Effect of Patient's Family Engagement in Nursing Care on Nurses' Perception and Patients' Clinical Outcome at Neurological Intensive Care Unit

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Abstract

Background: Family engagement means active partnerships between health care providers' families. Family engagement in ICU takes different forms depending on the needs of critically ill patients. IT can improve patients' clinical outcomes. **Aim**: Evaluate effect of patient's family engagement in nursing care on nurse's perception and patients' clinical outcome at Neurological Intensive Care Unit. **Subjects and Method**: Design: A quasi-experimental study was used at the Neurological Intensive Care Unit of Tanta University Hospital. **Subjects**: A convenience sample of all nurses working in previously setting and 60 adult critically ill patients in ICU. **Tools**: Three tools were developed by the researcher as follow. **Tool (I)**: Patient's socio-demographic characteristics, and patients' clinical data. **Tool (II)**: Nurses perception about family engagement. **Tool (III)**: Clinical Outcome Measurement of Critically Ill Patient. **Results**: The family engagement protocol show an improvement in clinical patient condition which in study group there were significant differences regarding level of consciousness، physiological parameters monitoring and Richmond Agitation-Sedation Scale (RASS) with p level=0.012 respectively. The most of critical care nurses (72.5%) have high level of knowledge after family engagement protocol implementation. **Conclusions**: Application of protocol of family engagement had significance effectiveness on improvement of clinical outcome among critically ill patients. The nurses made an encouraging and positive outlook on the involvement of family. **Recommendations**: Create polices, protocols, and procedure for family engagement in ICUs, assessment tool to assess family readiness to be actively contributing to their patients' care and the aspects of care they can be engaged in should be available.

Keywords: Critically ill patients, Family engagement, Intensive Care Unit, Nurse's perception.

Introduction:

Critical illness and intensive care have a profound and traumatic impact on the health and well-being of patients and their loved ones. According to earlier studies, many critically ill patients in the intensive care unit (ICU) are kept apart from their family by pervasive, stringent visitation regulations, which may have a detrimental effect on their care and ability to recover **(Hayes, Harding, Blackwood, & Latour, 2024)**. Admission of a patient to the ICU can be traumatic for both the patient and their family, and this stress may be heightened if the illness is severe, chronic, life-limiting, life-threatening, or involves resuscitation or death **(Schwartz et al., 2022)**.

Due to their admission to the intensive care unit, critically ill patients need special attention and needs to be met. One of the basic needs of patients and families during hospitalization ICU is the presence of a family member beside the patient. Family participation in patient care is accepted in public wards, but unfortunately in ICUs due to the structure and restriction of visits in these wards, this issue faces many challenges **(Ludmir & Netzer, 2019)**.

An active collaboration between medical staff, patients, and their families is known as family engagement, and it can enhance patient safety and quality of treatment as well as individual health and wellness. The necessity of family involvement, especially in decision-making, is emphasized in the most recent family-centered care (FCC) guidelines. However, there is little evidence to support active family participation, where family members assist with direct patient care, to the best of our knowledge, no evaluation of active family involvement strategies has been carried out, despite the fact that involving families in the provision of care is encouraged across ICU populations and practice contexts **(Alexanian, Fraser, Smith, & Kitto, 2024)**.

According to a research study conducted in Copenhagen in 2023 across 28 intensive care units, about one-third of the participating ICUs had a strategy for patient and family involvement. Approximately half of the ICUs engaged patients and families in the research process,

while only four ICUs reported engagement at the organizational level **(Oxenbøll Collet, Albertsen, & Egerod, 2024)**.

Furthermore, an Alexandria University study demonstrated that the use of structured auditory and tactile stimulation by trained family members improved the level of consciousness in comatose patients with traumatic brain injury, reduced the incidence of physiological adverse events, and shortened the length of stay in the intensive care unit **(Ahmed, Attia, Mansour, & Megahed, 2023)**. In a current review of family involvement interventions in adult ICUs, family engagement is described on a field moving from passive (eg, physical presence at the bedside and receiving and needs met) to more active activities (eg, sharing and getting information, involvement in decision-making, and making contributions to the care of the patient). The relevance of decision-making support in the intensive care unit, family presence, and communication with families are all supported by empirical data. **(Kaslow et al., 2022)**.

The assertive and supportive roles of family members are especially crucial when patients are critically ill, as many patients are unable to make decisions or communicate on their own and have limited support. As a result, patient-centered care should also be family-centered **(Doherty, Feder, Heyman, & Akgün, 2024)**. Offering appropriate care and support to family members and encouraging them to actively participate in the patient's care, can help them better address the patient's various needs and preferences **(Alam, Hannon, & Zimmermann, 2020)**.

An important component of patient- and family-centered care that nurses can apply is involving the family in the patient's daily care. When suitable, family members can assist by giving massages, helping with full-body bathing, providing eye and oral care, and grooming the patient's hair. They may also take part in washing the patient's hair or face, as well as assist with procedures such as suctioning, enteral feeding, monitoring central venous pressure, and performing limb exercises **(Krajnc & Bercan, 2020)**.

By supporting family involvement in patient care, the nurse fosters a sense of respect, support, and partnership between families and healthcare providers. Research has also shown that involving family members in care enhances emotional closeness, promotes patient safety and a sense of security, and helps maintain the patient's dignity **(Joo, Jang, & Kwon, 2024)**. While the advantages

of family involvement generally surpass the disadvantages, there are challenges related to family participation during physician rounds. Potential risks include confusion from misunderstandings of the discussions, breaches of privacy and confidentiality, and difficulty addressing sensitive medical issues like inadequate home care, medical errors, or poor prognosis in front of family members **(Exposito, & Marañón, 2021)**.

Critical nurses are essential to ICU family care because they stay in close proximity to patients' families during their stay, offering them support, comfort, and information while also facilitating their presence and communication with the ICU staff. It is essential to determine what encourages and hinders nurses from interacting with ICU families. There are facilitators at the organizational, unit, and nursing culture levels as well as at the family adaption level. Systemic obstacles, moral dilemmas, family misery, and family exclusion are disruptors **(Dijkstra et al., 2023)**.

Although ICU nurses are primarily responsible for facilitating families' daily contact with the ICU. In addition to their direct care responsibilities, critical care nurses also teach and assist family members with various nursing procedures, such as enteral feeding, naso-oropharyngeal suctioning, measuring central venous pressure, and providing bed baths **(Cypress, Gharzeddin, Ransom,Villarente, & Pitman**, **2024)**.

Prior recognition and intervention studies to explore these family engagements in patient care concepts have been reported, but limited data exist about the scope and variability of family engagement and visitation policies and practices across the developing country **(Abdi et al., 2024)**. Nurses in Egyptian intensive care units lack a clear understanding of the best practices for family engagement while taking patient safety into account because there are no explicit laws or regulations pertaining to the involvement of the family of critically ill patients in treatment. Critically ill patients receive round-the-clock care from the intensive care unit staff. This study will be carried out to increase planned family presence in the intensive care unit in order to improve clinical outcome among critically ill patients, as nurses' perceptions and attitudes on family engagement may have an impact on the implementation of the family involvement plan.

Subjects and Method

Research design:

A quasi- experimental design was utilized to conduct this study.

Setting:

The study was conducted at Neurological Intensive Care Unit at Tanta Main University Hospital affiliated to Ministry of Higher Education and Scientific Research. It was prepared with 2 wards each ward equipped with 8 beds; the total number of beds was 16.

Subjects:

All nurses employed in the aforementioned context as well as 60 adult patients from the previously described setting were selected. They will be split up into two equal groups, each of which will have thirty patients: Study group included thirty patients who received care from nurses and their families made up the study group. The control group included thirty patients who were just cared after by nursing staff. The sample was chosen based on the following criteria:

Inclusion criteria: Patients aged between 21 and 60 years. Both sexes. First class family member (Mother, father, sister, brother, and wife).

Tools of the study:

Three tools were utilized to collect patient data, which include the following:

Tool (I): Structural patient's Clinical Assessment Tool

It was consisted of two parts : **Part (A): Demographic characteristics of patients:** which included patient' code, age, sex.

Part (B): Patients' clinical data: - It included: current diagnosis, date of admission, previous admission to ICU, chief complaint and past medical and surgical history **(Gates, 2020).**

Tool (II): Nurses perception about family engagement

It was established by researcher after reviewing the up-to-date based on literature **(Hetland, Hickman, Mcandrew & Daly, 2017)**, it consisted of two parts**:**

Part (A): Nurses' demographic characteristics: The demographic traits of the nurses encompassed their age, gender, relationship status, years of experience, and level of education.

Part (B) Nurses' perception about family engagement: This part was created by the investigator to evaluate how nurses view family involvement and to gather their responses. It included 20 items, such as:

Family engagement in care is supported, family involvement in the planning and delivery of care, family members can easily access the ICU whenever they wish, Restrictions on

visiting hours and days, the presence of family members may increase the risk of infection **(Abd El Wareth, & Elcokany, 2019)**.

Scoring system:

All items included in the nurses' perception were measured using a five-point Likert scale as follows: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5 - Strongly agree.

All of the Likert scale items were summed and were described as follow:

-Total score <60% was considered negative feedback.

-Total score ≥60% was considered positive feedback.

Tool (III): Clinical Outcome Measurement of Critically Ill Patient:

It was comprised of three parts:

Part (A): Assessment of level of consciousness of patients by Glasgow coma scale:

The Glasgow Coma Scale (GCS) was developed by **Bryan Jennett et al., (1974), adopted by Cook (2021); Teasdale et al. (2014)**, **Glasgow Coma Scale (GCS)** reflects the patient's overall level of consciousness, consists of three domains: Eye opening: scored from 1 to 4, verbal response: from 1 to 5, and motor response: from 1 to 6. These individual scores are summed to form a total GCS score ranging from 3 to 15.

Part (B): Physiological Parameters Monitoring. This section was developed by the researcher after an extensive review of the related literature **(Brennan, Whittingham, Sinha, & Teasdale, 2024)**, and it was included: Heart rate, rhythm, respiratory rate, CVP, systolic blood pressure, diastolic blood pressure, mean arterial pressure and SPO2.

Part (C): The level of agitation was assessed using the Richmond Agitation-Sedation Scale (RASS), which was developed by **Sessler (2002) and later adopted by Namigar et al. (2017); Vasilevskis et al. (2016).** The RASS is used to assess arousal levels and guide sedation therapy.

Scoring system:

The RASS is a 10-point scale ranging from -5 to +4.

- Levels of sedation from -1 to -5 (drowsy, light sedation, moderate sedation, deep sedation, unarousable).
- Levels of agitation from +1 to +4 (restless, agitated, very agitated, and combative).

-RASS level 0 is "alert and calm."

Method:

1. **An Official Permission** was obtained from the responsible authorities at the Faculty of Nursing, Tanta University to the director of

the Neurological Intensive Care Unit emergency hospital in Tanta University Hospital.

2. Ethical and legal consideration:

a. Approval of Scientific Research Ethics Committee of the Faculty of Nursing under code number (127/11/22), and by the Ethics Committee of the Faculty of Medicine under code number (36103/11/22).
b. Nature of the study didn't cause any harm or pain to the entire subjects.
c. Informed consent was obtained from a family member after explaining the purpose of the study and the right to withdraw at any time. Consent was also obtained from nurses working in the Neurological Intensive Care Unit.

d- Confidentiality and anonymity were preserved by assigning code numbers in place of names, and patients' privacy was respected throughout the data collection process.

3. Tool Development: Study Tools (I) and (II) were developed by the researcher following a review of relevant literature, while Tool (III), parts (A) and (C), were adapted from existing sources.

4. Tool validity: content validity of the developed tools was evaluated for clarity and applicability by seven experts in critical care nursing and biostatistics to ensure their accuracy, and necessary modifications were made accordingly.

5. **A pilot study**: A pilot study was performed on 10% of the patients and nurses to assess the possibility and applicability of tools, as well as to identify any potential challenges might arise through data collection. Based on the findings, necessary modifications were made.

6. Reliability of the tool: was done on developed tools by Cronbach's alpha test

- Reliability of Glasco coma scale for conscious level assessment and RASS for sedation level assessment score was 0.96”95% confidence intervals (CI 0.92 - 1.0)”

-The reliability of the developed Tool III, Part (B), was assessed using Cronbach's alpha: is 0.878, indicating a high level of internal consistency.

7. Duration of study: Data was gathered over an eight-month timeframe, spanning from August 2023 to March 2024.

-The present research was conducted in four stages: evaluation, strategy development, execution, and assessment, as detailed below.

1. Assessment phase: the researcher assesses patients in both control and study group by using Tool (I) and Tool (III) on the first day of admission.

Nurses' assessment: The assessment of nurses in the ICU was conducted by the researcher using Tool (II) to evaluate their family involvement perceptions in patient care within the ICU.

2-Planning stage: Developing the material for involving families in patient treatment in the ICU: The researcher will create the material rooted in an analysis of existing literature **(Carew, Redley, & Bloomer, 2024)** to align with the specific objectives mentioned above. An illustrated, structured booklet will be created to support this content.

-Before beginning of this protocol and family entered to ICU, the informed consent included explanations regarding voluntary participation, by using a power-point presentation and a simple booklet and about which demonstrate brief data about what is ICU, it's shape ,devices , the ICU equipment, methods of the infection control, the mechanism of any probable complaint ,how to participate with nursing care procedures for patient .

-In the intervention group, the first class member Family (father, mother, wife, sister, brother) based on after The strongest and most emotional relationship with the patient will be chosen.

-Before entering into the unit, the researcher communicated to the family members that it was essential for them to adhere to the unit's regulations and to respect the privacy of other patients, ensuring they did not interfere with the nursing care while visiting their relative. To avoid overcrowding in the ICU, family members were allowed to enter the unit in rotation, with prior approval from the charge nurse. For ethical reasons, other visitors adhered to the standard visiting policy. Additionally, families of patients who were not eligible for the study were given the opportunity to visit their loved ones at a separate time, ensuring the environment remained controlled.

3. Implementation phase: The implementation phase involved the planned presence of a chosen family member who met the inclusion criteria, with their participation occurring from the first day of ICU admission for duration of 3 days. The selected family members were allowed to visit the ICU twice daily (at 10 a.m. in the morning and 3 p.m. during the evening shift), each visit lasting 15 minutes. After coordinating with the nurse in charge, they were permitted to enter the ICU to provide emotional support to their loved ones, including physical contact during

specific critical procedures such activities include suctioning, assessing central venous pressure, and engaging in fundamental care responsibilities such as changing dressings, cleansing the face, styling hair, cleaning teeth, providing oral and enteral nutrition, along with supporting the patient throughout procedures and assessments. Moreover, family members were given the chance to engage with the nursing team, inquire about the patient's health status, and acquire additional knowledge to enhance their understanding and assurance in their involvement.

4. Evaluation phase: Was done with tool I, II for both control and study group in first, second and third day to compare between the two studied groups.

-Nurses perception was evaluated before and at the end of the study by using tool II.

Results

Table (1) illustrates how the patients involved in the study are distributed according to their demographic characteristics. It was observed that more than two-fifths (43.33%) of the patients in the control group, compared to nearly one-third (33.33%) in the study group, were in the age range of 30-50 years. The mean age for the control group was 41.83±8.313 years, while for the study group, it was 41.47±8.733 years. Additionally, nearly two-thirds (63.33%) of the control group were male, compared to just over half (53.33%) in the study group respectively.

Table (2) shows how the patients involved in the study are categorized according to their clinical data. Regarding the current diagnosis, it was discovered that over one-third (36.67%) of individuals in the control group experienced a hemorrhagic stroke, while 33.34% of those in the study group were similarly affected. Regarding past medical history, the most common comorbid condition was neurological diseases, affecting 26.67% of patients in the control group and 30.00% in the study group. The results also indicated that 43.33% of patients in the control group and 53.33% in the study group had no past surgical history respectively.

Table (3) illustrates how the patients are categorized in the Neurological Intensive Care Unit according to their consciousness levels. It was revealed that there were no significant differences in control group as regards eye opening, motor response and verbal response. On the other hand, in the study group there were significant

differences regarding to eye opening at the 3rd day, motor response at the 2nd day and verbal response at the 2nd and 3rd day with P level less than 0.05 respectively.

Table (4) presents the mean scores of physiological parameters. It was originated that there were significant changes in the physiological parameters between the study and control groups throughout the study period, with a p-value of less than 0.05.

Table (5) displays how the patients in the study were categorized based on their scores on the Richmond Agitation-Sedation Scale (RASS) during the different phases of the research**.** The findings revealed that over seventy percent (70.00%) of the control group were unarousable upon admission, while by the third day, nearly one-third (33.3%) had reached deep sedation. In contrast, over half (60.00%) of the study group were unarousable upon admission, but by the third day, nearly one-quarter (23.33%) of the patients had become alert and calm. Additionally, significant differences were observed between two groups regarding their RASS scores on the third day, with a p-value of 0.012*.

Table (6) Distribution of the studied nurses regarding their socio-demographic characteristics. The results revealed that nearly half (42%) of the nurses were aged between 21 and 30 years, with a mean age of 35.10±8.752 years. Regarding gender, 60% of the nurses were female. In relation to marital status, nearly half (47.5%) of the nurses were married. Concerning education, about half (50%) of the nurses held a nursing bachelor's degree, while less than half (27.5%) had a nursing technician diploma. Regarding their years of experience in the neurological care unit, approximately one-third (32%) of the nurses in the study group had worked in the neurological intensive care unit for 5-10 years, with a mean ± SD of years of experience of 11.84±8.34 years.

Table (7) displays distribution of the studied nurses regarding their knowledge about family engagement in nursing care pre and post implementation. In relation to the family engagement protocol following a three-day intervention, The findings revealed notable statistical differences in the nurses' understanding pertaining to the concept of family, the significance of involving family in the ICU for both patients and nursing staff, along with the fundamentals, dimensions, levels, and obstacles related to family participation in the ICU, with a p-value of 0.000 after the family

engagement protocol was implemented.

Table (8) Distribution of the studied nurses regarding their total knowledge level about family engagement in nursing care pre and post implementation. The results revealed that a minority (5%) of the nurses had a high level of knowledge prior to the implementation of the family engagement protocol, compared to nearly three-quarters (72.5%) of nurses accomplishing a high level of knowledge after implementation of the protocols.

Table (9) Distribution of the studied nurses regarding their perception level about family engagement in nursing care pre and post implementation. The results indicated that 10% of the nurses had a positive perception prior to the family engagement protocol, whereas 92% of the nurses had a positive perception after its implementation, with a p-value of 0.005.

Table (1): Illustrates how the patients involved in the study are distributed according to their demographic characteristics.

Characteristics	The studied patients (n=60)				χ^2 P
	Control group (n=30)		Study group (n=30)		
	No	%	No	%	
Age (in years)					
(21-<30)	4	13.33	4	13.33	
(30-<40)	7	23.33	10	33.33	1.341
(40-<50)	13	43.33	9	30.00	0.720
(50-60)	6	20.00	7	23.33	
Range	**(25-56)**		**(22-53)**		t=0.028
Mean ± SD	**41.83±8.313**		**41.47±8.733**		P=0.868
Gender					
Male	19	63.33	16	53.33	FE
Female	11	36.67	14	46.67	0.601

Table (2): Shows how the patients involved in the study are categorized according to their clinical data

Clinical data	The studied patients (n=60)				χ^2 P
	Control group (n=30)		Study group (n=30)		
	No	%	No	%	
Current diagnosis					
Hemorrhage stroke	11	36.67	9	30.00	
Ischemic stroke	10	33.34	11	36.66	
Gullian baree syndrom	3	10.00	3	10.00	9.408 0.152
Mythenia gravies	3	10.00	4	13.33	
Seziure	3	10.00	3	10.00	
Previous hospitalization					
Yes	11	36.67	13	43.33	FE
No	19	63.33	17	56.67	0.792
Past medical history					
None	7	23.33	8	26.67	
Respiratorydiseases	2	6.67	2	6.67	
Heart diseases	4	13.33	4	13.33	
Renal diseases	1	3.33	1	3.33	3.368
Hepatic failure	2	6.67	0	0.00	0.849
Neurological diseases	8	26.67	9	30.00	
Diabetic	4	13.33	3	10.00	
Cancer	2	6.67	3	10.00	
Past surgical history					
None	13	43.33	16	53.33	
Heart surgery	3	10.00	2	6.67	0.670
Vascular surgery	6	20.00	5	16.67	0.880
Abdominal surgery	8	26.67	7	23.33	

Table (3): Illustrates how the patients are categorized in the Neurological Intensive Care Unit according to their consciousness levels

Total consciousness level	The studied patients (n=60)																							
	Control group (n=30)												Study group (n=30)											
	1st day				2nd day				3rd day				1st day				2nd day				3rd day			
	Pre		Post		Pre		Post		Pre		Post		Pre		Post		Pre		Post		Pre		Post	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Unconscious	25	83.3	25	83.3	25	83.3	21	70.0	21	70.0	20	66.7	26	86.7	26	86.7	28	93.3	10	33.3	10	33.3	1	3.33
Semiconscious	5	16.7	5	16.7	5	16.7	9	30.0	9	30.0	10	33.3	4	13.3	4	13.3	2	6.7	20	66.7	20	66.7	23	76.67
Full conscious	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	6	20.00
χ^2 , P	FE , 1.00				FE , 0.360				FE , 1.00				FE , 1.00				**FE , 0.000***				**17.074 , 0.000***			
Range Mean ± SD	**(3-9) 6.13±2.129**		**(3-9) 6.17±2.151**		**(3-9) 6.10±2.187**		**(3-10) 6.47±2.403**		**(3-11) 6.57±2.515**		**(3-11) 6.67±2.604**		**(4-9) 6.77±1.406**		**(4-9) 6.90±1.296**		**(4-9) 7.07±1.015**		**(6-11) 8.83±1.234**		**(6-11) 8.83±1.416**		**(7-14) 11.07±1.574**	
t , P	0.004 , 0.952				0.382 , 0.539				0.023 , 0.880				0.146 , 0.704				**36.678 , 0.000***				**33.371 , 0.000***			

(3-8) unconscious (9-12) semiconscious (13-15) full conscious

FE: Fisher' Exact test

* Significant at level P<0.05

Table (4): Mean scores of physiological parameters monitoring of the studied patients.

Physiological Parameters Monitoring	The Studied Patients (n=60)	Range Mean ± SD								
		1st day		T	2nd day		t	3rd Day		T
		Pre	Post	P	Pre	Post	p	Pre	Post	P
Heart rate (B/m)	Control group	(56-144) 86.20±29.972	(56-144) 86.27±29.914	0.00 0.993	(56-144) 86.87±29.752	(56-144) 87.07±30.157	0.001 0.979	(56-140) 86.53±28.863	(56-140) 85.27±27.983	0.030 0.864
	Study group	(78-140) 99.03±20.200	(76-125) 92.57±16.068	1.883 0.175	(70-136) 93.40±17.789	(60-120) 88.60±12.683	1.448 0.234	(76-100) 89.23±7.691	(60-100) 82.50±10.843	**7.697 0.007***
Respiratory rate (C/m)	Control group	(10-80) 19.87±13.214	(10-80) 19.87±13.214	0.00 1.00	(10-36) 18.20±7.053	(10-36) 18.40±7.054	0.012 0.913	(10-34) 18.33±6.890	(10-34) 18.47±6.658	0.006 0.940
	Study group	(14-26) 19.13±3.665	(14-26) 18.87±3.037	0.094 0.760	(14-24) 18.33±2.454	(14-21) 17.70±1.822	1.288 0.261	(14-20) 17.03±1.691	(12-22) 15.63±2.141	**7.897 0.006***
Blood pressure (mmHg) Systolic pressure	Control group	(90-190) 126.40±36.154	(90-190) 126.40±36.154	0.00 1.00	(90-190) 126.27±34.696	(90-190) 127.10±34.392	0.009 0.926	(90-190) 126.97±34.227	(90-190) 126.93±34.596	0.00 0.997
	Study group	(110-180) 141.17±23.624	(120-180) 134.90±22.045	0.743 0.392	(110-180) 135.87±18.638	(110-170) 130.83±13.839	1.410 0.240	(110-165) 128.00±11.111	(100-150) 112.67±13.629	**22.812 0.000***
Diastolic pressure	Control group	(60-160) 78.97±22.304	(60-100) 76.90±16.340	0.168 0.684	(60-100) 77.03±16.323	(60-100) 77.30±16.337	0.004 0.950	(60-100) 76.93±14.605	(60-100) 76.67±14.826	0.005 0.944
	Study group	(60-90) 79.67±12.172	(60-90) 78.83±11.940	0.072 0.790	(65-95) 79.17±9.567	(65-95) 74.00±7.701	**5.309 0.025***	(60-95) 71.67±8.938	(60-80) 66.50±8.110	**5.498 0.022***

* Significant at level P<0.05

Continue Table (4): Mean scores of physiological parameters monitoring of the studied patients.

Physiological Parameters Monitoring	The Studied Patients (n=60)	Range Mean ± SD								
		1st day		T P	2nd day		t p	3rd Day		T P
		Pre	Post		Pre	Post		Pre	Post	
MAP	Control group	(75-155) 102.68±27.480	(75-145) 101.65±25.822	0.023 0.881	(75-145) 101.65±25.075	(75-145) 102.20±24.899	0.007 0.932	(78-145) 101.95±23.523	(77-145) 101.80±23.856	0.001 0.981
	Study group	(36-130) 108.61±18.754	(36-125) 106.86±17.805	0.137 0.712	(87.5-130) 107.51±10.052	(90-120) 102.41±7.146	**5.130 0.027***	(90-112.5) 99.83±5.906	(80-105) 89.58±7.164	**36.559 0.000***
SPO_2	Control group	(76-96) 83.27±5.065	(76-98) 85.60±7.005	2.186 0.145	(76-96) 84.27±5.199	(76-97) 87.00±6.390	3.303 0.074	(76-96) 85.53±5.393	(76-100) 88.13±7.886	2.222 0.141
	Study group	(80-98) 83.93±5.099	(76-98) 84.33±7.019	0.064 0.802	(76-96) 84.17±5.253	(76-97) 91.50±6.902	**21.445 0.000***	(76-97) 88.70±5.961	(76-100) 95.20±6.692	**15.782 0.000***
Central venous pressure (mmhg)	Control group	(6-26) 13.87±7.036	(6-26) 13.73±7.090	0.005 0.942	(6-26) 14.00±7.017	(6-26) 13.60±6.886	0.050 0.824	(6-28) 13.87±7.094	(6-28) 13.73±7.148	0.005 0.942
	Study group	(6-22) 14.40±5.456	(6-20) 14.13±5.151	0.038 0.846	(6-20) 13.47±4.74	(8-20) 12.43±3.812	0.866 0.356	(7-16) 11.47±2.417	(6-14) 10.53±2.27	2.376 0.129

Table (5): Distribution of the studied patients regarding Richmond Agitation-Sedation Scale (RASS).

Total RASS Level	The studied patients (n=60)																							
	Control group (n=30)												Study group (n=30)											
	1st day				2nd day				3rd day				1st day				2nd day				3rd day			
	Pre		Post		Pre		Post		Pre		Post		Pre		Post		Pre		Post		Pre		Post	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Alert and calm	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	7	23.33
Drowsy	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.33	0	0.00	0	0.00	0	0.00	3	10.00	7	23.33	9	30.00
Light sedation	0	0.00	0	0.00	0	0.00	1	3.33	2	6.67	3	10.00	0	0.00	0	0.00	2	6.67	2	6.67	11	36.67	6	20.00
Moderate sedation	2	6.67	2	6.67	1	3.33	3	10.00	4	13.33	2	6.67	1	3.33	2	6.67	3	10.00	15	50.00	7	23.33	3	10.00
Deep sedation	7	23.33	7	23.33	7	23.33	12	40.00	10	33.33	10	33.33	11	36.67	10	33.33	17	56.67	9	30.00	4	13.33	5	16.67
Unarousable	21	70.00	21	70.00	22	73.33	14	46.67	14	46.67	14	46.67	18	60.00	18	60.00	8	26.67	1	3.33	1	3.33	0	0.00
χ^2 , P	0.00 , 1.00				5.557 , 0.135				2.267 , 0.687				0.387 , 0.824				**21.592 , 0.000***				**14.591 , 0.012***			
Range	**(8-10)**		**(8-10)**		**(8-10)**		**(7-10)**		**(7-10)**		**(6-10)**		**(8-10)**		**(8-10)**		**(7-10)**		**(6-10)**		**(6-10)**		**(5-9)**	
Mean ± SD	**9.63±0.615**		**9.63±0.615**		**9.70±0.535**		**9.30±0.794**		**9.20±0.925**		**9.10±1.125**		**9.57±0.568**		**9.53±0.629**		**9.03±0.809**		**8.10±0.96**		**7.37±1.098**		**6.67±1.398**	
t , P	0.00 , 1.00				5.233 , 0.026				0.141 , 0.708				0.046 , 0.830				**16.596 , 0.000***				**4.652 , 0.035***			

(3-8) Severe (9-12) Moderate (13-15) Mild

* Significant at level P<0.

Table (6): Distribution of the studied nurses regarding their socio-demographic characteristics

Characteristics	The studied nurses (n=40)	
	No	%
Age (in years)		
(21-<30)	17	42.5
(30-<40)	11	27.5
(40-<50)	7	17.5
(50-60)	5	12.5
Range	**(24-56)**	
Mean ± SD	**35.10±8.752**	
Gender		
Male	16	40.0
Female	24	60.0
Marital status		
Single	15	37.5
Married	19	47.5
Divorced	2	5.0
Widow	4	10.0
Level of education		
Diplom	5	12.5
Institute of nursing	11	27.5
Bachelor of nursing	20	50.0
Post studies	4	10.0
Work experience (in years)		
(<5)	8	20.0
(5-<10)	13	32.5
(10-<15)	9	22.5
(15-<20)	3	7.5
(≥20)	7	17.5
Range	**(0.5-30)**	
Mean ± SD	**11.84±8.34**	

Table (7): Distribution of the studied nurses regarding their knowledge about family engagement in nursing care pre and post implementation

Items	The studied nurses (n=40)								FE P-value
	Pre				Post				
	Incorrect		Correct		Incorrect		Correct		
	No	%	No	%	No	%	No	%	
Definition of family engagement in ICU	35	87.5	5	12.5	7	17.5	33	82.5	**0.000***
Importance of family engagement in ICU for patients	35	87.5	5	12.5	7	17.5	33	82.5	**0.000***
Importance of family engagement in ICU for nurses	34	85.0	6	15.0	5	12.5	35	87.5	**0.000***
Importance of family engagement in ICU for family	34	85.0	6	15.0	5	12.5	35	87.5	**0.000***
Principles of family engagement in ICU	35	87.5	5	12.5	3	7.5	37	92.5	**0.000***
Level of family engagement in ICU	36	90.0	4	10.0	7	17.5	33	82.5	**0.000***
Criteria of family member engaged in patient care	29	72.5	11	27.5	3	7.5	37	92.5	**0.000***
Aspect of family engagement in ICU	33	82.5	7	17.5	7	17.5	33	82.5	**0.000***
Barriers of family engagement related to ICU	32	80.0	8	20.0	9	22.5	31	77.5	**0.000***
Barriers of family engagement related to nurses	29	72.5	11	27.5	6	15.0	34	85.0	**0.000***
Barriers of family engagement related to patients	31	77.5	9	22.5	13	32.5	27	67.5	**0.000***

FE: Fisher' Exact test

* Significant at level P<0.05

Table (8): Distribution of the studied nurses regarding their total knowledge level about family engagement in nursing care pre and post implementation.

Total Knowledge Level	The studied nurses (n=40)				χ^2 P
	Pre		Post		
	No	%	No	%	
Low	36	90.0	1	2.5	**101.51 0.000***
Moderate	2	5.0	10	25.0	
High	2	5.0	29	72.5	
Range	**(0-6)**		**(6-11)**		**t=56.91**
Mean ± SD	**1.90±1.614**		**9.20±1.265**		**P=0.000***

<60% Low (60-80) % Moderate >80% High

* Significant at level P<0.05

Table (9): Distribution of the studied nurses regarding their perception level about family engagement in nursing care pre and post implementation

Total perception level	The studied nurses (n=40)				χ^2 P
	Pre		Post		
	No	%	No	%	
Negative attitude	36	90.0	3	7.5	FE
Positive attitude	4	10.0	37	92.5	0.000*
Range	(34-59)		(64-80)		t=62.63
Mean ± SD	46.00±5.634		73.03±3.886		P=0.000

* Significant at level P<0.05

Discussion

Regarding age, it was observed that more than two-fifth of the patients in the control group, compared to nearly one-third in the study group, were in 30-50 years old , with mean ages of 41.83±8.313 and 41.47±8.733 years, respectively. It may be contributed that age in a non-modifiable risk factor for chronic diseases. This observation aligns with the research conducted by **Al Mamun, Sheikh, Rahman, Wadud, & Iffat (2023)**, who investigated the role of intraventricular hemorrhage extension as a strong predictor of mortality in hemorrhagic stroke. They found that approximately half of the patients in their study were aged between 40 and 50 years.

Concerning gender, it was noted that two third of the control group consisted of males, whereas slightly more than half of the individuals in the study group were male. This could be linked to the reality that men face a greater risk of experiencing a stroke than women, possibly due to elements like occupational stress, tobacco use, and various lifestyle decisions**.** This finding is consistent with the study by **Rexrode, Madsen, Carcel, Lichtman, and Miller (2022)**, which explored the impact of sex on stroke, revealing that two-thirds of their studied groups were male. Similarly, the result agreed with the research by **Elsaid, El-Seidy, Bahnasy, and Belal (2024)**, who studied posterior circulation strokes and found that the largest proportion of participants were male.

Concerning medical diagnosis, the findings indicated that most individuals in both the control and experimental group were identified as having either a hemorrhagic or ischemic infarction. This may be indicated that patients in neuro-intensive care units may have distinct characteristics as sensory stimuli exposure can increase the risk

of sensory deprivation, requiring additional care and support from close family members. This helps create a supportive and familiar environment that promotes the patient's peace and comfort. This result was agreed with **Qaryouti and Greene (2023**), this finding is supported by a study that examined neurocritical care aspects of ischemic stroke management, which described that the majority of the studied group were diagnosed with stroke. This agrees with the current results, highlighting the prevalence of both hemorrhagic and ischemic stroke among critically ill patients in intensive care settings.

Concerning medical history, it was noted that neurological disorders ranked as the prevalent additional health issue among individuals in both the experimental and control cohorts. This could be attributed to the considerable impact hypertension has on the configuration of cerebral blood vessels, which elevates the likelihood of stroke occurrence. This finding was corroborated by **Turana and colleagues in 2021**, who examined the relationship between hypertension and stroke in Asia, highlighting that hypertension was frequently identified as the primary factor leading to stroke.

Concerning the level of consciousness, the results of this study discovered no significant differences within the control group in terms of eye opening, motor response, and verbal response throughout the study period. In contrast, significant improvements were observed in the study group: specifically, eye opening showed a significant difference on the third day, motor response on the second day, and verbal response on both the second and third days.

These findings were agreed with **Mohammadi and Yeganeh (2019)**, who investigated the effects of familiar voices on the level of consciousness among comatose patients; they reported that patients who were exposed to familiar voices and received care from familiar individuals showed noticeable improvements in consciousness levels. This improvement may be attributed to the brain’s neuroplasticity its ability to form new neural connections and bypass damaged areas which is stimulated by repeated environmental input. Emotional and affective stimulation especially from family members can activate the reticular activating system, leading to the increased release of norepinephrine, which enhances arousal and consciousness.

These findings are further supported by studies from **Cheng et al. (2018); Zhu et al. (2019)**, who observed statistically significant improvements in the level of consciousness in patients receiving family-centered auditory and tactile

stimulation. Improvements were noted as early as the first day and continued through the third day of the intervention. Similarly, **Sedghi and Ghaljeh (2020)** emphasized the direct impact of family involvement in sensory stimulation, as demonstrated by the significant differences in consciousness levels between intervention and control groups.

Concerning physiological parameters, the current study exposed fluctuations in the improvement and stability of respiratory rate, heart rate, systolic and diastolic blood pressure, mean arterial pressure, SpO2, and central venous pressure among patients in the intervention group, compared to those in the control group over the course of 3 days. The stability of these physiological parameters within normal ranges may be attributed to the balancing effects of family-engaged sensory stimulation on both the sympathetic and parasympathetic nervous systems. From the researcher's perspective, interactions between conscious patients and their family members reduce sympathetic nervous system activity, decrease stress, and, as a result, may lead to positive hemodynamic changes. This was in line with **Yekefallah, Aghae, Azimian, Heidari, and Hasandoost (2018),** who studied the effect of hand tactile stimulation on the vital signs of brain injury patients, reported a positive impact, specifically noting a decrease in heart rate and blood pressure in patients with brain trauma.

More ever this finding agrees with **Sosnowski, et al. (2023),** the research examining the influence of the ABCDE/ABCDEF combination on delirium, functional results, and life quality for severely ill individuals indicated that the adoption of the ABCDEF combination resulted in notable enhancements in the clinical results of the patients.

Regarding mean score of heart rate, the present research revealed an enhancement in the average heart rate measurement for the experimental group in contrast to the control group on day three. Our results suggest that this enhancement might be associated with the treatments administered.

This result is also in line with the findings of **Goldfarb, Bibas, and Burns (2020)**, whose study on patient and family engagement in care within the cardiac intensive care unit reported a significant improvement in the mean heart rate scores of patients in the intervention group. Their findings further support the positive impact of family involvement on physiological and neurological outcomes in critically ill patients.

Concerning systolic, diastolic, and mean arterial pressure, the current study showed that systolic, diastolic and mean arterial pressure decreased

statistically significantly in study group. This finding was agreed with **Park and Giap (2020)** who conducted study about patient and family engagement as a potential approach for improving patient safety**.** This finding aligns with the results of **Park and Giap (2020)**, who explored patient and family engagement as a strategy to enhance patient safety, reporting improvements in physiological outcomes associated with increased family involvement. Similarly, the results are consistent with the study by **Nagm Eldean, Khalaf, and Bakri (2024)**, who examined the effects of implementing the ICU liberation bundle on outcomes for critically ill patients. They found that the mean values of hemodynamic parameters showed significant improvement within six days of hospital stay, reinforcing the positive influence of structured interventions and family-centered care on patient stability.

Regarding O2 saturation, present study showed a significant decrease in the mean O2 saturation levels among the control group, while patients in the study group showed a significant improvement. This result aligns with the research conducted by **Yousefi, Naderi, and Daryabeigi in 2015**, explored how sensory input from family could influence arterial oxygen levels in patients facing severe health issues. Their research revealed that the levels of SpO2 were notably elevated in agitated patients on mechanical ventilation who experienced touch massage in comparison to those who did not receive such treatment in the control group.

On the other hand, this finding disagrees with **Uysal and Vaizoğlu (2023)**, who studied the effect of video calls with family members on physiological parameters of critically ill patients in the intensive care unit, they reported that while video calls influenced Pulse rate (PR), respiratory rate (RR), and Glasgow Coma Scale (GCS) ratings did not have a meaningful impact on blood pressure (BP) and oxygen saturation (SpO2).

Concerning Richmond Agitation-Sedation Scale (RASS), the current study showed that the percentage of calm and alert patient increased among the study group nearly to quarter of patient versus only small percentage in control group at 3th day post intervention**.** This finding is consistent with **Devlin, Skrobik, and Gélinas (2018)**, who studied clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult ICU patients, found that the majority of patients in both groups were unarousable according to the RASS score.

This finding also agrees with **Reznik and Daiello (2020)**, who studied fluctuations of consciousness after stroke and their association with the confusion assessment method for the intensive care unit, reported that they the majority of patients in both groups were unarousable according to the RASS score by the end of the study period.

Regarding the age of the studied nurses, the results showed that nearly half of them were between 21 and 30 years old, with a mean age of 35.10 ± 8.75 years.

This finding may be attributed that the majority of the studied nurses were newly graduated. This result is consistent with **Helwan et al. (2019)**, who, in their study titled "assess nursing performance during implementation of care bundle for critically ill patients," found that the mean age of the nurses was 29.32 ± 6.77 years, with ages ranging mostly between 20 and 35 years.

Regarding the gender of the nurses observed in the study, it was clear that most of them were women. This observation aligns with the findings of **Erbay Dalli et al. (2023),** who **studied** "practices of the ABCDEF care bundle in intensive care units as reported by nurses," which also revealed that most of the participating nurses were female.

In terms of the academic qualifications of the nurses examined, the present research indicated that over fifty percent possessed a bachelor degree**.** This may be attributed to the increasing enrollment in faculties of nursing in recent years, possibly influenced by the growing emphasis on implementing family engagement protocols in ICUs. This finding is supported by **Bozkurt, Duzkaya, and Oren (2021)**, who conducted a study about "opinions of intensive care nurses about family-centered care in turkey," and found that the majority of nurses surveyed held a bachelor's degree.

Concerning the years of expertise within the neurological care unit, it was noted that nearly one-third of the participants in the study had spent between 5 to 10 years in the neurological intensive care unit. This finding aligned with **Berchtenbreiter, Innes, Watterson, Nickson& Wong, (2024)** who studied Intensive care unit nurses' perceptions of debriefing after critical incidents reported that more than half of studied nurses have 5-10 years of experiences at intensive care unit .this study is contraindicated with **Helwan et al. (2019)** who found that nearly one quarter had more than 10years of clinical experience. Also, the present study revealed that all of the studied nurses did not receive any training sessions about family engagement in ICU may be due to

nurses' disability to attend training courses because of work over load.

The current results revealed that only a minority of the studied nurses had a high level of knowledge before the implementation of the family engagement protocol. In contrast, nearly three-quarters of the nurses demonstrated a high level of knowledge following the implementation. This indicates a marked improvement in knowledge levels as a result of the protocol intervention.

The current result is in accordance with **Liang et al. (2016)**, who demonstrated in their study "The ABCDEF Bundle: A Survey of Nurses' Knowledge and Attitudes in the Intensive Care Units" that the majority of the participating nurses reported being aware of the bundle. Their findings support the idea that structured educational interventions, such as protocol implementation, can significantly enhance nurses' knowledge and awareness in critical care settings.

Regarding nurses' perception of family engagement in nursing care before and after implementation of the protocol, the results highlighted the majority of the nurses that were examined had an optimistic view after the implementation. From the researcher's perspective, nurses demonstrated a favorable attitude toward family presence, expressing that families could help calm patients through conversation and that many believed sedated patients could still hear their loved ones. Although most nurses acknowledged only minimal family involvement in direct care tasks, they recognized the psychological and spiritual support provided by families as valuable to patients. Specifically, this study showed that nurses viewed family involvement as a source of emotional reassurance and comfort for critically ill patients.

This finding similar with **Juba, Olumide, and Azeez (2024)**, who conducted a study on the influence of family involvement on the quality of care for aged adults. They reported that ICU nurses had a positive attitude toward family participation in routine care, including tasks such as oral care, body massage, lotion application, and assistance with bed-bathing, highlighting the beneficial role of families in supporting both emotional and physical aspects of care.

In contrast, **McConnell and Moroney (2015)** reported that many nurses identified negative aspects of family engagement in ICU care. Concerns included increased infection risk, restricted workspace, heightened stress among healthcare staff, and added workload. The literature also reflects that family presence can be a source of stress for care teams, and some staff may resist family participation,

particularly during more invasive procedures or critical interventions.

Additionally, restricted hospital visitation policies were identified by nurses as a significant barrier to family involvement. This was supported in the study by **Erbay et al. (2023)**, which study Practices of the ABCDEF Care Bundle in Intensive Care Units as Reported by Nurses. Their findings suggest that while nurses recognize the value of family involvement, institutional policies—especially those limiting visitation—can hinder meaningful participation. Nonetheless, nurses showed awareness of the importance of minimizing interruptions during allowed visiting hours to support family-patient interaction.

Conclusions

Application of protocol of family engagement had significance effectiveness on improvement of clinical outcome among critically ill patients.

The nurses made encouraging and positive outlook on the involvement of family.

Recommendations

Create polices, protocols, and procedure for family engagement in ICUs, assessment tool to assess family readiness to be actively contributing to their patients' care and the aspects of care they can be engaged in should be available.

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