just understanding a patient's experience; it also involves fostering a strong

emotional connection (3). The American Association of Colleges of Nursing emphasizes the importance of empathy in nursing education and considers empathy as one of the main components of nursing education (4).

The importance of empathetic care in the treatment of chronic childhood conditions, such as epilepsy, has been well-established in the literature. Epilepsy is a prevalent childhood disorder that affects approximately 1% of children. Childhood epilepsy is a multifaceted condition linked to various adverse consequences such as higher caregiving requirements, poorer academic performance, heightened healthcare utilization, and a greater likelihood of unaddressed medical and mental health issues (5,6).



By the same token, empathy has been identified as an essential element of nursing practice, as it contributes to improved patient satisfaction and adherence to treatment protocols. This is especially pertinent in the context of pediatric epilepsy, where empathetic care plays a vital role due to the considerable psychological challenges and stressors that children and their families frequently encounter during hospitalization (7). Children with epilepsy need more attention and empathetic care due to their long-term process and frequent hospitalizations. Children with epilepsy are confronted with psychological complications and tensions during their hospital stay. In this regard, mothers of these children need care with more understanding and consideration. Consequently, in addition to physical issues, heed must be given to psychological dimensions of patients, such as empathy (8). Nurses, as the first line caregivers, are faced with children with epilepsy regularly in the ward environment and play a central role in epilepsy management. Nurses use their clinical knowledge integrated with humanistic aspects of care to provide patient care for these patients (9).

Jean Watson developed the human care theory and defined effective care through interpersonal communication (10). Jean Watson's theory of care can provide a framework to develop and facilitate empathetic care practices. On the premise of her theory, the emphasis is on the theoretical structure of human caring. Her framework of human care referred as the Caritas Processes encompasses: practicing loving-kindness to self and others; being authentically present to enable faith, hope, and the inner-subjective life world of oneself and others; fostering one's own spiritual practices; developing trusting interpersonal caring relationships; forgiving and showing empathy to self and others; using all ways of knowing; engaging in genuine teaching-learning experiences; creating a caring-healing environment for all involved; valuing humanity; and embracing the unknowns and miracles in life (11). Watson asserts that love, compassion, and forgiveness from patients and nurses are essential to the healing process. Evidence indicates that the Theory of Human Caring can make nursing care more efficient and improve care outcomes (12). Professor Jean Watson pays special attention to empathetic patient care and considers appropriate and effective communication with patients as the most important factor (13). Recent research has investigated the implementation of the Caritas Processes across diverse healthcare environments, revealing beneficial effects on patient outcomes, including enhanced emotional well-being and diminished anxiety (14). Nevertheless, there is a paucity of studies that have specifically focused on the influence of the Caritas Processes on the happiness and anxiety levels of mothers and children affected by epilepsy.

The rationale for undertaking this research paper on children with epilepsy and their mothers as caregivers

is multifaceted. First, although the significance of empathetic care in the context of pediatric epilepsy has been recognized, there remains a notable deficiency in research that specifically explores the influence of the Caritas Processes on the psychological well-being of children with epilepsy. Most of the current literature has concentrated on the broader implications of empathy within nursing care, lacking a focused examination of its effects on the emotional states, including happiness and anxiety, of mothers and children affected by epilepsy (15,16). Children with epilepsy face unique challenges, including higher levels of anxiety and emotional distress due to their condition. Therefore, empathetic care can alleviate these psychological burdens, thereby contributing to improved emotional well-being for both children with epilepsy and their caregivers.

Second, it is important to mention that empathy as part of the formal curriculum in Iran is not taught for nursing students (17). Notwithstanding the evidence, the concern in our context is its training, which has been neglected, and nursing students do not acquire the required competency to meet the emotional needs of patients, especially children with epilepsy. By demonstrating the benefits of empathetic care, this research can inform nursing education and practice, particularly in contexts where empathy training is lacking. Our study underscores the necessity of incorporating empathy into nursing curricula to better equip future nurses to meet the emotional needs of pediatric patients and their families. Also, the well-being of mothers who care for children with epilepsy is crucial as it supports their emotional health. Understanding this dynamic can lead to a more holistic approach in caregiving, ultimately enhancing the quality of care provided.

to the best of our knowledge, there is a paucity of studies in our context to explore the impact of empathetic care on children with epilepsy, therefore, this study seeks to fill current gaps in the literature by exploring the effects of empathetic care, as conceptualized through the Caritas Processes, on the levels of happiness and anxiety experienced by mothers and children affected by epilepsy. By specifically investigating the application of this theoretical framework within the realm of pediatric epilepsy, the study aims to enhance the understanding of the potential advantages of empathetic care for this particularly vulnerable population.

Methods

Study design and subjects

This quasi-experimental study with a non-equivalent control group design was undertaken on a total of 100 participants admitted to Tehran Children's Medical Center. In this regard, 50 participants (25 mothers and 25 children) were recruited in the case group. Also, 50 participants (25 mothers and 25 children) were assigned

to the intervention group.

Sampling

The sample selection for this quasi-experimental study was executed utilizing a convenience sampling method, which is deemed suitable for research endeavors that aim to collect data from readily accessible participants within a defined context. The investigation was conducted at the Tehran Children's Medical Center, a facility dedicated to pediatric care, thereby offering an appropriate population for the research emphasis on children diagnosed with epilepsy. Before commencing the data collection process, ethical approval was obtained from the ethics committee of the Tehran University of Medical Sciences (code number: IR.TUMS.MEDICINE.REC.1399.1065). This step was taken to ensure that the study complied with ethical standards, particularly concerning the welfare of participants and the acquisition of informed consent. To facilitate participant recruitment, a designated member of the research team was tasked with conducting regular visits to the Children's Medical Center for the purpose of identifying potential participants. The hospital's medical records were reviewed to identify children diagnosed with epilepsy, thereby ensuring that the recruitment process was systematic and specifically targeted the intended population. Upon identifying potential participants, the research team engaged with the mothers of the selected children to elucidate the study's objectives, methodologies, and the associated risks and benefits. Written informed consent was secured from both the mothers and their children, thereby ensuring that all participants willingly consented to their involvement in the study.

Grouping process

After obtaining informed consent, the participants were categorized into two distinct groups: the intervention group and the control group. The process of grouping was conducted as follows:

The intervention group, consisted of 50 participants, evenly divided into 25 mothers and 25 children. This group was subjected to the intervention specifically developed for the study, to evaluate its impact on the outcomes of the participants. In a parallel manner, a total of 50 participants were designated to the control group, which comprised 25 mothers and 25 children. This group did not undergo the intervention and was instead observed for comparative analysis. The control group functioned as a reference point for assessing the efficacy of the intervention. The research utilized a non-equivalent control group design; however, randomization was not achievable due to the constraints of convenience sampling. Consequently, participants were allocated to groups according to the sequence of their recruitment. Specifically, the initial 50 participants who provided consent were designated to the intervention group, while the following 50 participants were assigned

to the control group. This approach sought to mitigate selection bias, while also recognizing the limitations associated with the non-equivalent design.

Inclusion and exclusion criteria

Inclusion criteria for children encompassed: 1) the age range of 7 to 15 years, 2) having epilepsy, 3) speaking Persian, 4) not having hearing or vision impairment, and 5) any other disorders that caused an inability to communicate. Inclusion criteria for mothers included: 1) being the patient companion, 2) willingness of the child to participate in the study, 3) speaking Persian, 4) not having hearing and vision impairments, and 5) any other disorders that caused an inability to communicate. Mothers and their children were excluded if the diagnosis was not finalized as epilepsy. In addition, discharge earlier than 3 days was another exclusion criterion.

Intervention (study approach)

The nursing training program was founded on the theoretical framework of Jean Watson's Theory of Human Caring, which underscores the significance of empathetic care within nursing practice. Watson's Caritas Processes provide a framework for nurses to develop caring relationships with patients, thereby facilitating holistic healing and emotional support (18). The choice of this model was informed by its demonstrated efficacy in improving patient outcomes through empathetic interactions. The Caritas Processes encompass ten fundamental elements, which include fostering a supportive environment, nurturing a caring relationship, and promoting a profound understanding of patients' experiences.

To guarantee a thorough and effective training experience, the program was specifically designed to meet the unique requirements of nurses caring for children with epilepsy. The training sessions encompassed practical strategies for delivering empathetic care, identifying emotional signals, and enhancing communication with both the children and their mothers. Furthermore, the training integrated evidence-based practices and contemporary literature on empathetic care in pediatric environments, thereby underscoring the significance of the Caritas Processes in routine nursing practice. The timetable of the training sessions is shown in [Table 1](#).

The intervention was executed systematically to ensure uniformity and efficacy in the provision of empathetic care, in alignment with the Caritas Processes. The following are the pertinent details:

Training sessions: A total of two virtual training sessions were executed, for a duration of 14 hours. These sessions incorporated interactive discussions, case studies, and role-playing exercises designed to enhance nurses' skills in empathetic communication and care techniques. For those nurses who were unable to participate due to

Table 1. Timetable of virtual training sessions held for nurses participated in the study (n=20)

The first day	
Time	Topics
8-10	- An introduction to the effect and importance of empathy - Definition of the communication process - Components of the communication process - Key points in communication - Forms of communication (verbal and non-verbal communication)
10-10:15	Rest
10:15-13	- Formal and informal communication - Patient communication
13-15	- Presenting videos, scenario presentation, and rehearsing through role-playing
The second day	
8-10	- Using a video about patient communication to practice and recall the topics of the previous day - Definition of empathy - Difference between empathy and sympathy, presenting a film in this regard
10-10:15	Rest
10:15-13	- Full explanation of Caritas processes
13-15	- Mock scenario presentation and the practice of Caritas process - Barriers to empathy

conflicting shift schedules, recorded videos of the sessions were provided, enabling them to engage with the training material at their convenience.

Knowledge assessment: In order to assess the nurses' comprehension of the Caritas Processes, a self-administered questionnaire comprising 20 questions pertinent to the training material was disseminated. This evaluation served to gauge knowledge retention while also pinpointing areas that may require additional clarification or further training.

Empathy assessment: The Jefferson Empathy Self-Assessment Scale was employed to evaluate the empathetic competencies of nurses before and following the training intervention. This validated instrument offered valuable insights into the efficacy of the training program in improving empathy levels among the nursing personnel.

Performance observation: A member of the research team conducted an observational assessment of the nurses' performance in providing patient care within the Neurology ward, utilizing a checklist developed by the researchers. This evaluation took place before the intervention in order to establish a baseline measurement of the nurses' empathetic care practices. This approach facilitated a direct assessment of the extent to which the nurses implemented the Caritas Processes during their daily interactions with patients.

Ongoing support and additional training: In instances where a nurse exhibited a requirement for further training, in-person sessions were organized to offer additional assistance. This approach guaranteed that all nursing staff

had the opportunity to improve their competencies and confidence in delivering compassionate care.

Implementation of empathetic care (intervention group): In the intervention phase, a group of 25 children diagnosed with epilepsy, along with their mothers, were provided with empathetic care within the Neurology ward. The nursing staff applied the principles of Jean Watson's Caritas Processes to create a supportive and nurturing environment for both the children and their mothers. This included active listening to the concerns and emotional needs expressed by the participants, ensuring that they felt heard and valued during their hospital stay. Additionally, nurses engaged in personalized interactions, addressing specific anxieties related to the child's condition and providing emotional support through compassionate communication. The intervention emphasized the importance of fostering trust and rapport, which is essential for effective caregiving. It is important to mention that participants in the control group received standard routine care as per the established protocols of the Tehran Children's Medical Center. This included basic medical treatment, monitoring, and support typically offered to children with epilepsy and their mothers during hospitalization. However, unlike the intervention group, the control group did not receive the specialized empathetic care training that the nursing staff underwent. While routine care encompasses essential medical attention and emotional support, it lacked the focused, structured approach to empathetic interactions emphasized in the intervention. To ensure a fair comparison, the control group was observed over the same timeframe as the intervention group, allowing for an assessment of the differences in emotional outcomes between those receiving enhanced empathetic care and those receiving standard care. This design aimed to highlight the specific impacts of the educational intervention on the psychological well-being of children with epilepsy and their mothers, thereby reinforcing the significance of empathetic care within pediatric nursing practices.

Post-intervention evaluation: Upon conclusion of the admission period, participants were administered the Happiness and Anxiety inventories to assess the emotional effects of the empathetic care provided. This feedback was essential for appraising the overall efficacy of the intervention in enhancing the psychological well-being of both the children and their mothers.

Intervention's implications

While the training program for nurses was crucial in enhancing their knowledge and performance in delivering empathetic care, the primary aim was to translate this improved competency into tangible benefits for the children and their mothers. The intervention sought to create an environment where children felt safe and supported, and where their mothers could express

concerns and receive guidance regarding their child's condition. By employing the principles of Watson's Caritas Processes, nurses provided individualized emotional support, facilitated open communication, and addressed specific anxieties related to epilepsy. This approach not only aimed to alleviate the psychological distress experienced by children but also to empower mothers by equipping them with coping strategies and fostering a sense of community and understanding. The subsequent assessments using the Happiness and Anxiety inventories were designed to measure the direct impact of this empathetic care on the emotional well-being of both children and their mothers, thereby highlighting the intervention's broader implications beyond nurse education. Ultimately, the study aimed to demonstrate that enhancing nurses' empathetic competencies directly translates into improved psychological outcomes for pediatric patients and their families.

Data collection

Oxford Happiness Inventory

The Oxford Happiness Inventory is a relatively lengthy measure of well-being constructed from 29 multiple-choice items. Items are measured on a four-point Likert scale ranging from strongly agree (4) to strongly disagree (0). The minimum score is 0 and the maximum score is 87. Based on this scale, the higher the score, the greater the happiness and vice versa. In similar studies by Iranian researchers, this inventory has been translated and validated (19). In our study, we used test-retest reliability, and 20 mothers over a period of 2 weeks completed the inventory. The Cronbach's alpha coefficient obtained was 0.945. In addition, the intraclass correlation coefficient was 0.67.

Hospital Anxiety and Depression Scale (HADS)

The HADS contains 14 items and consists of two subscales: anxiety and depression. The questionnaire comprises seven questions for anxiety and seven questions for depression. Each item is rated on a four-point Likert scale, giving maximum scores of 21 for anxiety and depression. Scores of 11 or more on either subscale are considered to be a significant 'case' of psychological morbidity, while scores of 8–10 represent 'borderline' and 0–7 are 'normal'. This scale has been translated and validated by an Iranian researcher (20). In the present study, the reliability of this tool was checked by Cronbach's alpha coefficient using test-retest, which was equal to 0.915.

Spence Children's Anxiety Scale (SCAS)

The SCAS is a psychological questionnaire designed to identify symptoms of various anxiety disorders, specifically social phobia, obsessive-compulsive disorder, panic disorder/agoraphobia, and other forms of anxiety in children and adolescents aged between 8 and 15

years. This questionnaire was developed by Susan H. Spence, and it can be completed by the child or by the parent. Each question addresses the frequency of certain anxiety symptoms, measured on a 0-3 scale from "never," "sometimes," "often," to "always." A maximum score of 114 is possible on the child and parent-reported SCAS. Scores consist of a total raw score (ranging from 0 to 114) and six subscale scores, with higher scores indicating greater severity of anxiety symptoms. This scale has been translated and validated by Iranian researchers (21). In the present study, Cronbach's alpha coefficient calculated for this tool was 0.928.

The Children's Happiness Scale

This questionnaire was designed by Dr. Roger Morgan and has 20 items. Each item is given a special score if selected by the child; otherwise, zero points will be awarded to that item. The highest ('happiest') possible score is 4.25. The 'middle' score is 2.88. The lowest possible score (unless someone does not tick any of the items in the questionnaire at all) is 1.68 (22). This scale has been translated and validated by an Iranian researcher (23). In the present study, Cronbach's alpha coefficient calculated for this tool was 0.727.

Jefferson Scale of Empathy (JSE)

This scale assesses nurses' self-assessment of their empathy. Self-assessment instrument has a mixture of positive and negative items and asks respondents to rate the extent to which they agree or disagree with statements. JSE has 20 items; each rated on a 7-point Likert scale, and comprises three sub-dimensions, Perspective Taking, Compassionate Care and Standing on the Patients' shoes. The Persian version of this scale has been used in the study conducted by Managheb and Bagheri in 2013 (17). In the present study, Cronbach's alpha coefficient calculated for this tool was 0.852.

Performance observation checklist

In this study, a researcher-made checklist was completed by one of the members of the research team to evaluate the performance of nurses after empathetic care training. This checklist has 10 items with positive or negative scores according to the nurse's performance. The validity of this questionnaire was obtained by face validity, and its reliability was achieved by the observation of three experts.

Quality assurance measures

To ensure the reliability and validity of the study's findings, all members of the research team were thoroughly familiarized with the study protocols. Dr. Jean Watson, a member of the research team and the founder of the human caring theory, served as a counselor throughout the study, providing support to the research team. Additionally, other team members involved in participant

recruitment and data collection participated in training sessions conducted by the research supervisor. To further minimize variability in the execution of the study, the processes of sampling and grouping were carried out according to standardized procedures. Data collection was also performed using standardized inventories. Furthermore, participants were informed about the study's objectives, and written informed consent was obtained. During the intervention phase, nurses adhered to the intervention protocol outlined in the training sessions with which they were already familiar. By implementing these standardized processes, the study aimed to reduce bias and enhance the reliability of the findings. Supervision of the pre-intervention implementation was deemed essential for maintaining quality assurance. In this context, a member of the research team conducted an observational assessment of the nurses' performance using a checklist, which provided feedback and identified areas for improvement before the intervention.

Sample size

According to educational studies and considering empathetic care as the main outcome, the sample size was calculated (95% confidence interval and 80% power) according to the following formula:

$$n = \frac{\left(z_1 - \frac{\alpha}{2} + z_1 - \beta\right)^2 (\delta_1^2 + \delta_2^2)}{(\mu_1 - \mu_2)^2}$$

A sample size of 25 children and 25 mothers was obtained for each group.

Statistical analysis

For descriptive analysis, we used mean, standard deviation, frequency, and frequency percent. For statistical analysis, we used chi-square and Fisher's exact tests to examine the homogeneity of qualitative variables, and an independent

t-test was used to compare quantitative variables. A *P* value less than 0.05 was considered statistically significant. Data analysis was performed by using SPSS software version 21.

Result

Demographic characteristics

Concerning the age of children, findings showed that of 25 children in the control group, 9 (36%) aged ≤ 10 years, and 16 (64%) aged > 10 years. On the other hand, in the intervention group, 12 (48%) aged ≤ 10 years and 13 (52%) aged > 10 years. In terms of gender, in both groups, 11 (44%) were female and 14 (56%) were male. Other demographic data regarding children and their mothers are depicted in Tables 2-4. Totally, findings revealed that the control and intervention groups were not significantly different regarding demographic information.

Anxiety of children with epilepsy and their mothers

In terms of children's anxiety, our findings showed a statistically significant decrease in the mean of total anxiety score after the intervention, in which children in the control group received a total score of 44 ± 20.21 vs. 32.40 ± 11.07 obtained for the intervention group ($t = 2.516$; $df = 48$; $P = 0.015$). More information on children's anxiety and its dimensions is highlighted in Table 5.

Concerning mothers' anxiety, findings showed a significant decrease in the mean score of anxiety in the intervention group ($M = 7.68 \pm 2.05$), compared to the mean score of the control group ($M = 9.68 \pm 3.67$) ($t = 2.377$; $df = 48$; $P = 0.022$). More information is shown in Table 6.

Happiness of children with epilepsy and their mothers

The mean score of children's happiness in the control and intervention groups was statistically significant ($P = 0.008$). In this regard, the mean score of happiness in children in the intervention group was 2.99 ($SD = 0.21$), and in the control group, it was 2.77 ($SD = 0.32$) (Table 7). In a

Table 2. Frequency distribution of demographic characteristics of children with epilepsy in the intervention and control groups

Variables & groups		Control		Intervention		Test results
		Frequency	Percent	Frequency	Percent	
Age (y)	10 and less	9	36	12	48	Independent T-test <i>P</i> = 0.95, df = 0.063
	More than 10	16	64	13	52	
	total	25	100	25	100	
	Mean ± SD	2.28 ± 11.22		2.20 ± 11.26		
	Min - Max	7-15		8-15		
Gender	Female	11	44	11	44	No analysis due to equal frequency in the two groups
	Male	14	56	14	56	
	total	25	100	25	100	
Diagnosis duration	The last three months	3	12	3	12	Fishers exact test <i>P</i> = 0.344
	Three months to a year	4	16	9	36	
	More than a year ago	18	72	13	52	
	total	25	100	25	100	

Table 3. Frequency distribution of family characteristics and the educational status of children with epilepsy in the intervention and control groups

Variables & groups		Control		Intervention		Fishers exact test
		Frequency	Percent	Frequency	Percent	
Seizures in another family member	yes	1	4	2	8	$P=0.998$
	No	24	96	23	92	
	Total	25	100	25	100	
Parental status	Living with parents	20	80	21	84	$P=0.998$
	Living only with mother	5	20	4	16	
	Total	25	100	25	100	
Educational status	I am enrolled in school and attend online classes	16	64	18	72	$P=0.732$
	I got a tutor at home	3	12	1	4	
	I am not studying at the moment	6	24	6	24	
	Total	25	100	25	100	
Education level	I can read and write	19	76	17	68	$P=0.520$
	I can read and write to some extent	5	20	8	32	
	I do not know how to read and write	1	4	0	0	
	Total	25	100	25	100	

similar line, the mean score of mothers' happiness in the control group was 33.40 ($SD=13.36$) with a range of 10-72, and in the intervention group, it was 39.32 ($SD=5.79$) with a range of 21-48. The findings revealed that the mean score of happiness in mothers in the intervention group was significantly higher than the control group ($P=0.048$) (Table 8).

Discussion

In the present study, we aimed to investigate whether nurses' empathetic care affected the anxiety and happiness of children with epilepsy and their mothers. Therefore, we designed a quasi-experimental study with a non-equivalent control group to evaluate the impact of empathetic care using Caritas Processes proposed by Professor Jean Watson.

The theory of Watson's Human Caring focuses on the human and nursing paradigm (24). The theory ensures a balance and harmony between health and illness experiences of a patient. Watson states that in a holistic approach to caring for a human, there are mind-body-spirit sub-dimensions, all of which reflect the whole as the whole is different from her/his sub-dimensions (18). Based on her theory the patient is part of his/herself, environment, nature, and the larger universe. The present study is an example of the value of a theory-based nursing practice that can enhance human health and healing in children with epilepsy.

Mother and child happiness

The mean score of happiness for mothers and children in the intervention group was significantly higher than the control group. This finding is consistent with similar studies. In a study, robots were designed to empathize with children while playing, and the study examined whether

children understood the robot's empathetic behaviors and how such behaviors affect children's emotions. Most of the children who were treated with empathetic behavior reported happiness as the most prominent emotion during their play, and some children also felt that the robot was very good for them (25). This shows that empathetic behavior in our study was probably perceived by children and influenced their sense of happiness. Evidence indicates that empathy can help individuals establish and maintain social bonds. Also, empathy promotes social relationships by solidifying social bonds (26). In another study, the findings highlighted that empathy and empathetic responses were tied to the quality of social interactions (27). In a similar line, the study by Julia Krevans and Gibbs, found that there is a relationship between empathy and social behavior in children and empathy in children promotes social behavior (28).

Research studies show that empathy with children could facilitate child support, better communication with nurses, and better social interactions. Empathy with the child could increase participation in joint interactions with the caregiver (29). We can assume that empathetic care in our study also led to enhanced mother-child relationships with caring nurses, resulting in increased happiness. Other studies have also shown that good relationships can lead to better awareness of the support received, reducing anxiety and depression and increasing happiness (30). It seems that empathy is defined as an emotional support and the emotional support received from other people is a strong determinant of happiness. McAuley and Davis found that parental depression plays a pivotal role and is inversely related to children's happiness (31).

Mother and child anxiety

The mean score of anxiety for mothers and children in the

Table 4. Frequency distribution of demographic characteristics of mothers with children with epilepsy between the two intervention and control groups

Variables & groups		Control		Intervention		Test results
		Frequency	Percent	Frequency	Percent	
Age (y)	Less than 34	4	16	5	20	Independent T-test $t=0.269$, $df=48$, $P=0.001$
	35-39	11	44	8	32	
	40-44	7	28	6	24	
	45 and more	3	12	6	24	
	Total	25	100	25	100	
	Mean±SD	38.48±4.96		38.88±5.51		
	Min-Max	28-48		25-48		
Education	High school education	6	24	4	16	Fisher's exact test $P=0.944$
	Diploma	13	52	14	56	
	Associate Degree	3	12	3	12	
	Bachelor's degree	3	12	4	16	
	Total	25	100	25	100	
Job	Self-employed	5	20	9	36	Fisher's exact test $P=0.217$
	housewife	20	80	15	60	
	Employee	0	0	1	4	
	Total	25	100	25	100	
Days of child hospitalization in neurology department	Less than 5	8	32	2	8	Independent T-test $t=0.667$, $df=48$, $P=0.508$
	5-9	14	56	22	88	
	10 and more	3	12	1	4	
	Total	25	100	25	100	
	Mean±SD	3.34±6.20		2.01±6.72		
	Min-Max	1-15		2-12		
History of depression	Yes	8	32	7	28	Chi-squared test $\chi^2=-0.095$, $df=1$, $P=0.758$
	No	17	68	18	72	
	Total	25	100	25	100	
Taking antidepressant medication	Yes	4	16	5	20	Fisher's exact test $P=0.999$
	No	21	84	20	80	
	Total	25	100	25	100	
Chronic disease	Yes	2	8	3	12	Fisher's exact test $P=0.999$
	No	23	92	22	88	
	Total	25	100	25	100	
Hospitalization history	I do not have	13	52	8	32	Chi-squared test $\chi^2=-3.829$, $df=2$, $P=0.147$
	once	4	16	10	40	
	several times	8	32	7	28	
	Total	25	100	25	100	
Sport	I do not exercise	11	44	9	36	Fisher's exact test $P=0.826$
	I exercise at times	1	4	14	56	
	I usually exercise	2	8	2	8	
	I always exercise	1	4	0	0	
	Total	25	100	25	100	
Participate in relaxation classes	Yes	2	8	7	28	Fisher's exact test $P=0.138$
	No	23	92	18	72	
	Total	25	100	25	100	

Table 4. Continued.

Variables & groups		Control		Intervention		Test results
		Frequency	Percent	Frequency	Percent	
Information about the child's illness	Weak	3	12	0	0	Fisher's exact test $P=0.452$
	medium	10	40	12	48	
	enough	9	36	10	40	
	perfectly well	3	12	3	12	
	Total	25	100	25	100	
Economic status of the family	Weak	5	20	0	0	Fisher's exact test $P=0.096$
	medium	12	48	14	56	
	Good	7	28	10	40	
	Excellent	1	4	1	4	
	Total	25	100	25	100	
Time of diagnosis	The last three months	3	12	3	12	Fisher's exact test $P=0.344$
	Three months to a year	4	16	9	36	
	More than a year ago	18	72	13	52	
	Total	25	100	25	100	

Table 5. Comparison of anxiety levels in children in intervention and control groups

Anxiety and its dimensions	Control		Intervention		Independent t-test results
	Mean	SD	Mean	SD	
Fear of open spaces (Agoraphobia) (0-27)	7.72	5.01	5.04	2.65	$t=2.363, df=48, P=0.022$
Separation anxiety (0-18)	9.04	4.88	6.32	2.79	$t=2.416, df=48, P=0.020$
Fear of physical harm (Trauma phobia) (0-15)	5.72	3.28	4.72	2.74	$t=1.168, df=48, P=0.249$
Social fear (social phobia) (-18)	7.76	3.47	6.48	3.16	$t=1.361, df=48, P=0.180$
Obsessive-compulsive disorder (0-18)	5	4.06	4.52	2.77	$t=0.488, df=48, P=0.628$
General anxiety (0-18)	8.76	3.43	5.32	2.51	$t=4.045, df=48, P=0.001$
Total anxiety score (0-114)	44	20.21	32.40	11.07	$t=2.516, df=48, P=0.015$

Table 6. Comparison of anxiety levels in mothers of hospitalized children in intervention and control groups

Anxiety	Control		Intervention	
	Frequency	Percent	Frequency	Percent
0-7 (normal)	6	24	10	40
8-10 (slight)	10	40	13	52
(medium) 11-14	7	28	2	8
Intense)) 15-21	2	8	0	0
Total	25	100	25	100
Mean±SD	9.68±3.67		7.68±2.05	
Min- Max	3-18		2-12	
Independent t-test results	t=2.377, df= 48, P=0.022			

intervention group was significantly lower in comparison to the control group. Evidence indicates that empathy is a moral behavior that is commensurate with human dignity and increases peace of mind. This finding is in line with our study (32). Another study by Mazie Tsang et al. showed that emotional empathy could lead to better information exchange, and increased participation and trust, which could reduce anxiety (33). Howick et al found

Table 7. Comparison of happiness levels in children in intervention and control groups

Happiness (1.48-4.25)	Control		Intervention	
	Frequency	Percent	Frequency	Percent
2.88 and less (less than median)	15	60	8	32
More than 2.88 (more than median)	10	40	17	68
Total	25	100	25	100
Mean ± SD	0.32 ± 2.77		0.21 ± 2.99	
Min - Max	2.13–3.36		2.57 – 3.54	
Independent t-test results	t = 2.755, df = 48, P = 0.008			

that continuous empathetic care reduced pain and anxiety. Empathetic interventions also reduced pain by 1 to 2 degrees on a visual analog scale of 10 degrees. It seems that reducing pain could help to decrease patient anxiety (34).

A study by Choi et al, concluded that verbal and tactile empathy can help reduce anxiety in patients with high baseline anxiety (35). In another study by Gambin and Sharp, nurses' empathetic relationship with hospitalized

Table 8. Comparison of mothers' happiness levels in intervention and control groups

Variable	Control				Intervention				Independent T-test
	Min	Max	M	SD	Min	Max	M	SD	
Happiness of mothers (0-87)	10	72	33.40	13.36	21	48	39.32	5.79	$t=2, df=48$ $P=0.048$

adolescents aged 12 to 17 years affected all aspects of anxiety (36). Derksen et al concluded that empathy affects factors such as patient satisfaction, adherence to treatment, reduction of anxiety and stress, better diagnosis, and patient empowerment (37). These findings are consistent with our results. In addition, empathy education has its merit for health science students to better provide care to patients, even among blood donors (38,39).

This study has its own limitations. First, this study was undertaken at the time of the COVID-19 pandemic when mothers and children were distressed owing to the hazards of the pandemic. Thus, the anxiety and happiness factors might have been affected by the COVID-19 circumstances. Second, due to the presence of COVID-19, it was impossible to attend other hospitals in order to get a parallel control group. Third, as the sample included children, it was difficult to gather data. But with the help of mothers, we managed to obtain the required data. By the same token, convenience sampling may lead to a sample that is not representative of the broader population of mothers and children with epilepsy. This can affect the external validity of the findings. Also, the study was conducted in a single medical center, which may limit the applicability of the findings to other settings or populations. Also, the intervention consisted of only two 14-hour virtual training sessions. The duration may not be sufficient to fully equip nurses with the skills necessary for implementing empathetic care effectively. The last but not least, to mitigate the risk of information exchange between the intervention and control groups in this study, several strategic measures were implemented. First, participants in both groups were informed about the nature of the study and were explicitly instructed not to discuss their experiences or the care they received with one another. This was reinforced through verbal reminders during the recruitment process and written instructions provided in the study materials. Additionally, the intervention group received specialized training and care that was distinct from the standard routine care provided to the control group, further minimizing the likelihood of overlap in experiences. The study was conducted in separate areas of the Neurology ward, with designated times for the intervention sessions, ensuring physical separation between the two groups. Furthermore, the research team maintained strict confidentiality protocols, limiting access to data and discussions related to the study to authorized personnel only.

The present study has several notable strengths. Anchored in Jean Watson's Theory of Human Caring, it

establishes a solid theoretical framework for examining the effects of empathetic care, thereby enhancing its credibility and facilitating an exploration of emotional dimensions. In addition, data collection was conducted using multiple validated instruments to assess levels of happiness and anxiety among mothers and children, which contributes to a comprehensive understanding of the intervention's effects and reinforcing reliability. Furthermore, by concentrating on mothers and children affected by epilepsy, the study addresses a significant gap in the existing literature concerning psychosocial care, offering valuable insights into how empathetic care can alleviate anxiety and promote happiness, ultimately enhancing overall well-being.

Future research endeavors may be significantly enhanced through the implementation of longitudinal studies that examine the long-term effects of empathetic care on mothers and children diagnosed with epilepsy. By evaluating outcomes over an extended timeframe, researchers can ascertain whether the benefits identified are maintained and how continuous empathetic interactions may affect health outcomes. Furthermore, broadening the scope of the study to encompass diverse populations, including children with various chronic conditions or those from different cultural backgrounds, could improve the generalizability of the results. Additionally, comparative studies could be undertaken to investigate differences in outcomes influenced by cultural perceptions of empathy and care. The integration of qualitative methodologies, such as interviews or focus groups, could yield deeper insights into the experiences of mothers and children concerning empathetic care, thereby facilitating a more nuanced understanding of its emotional and psychological impacts.

Conclusion

In conclusion, this research underscores the critical importance of implementing Jean Watson's Theory of Human Caring within pediatric nursing, specifically focusing on children with epilepsy and their mothers. The executive phases of the model—such as the creation of a caring environment, fostering trust, and promoting empathetic communication—were pivotal in enhancing the emotional well-being of the participants. By training nurses to embody these principles, the study demonstrated significant improvements in the children's psychological outcomes and their mothers' coping abilities. The structured intervention not only facilitated individualized care but also empowered families through compassionate

interactions, ultimately fostering a supportive healthcare experience. These findings highlight the necessity of integrating empathetic care practices into pediatric nursing curricula, ensuring that future healthcare providers are equipped to address the unique emotional needs of vulnerable populations. This approach promises to enhance the overall quality of care and improve health outcomes for children with epilepsy and their families.

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Competing Interests

All contributing authors declare no conflicts of interest.

Ethical Approval

This study was approved by the Ethics Committee of Tehran University of Medical Sciences (Ethical code: IR.TUMS.MEDICINE.REC.1399.1065). Written informed consent was obtained from participants.

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References

1. Nembhard IM, David G, Ezzeddine I, Betts D, Radin J. A systematic review of research on empathy in health care. *Health Serv Res*. 2023;58(2):250-63. doi: [10.1111/1475-6773.14016](https://doi.org/10.1111/1475-6773.14016).
2. Keshtkar L, Madigan CD, Ward A, Ahmed S, Tanna V, Rahman I, et al. The effect of practitioner empathy on patient satisfaction: a systematic review of randomized trials. *Ann Intern Med*. 2024;177(2):196-209. doi: [10.7326/m23-2168](https://doi.org/10.7326/m23-2168).
3. Bas-Sarmiento P, Fernández-Gutiérrez M, Baena-Baños M, Romero-Sánchez JM. Efficacy of empathy training in nursing students: a quasi-experimental study. *Nurse Educ Today*. 2017;59:59-65. doi: [10.1016/j.nedt.2017.08.012](https://doi.org/10.1016/j.nedt.2017.08.012).
4. Mailloux CG. Using the essentials of baccalaureate education for professional nursing practice (2008) as a framework for curriculum revision. *J Prof Nurs*. 2011;27(6):385-9. doi: [10.1016/j.profnurs.2011.04.009](https://doi.org/10.1016/j.profnurs.2011.04.009).
5. Kessler SK, Blank LJ, Glusman J, Thibault D, Massey S, Abend NS, et al. Unplanned readmissions of children with epilepsy in the United States. *Pediatr Neurol*. 2020;108:93-8. doi: [10.1016/j.pediatrneurol.2020.01.010](https://doi.org/10.1016/j.pediatrneurol.2020.01.010).
6. Xiaowen C, Zi L. Daily Life Experiences of Children and Adolescents with Epilepsy: A Descriptive Literature Review. 2024. Available from: <http://hig.diva-portal.org/smash/record.jsf?pid=diva2:1862187>.
7. Chong L, Jamieson NJ, Gill D, Singh-Grewal D, Craig JC, Ju A, et al. Children's experiences of epilepsy: a systematic review of qualitative studies. *Pediatrics*. 2016;138(3):e20160658. doi: [10.1542/peds.2016-0658](https://doi.org/10.1542/peds.2016-0658).
8. Berg AT, Altalib HH, Devinsky O. Psychiatric and behavioral comorbidities in epilepsy: a critical reappraisal. *Epilepsia*. 2017;58(7):1123-30. doi: [10.1111/epi.13766](https://doi.org/10.1111/epi.13766).
9. Spray J. Seizures: awareness and observation in the ward environment. *Br J Nurs*. 2015;24(19):946-55. doi: [10.12968/bjon.2015.24.19.946](https://doi.org/10.12968/bjon.2015.24.19.946).
10. Saviato RM, Leão ER. Nursing assistance and Jean Watson: a reflection on empathy. *Esc Anna Nery*. 2016;20(1):198-202. doi: [10.5935/1414-8145.20160026](https://doi.org/10.5935/1414-8145.20160026).
11. Wei H, Watson J. Healthcare interprofessional team members' perspectives on human caring: a directed content analysis study. *Int J Nurs Sci*. 2019;6(1):17-23. doi: [10.1016/j.ijnss.2018.12.001](https://doi.org/10.1016/j.ijnss.2018.12.001).
12. Drenkard KN. Integrating human caring science into a professional nursing practice model. *Crit Care Nurs Clin North Am*. 2008;20(4):403-14. doi: [10.1016/j.ccell.2008.08.008](https://doi.org/10.1016/j.ccell.2008.08.008).
13. Devi B, Pradhan MS, Giri MD, Lepcha MN. Watson's theory of caring in nursing education: challenges to integrate into nursing practice. *J Posit Sch Psychol*. 2022;6(4):1464-71.
14. Cara C. A pragmatic view of Jean Watson's caring theory. *Int J Hum Caring*. 2003;7(3):51-62. doi: [10.20467/1091-5710.7.3.51](https://doi.org/10.20467/1091-5710.7.3.51).
15. Mullan BA, Kothe EJ. Evaluating a nursing communication skills training course: the relationships between self-rated ability, satisfaction, and actual performance. *Nurse Educ Pract*. 2010;10(6):374-8. doi: [10.1016/j.nepr.2010.05.007](https://doi.org/10.1016/j.nepr.2010.05.007).
16. Hojat M, Louis DZ, Markham FW, Wender R, Rabinowitz C, Gonnella JS. Physicians' empathy and clinical outcomes for diabetic patients. *Acad Med*. 2011;86(3):359-64. doi: [10.1097/ACM.0b013e3182086fe1](https://doi.org/10.1097/ACM.0b013e3182086fe1).
17. Managheb E, Bagheri S. The impact of empathy training workshops on empathic practice of family physicians of Jahrom University of Medical Sciences. *Iran J Med Educ*. 2013;13(2):114-22. [Persian].
18. da Rocha Afonso S, Padilha MI, Neves VR, Elizondo NR, Vieira RQ. Critical analysis of the scientific production on Jean Watson's Theory of Human Care. *Rev Bras Enferm*. 2024;77(2):e20230231. doi: [10.1590/0034-7167-2023-0231](https://doi.org/10.1590/0034-7167-2023-0231).
19. Alipoor A, Noorbala AA. A preliminary evaluation of the validity and reliability of the Oxford happiness questionnaire in students in the universities of Tehran. *Iran J Psychiatry Clin Psychol*. 1999;5(1):55-66. [Persian].
20. Kaviani H, Seyfourian H, Sharifi V, Ebrahimkhani N. Reliability and validity of anxiety and depression hospital scales (HADS): Iranian patients with anxiety and depression disorders. *Tehran Univ Med J*. 2009;67(5):379-85. [Persian].
21. Zarghami F, Heidari Nasab L, Shaeiri MR, Shahrivar Z. A study in the impact of coping-cat-based cognitive-behavior therapy (CBT) on reduced anxiety in the children aged 8 to 10 with anxiety disorder. *Clin Psychol Stud*. 2015;6(19):183-202. [Persian].
22. Morgan R. The Children's Happiness Scale: Scale and Data for Children in Care, Receiving Social Care Support, and Living Away from Home in Boarding or Other Residential Schools or Colleges. *Children's Services and Skills*. 2014. Available

- from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/379265/The_20Children_27s_20Happiness_20Scale.pdf.
23. Palvan S, Zareii K, Sadat Hoseini AS, Haghani H. The effect of exchanging drawings with peers on the happiness of children with cancer, aged 7-11 years: a clinical trial. *PLoS One*. 2021;16(10):e0257867. doi: [10.1371/journal.pone.0257867](https://doi.org/10.1371/journal.pone.0257867).
 24. Watson J. Caring science and human caring theory: transforming personal and professional practices of nursing and health care. *J Health Hum Serv Adm*. 2009;31(4):466-82.
 25. Leite I, Castellano G, Pereira A, Martinho C, Paiva A. Modelling empathic behaviour in a robotic game companion for children: an ethnographic study in real-world settings. In: *Proceedings of the Seventh Annual ACM/IEEE International Conference on Human-Robot Interaction*. Association for Computing Machinery; 2012. p. 367-74. doi: [10.1145/2157689.2157811](https://doi.org/10.1145/2157689.2157811).
 26. Anderson C, Keltner D. The role of empathy in the formation and maintenance of social bonds. *Behav Brain Sci*. 2002;25(1):21-2. doi: [10.1017/s0140525x02230010](https://doi.org/10.1017/s0140525x02230010).
 27. Blum LA. *Friendship, Altruism and Morality* (Routledge Revivals). London: Routledge; 2009. doi: [10.4324/9780203857304](https://doi.org/10.4324/9780203857304).
 28. Krevans J, Gibbs JC. Parents' use of inductive discipline: relations to children's empathy and prosocial behavior. *Child Dev*. 1996;67(6):3263-77.
 29. Eisenberg N, Eggum ND, Di Giunta L. Empathy-related responding: associations with prosocial behavior, aggression, and intergroup relations. *Soc Issues Policy Rev*. 2010;4(1):143-80. doi: [10.1111/j.1751-2409.2010.01020.x](https://doi.org/10.1111/j.1751-2409.2010.01020.x).
 30. Alkozei A, Smith R, Killgore WD. Gratitude and subjective wellbeing: a proposal of two causal frameworks. *J Happiness Stud*. 2018;19(5):1519-42. doi: [10.1007/s10902-017-9870-1](https://doi.org/10.1007/s10902-017-9870-1).
 31. McAuley C, Davis T. Emotional well-being and mental health of looked after children in England. *Child Fam Soc Work*. 2009;14(2):147-55. doi: [10.1111/j.1365-2206.2009.00619.x](https://doi.org/10.1111/j.1365-2206.2009.00619.x).
 32. Ranaei Kordshouli H, Allahyari Bouzanjani A. Nurses' empathy with patient: the effect of perceived social supports and ethical responsibility to patient. *Quarterly Journal of Nursing Management*. 2016;5(1):29-39. doi: [10.29252/ijnv.5.1.29](https://doi.org/10.29252/ijnv.5.1.29). [Persian].
 33. Tsang M. The importance of empathy--as I have studied and experienced it. *Hawaii J Med Public Health*. 2013;72(9 Suppl 4):79-80.
 34. Howick J, Moscrop A, Mebius A, Fanshawe TR, Lewith G, Bishop FL, et al. Effects of empathic and positive communication in healthcare consultations: a systematic review and meta-analysis. *J R Soc Med*. 2018;111(7):240-52. doi: [10.1177/0141076818769477](https://doi.org/10.1177/0141076818769477).
 35. Choi SM, Lee J, Park YS, Lee CH, Lee SM, Yim JJ. Effect of verbal empathy and touch on anxiety relief in patients undergoing flexible bronchoscopy: can empathy reduce patients' anxiety? *Respiration*. 2016;92(6):380-8. doi: [10.1159/000450960](https://doi.org/10.1159/000450960).
 36. Gambin M, Sharp C. Relations between empathy and anxiety dimensions in inpatient adolescents. *Anxiety Stress Coping*. 2018;31(4):447-58. doi: [10.1080/10615806.2018.1475868](https://doi.org/10.1080/10615806.2018.1475868).
 37. Derksen F, Bensing J, Lagro-Janssen A. Effectiveness of empathy in general practice: a systematic review. *Br J Gen Pract*. 2013;63(606):e76-84. doi: [10.3399/bjgp13X660814](https://doi.org/10.3399/bjgp13X660814).
 38. Delzendeh M, Nazarieh M, Beigzadeh A. Empathy as an essential component in the practice of medicine. *J Emerg Med Trauma Acute Care*. 2023;2023(4):28. doi: [10.5339/jemtac.2023.28](https://doi.org/10.5339/jemtac.2023.28).
 39. Seyed-Askari SM, Beigzadeh A, Mohammadpoor-Ravari M. The prevalence of transfusion transmitted infections among blood donors in Kerman, Iran. *J Kerman Univ Med Sci*. 2015;22(5):669-76. [Persian].