Effect of Nurse Caring Intervention on Nurse-Patient Interaction and Minimizing ICU Stressors among patients with Diabetic Crisis

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Abstract:

Background: Nurse caring interventions have been recognized as effective in improving nurse-patient interactions and alleviating environmental stressors in the ICU, which is crucial for enhancing the well-being of patients with diabetic crisis. **Aim:** To evaluate the effect of nurse caring intervention on nurse-patient interaction and minimizing ICU stressors among patients with diabetic crisis. **Design:** Quasi-experimental research design was used. **Sample and setting:** A convenient sample of 60 patients who fit the criteria and were admitted to Aswan University Hospital's ICUs and emergency units. **Tools:** Three main tools were used to collect data include Tool I: Patient assessment sheet, Tool II: Caring Nurse-Patient Interaction Scale and Tool III: Intensive Care Unit Environmental Stressor Scale (ICUESS). **Results:** The findings showed no significant differences between the control and study groups regarding their personal characteristic data. Patients in the study group demonstrated higher interaction scores, (p = 0.034). (ICUESS) scores were significantly lower in the study group, indicating reduced stress levels (p $\leq$ 0.001). Additionally, age and marital status were significantly associated with patient satisfaction. **Conclusion:** The study found that nurse caring interventions significantly improved nurse-patient interaction and reduced ICU stress levels. **Recommendation:** Enhancing emotional support, communication, and humanistic care, while tailoring approaches to the specific needs of adults and married patients to improve overall patient satisfaction and reduce ICU stress.

Keywords: Diabetic crisis, ICU Stressors & Nurse-Patient Interaction.

Introduction:

Patients who experiencing an acute diabetic crisis, such as diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic state (HHS), require intensive care due to life-threatening complications. While medical management focuses on stabilizing blood glucose levels and addressing metabolic imbalances, nurse-patient interaction plays a critical role in the overall recovery process. However, the intensive care unit (ICU) environment presents unique stressors that may negatively affect patient outcomes, including high noise levels, frequent alarms, invasive procedures, and limited communication with healthcare providers. These environmental factors, combined with the physical and emotional distress of a diabetic crisis, can increase anxiety, prolong recovery, and decrease overall patient satisfaction **(Venyo, 2023)**.

Nurse caring interventions, based on holistic and patient-centered care principles, have been shown to enhance nurse-patient interactions and mitigate ICU stressors. Effective communication, emotional support, and humanistic care strategies help patients feel valued, reduce their fears, and promote adherence to treatment. Watson's Theory of Human Caring highlights that a compassionate and therapeutic nurse-patient relationship can lead to better psychological and physiological outcomes. Implementing structured caring interventions in ICUs may significantly improve patient experiences by fostering trust, reducing perceived stress, and enhancing overall well-being **(Salimi & Tarbiat, 2021).**

Several studies have explored the impact of nurse-patient interaction on patient outcomes in critical care settings. Research indicates that increased communication and emotional support lead to reduced anxiety levels, improved patient satisfaction, and even shorter ICU stays. However, there is a lack of studies specifically focusing on acute diabetic crisis patients and how nurse caring interventions influence their recovery. Given the metabolic instability and heightened stress associated with diabetic emergencies, understanding the role of nursing care in this population is crucial for improving patient-centered ICU care **(Murray et al., 2020).**

Addressing both the medical and emotional needs of ICU patients is essential for optimal recovery. Nurse caring interventions serve as a bridge between clinical treatment and emotional well-being, ensuring that patients not only survive but also experience a compassionate and supportive healing environment. By investigating the impact of these interventions, this

study contributes to the growing body of evidence emphasizing the importance of holistic nursing care in critical care settings **(Kibret et al., 2022).**

Critical care nurses play a crucial part in delivering specialized, high-quality care to patients with life-threatening conditions, including those experiencing an acute diabetic crisis. Their responsibilities extend beyond routine nursing care, as they must closely monitor patients, manage complex treatments, and respond quickly to sudden changes in health status. Their expertise in critical care interventions, rapid decision-making, and patient advocacy ensures that critically ill patients receive the best possible care, reducing complications and improving survival rates **(Klarare et al., 2021) & (Mårtensson et al., 2021).**

Significance of the study:

Diabetes mellitus (DM) patients can be admitted to ICU for a variety acute complication, which include hypoglycemia, diabetic ketoacidosis, and hyperosmolar coma, and also for other underlying pathologies and co-morbidities. The condition that led to admission was usually regarded as more important than the hospital's management of diabetes. **(Draznin et al., 2022)**

Furthermore, these patients require extra attention to the stress being admitted to the ICU caused by the unfamiliar medical equipment, intrusive procedures, loud noises, bright lights, not having privacy, being separated from family, and immobilization, all of which, lead to a stressful environment **(Karaagac & Ozkaptan, 2023)** Hence, critical care nurses cannot manage practice challenges unless they adhere to caring intervention principles **(Izadi et al., 2020)**. At Aswan University Hospital, records indicate that over 350 patients experiencing diabetic crises were admitted to the ICU and emergency department during the year 2022–2023. Given this high prevalence and the associated stressors, the current study aims to evaluate the effect of nurse-led caring interventions on improving nurse-patient interaction and reducing ICU-related stress among this vulnerable patient group.

Operational definitions:

Nurse-Patient Interaction:

Nurse-patient interaction refers to the measurable verbal and non-verbal communication exchanges between ICU nurses and patients experiencing a diabetic crisis. In this study, it is operationalized by evaluating the frequency, clarity, emotional support, and therapeutic quality of these interactions using a structured observation checklist and **The Caring Nurse-Patient Interaction Scale-23 (CNPI-23)**, with higher scores indicating more effective and patient-centered communication. **(Kwame, 2023).**

Minimizing ICU Stressors:

Minimizing ICU stressors refer to the implementation of nursing care strategies aimed at reducing physical, psychological, or environmental factors in the ICU like noise, lighting, invasive procedures, and lack of privacy that provoke stress responses, in this study, it is assessed via validated instruments **(ICU Environmental Stressor Scale).** The ICUESS was being used to assess stressors related to the ICU environment. It includes items related to noise, light, pain, and other environmental factors. **(Bulbuloglu et al., 2022) & (Gezginci et al., 2022).**

Aims of the study:

To evaluate effect of nurse caring intervention on nurse-patient interaction and minimizing ICU stressors among patients with diabetic crisis.

Research hypothesis:

H1: Implementation of a nurse caring intervention will significantly improve nurse-patient interaction among patients with acute diabetic crisis.

H2: Implementation of a nurse caring intervention will significantly reduce ICU environmental stressors among patients with acute diabetic crisis.

Patients and Method

Design: Quasi-experimental research design was used to conduct this study.

Setting: This study was being carried out in all ICUs and emergency units at Aswan university hospital.

Sample: A convenient sample of 60 patients who met the inclusion criteria and were admitted to the ICU and emergency units was selected. The participants were divided into two groups:

- **Control Group (30 patients):** Received routine nursing care.
- **Study Group (30 patients):** Received the nurse caring intervention.
- The study was conducted over a six-month period, from February 2024 to July 2024, based on the following inclusion and exclusion criteria:

The inclusion criteria:

- Age from 18–60 years
- Newly admitted patients to ICU and emergency units with diabetic crisis.
- Diabetic crisis patients (Hypoglycemia, diabetic ketoacidosis (DKA), and hyperosmolar hyperglycemic state (HHS)) admitted to the intensive care units (ICU) and emergency units.

The exclusion criteria for patients

- Diabetes retinopathy patients
- Unstable state of hemodynamics (systolic blood pressure below 90 mm/hg)

Tools of data collection:

Three tools were used in the present study after reviewing related literature. **(Ballard.1981)**, **(Larson.**

1984), (Cronin & Harrison.1988), (Amalina et al., 2020) & (Bachtiar et al. 2023).

Three tools included as follows:

Tool (I): Patients' assessment sheet

This part was being used for focusing on the patients' personal characteristics, such as age, gender, occupation, marital status and level of education.

Tool (II): The Caring Nurse-Patient Interaction Scale-23 (CNPI-23),

It originally developed by **Cossette et al. (2008),** was utilized in this study to assess nurses' perceptions of caring behaviors. The scale has been employed in recent studies, including those by **Barnawi & Barnawi (2023) & Bahreini et al. (2023)**

Scoring System:

The CNPI-23 consists of 23 items rated on a 5-point Likert scale ranging from **1 (Almost Never)** to **5 (Almost Always)**. The scale evaluates four primary domains of nursing care:

▪ **Humanistic Care** (4 items)
▪ **Relational Care** (7 items)
▪ **Clinical Care** (9 items)
▪ **Comforting Care** (3 items)

The total score ranges from **23 to 115**, where:

▪ **23–53** indicates **low interaction**
▪ **54–84** indicates **moderate interaction**
▪ **85–115** indicates **high interaction**

Tool (III): Intensive Care Unit Environmental Stressor Scale (ICUESS):

This ICUESS scale was adopted as a universal diagnostic tool to determine how patients in ICUs were affected by environmental stressors. The scale adopted from **(Ballard, 1981).** Used by **(Bulbuloglu et al., 2022) & (Gezginci et al., 2022).** The ICUESS was being used to assess stressors related to the ICU environment. It includes items related to noise, light, pain, and other environmental factors.

Scoring system:

Forty questions were being asked to the patients. Every question on the scale has been reviewed as (1) not stressful; (2) moderately stressful; (3) very stressful; or (4) extremely stressful. The responses are summed to yield a total score ranging from 42 to 168, with the interpretation as follows:

▪ Mild stress: < 60
▪ Moderate stress: 60–75
▪ Severe stress: > 75

Methods:

Preparatory phase:

Tools development:

Data collection tools were developed on the basis of reviewing the current, past, local and international relevant literature in those various aspects using books, articles, periodicals, magazines, and references were done.

Tools Validity and reliability:

Face validity of the tool was evaluated by a panel of experts from the Critical Care and Emergency Nursing Department at Assiut University. Based on their feedback, necessary modifications were made to ensure clarity and content relevance.

The Reliability was being done on tools (I), which was (0.872) by Cronbach's Alpha to assess the consistency and stability of the tools.

Pilot Study:

A Pilot Study was being conducted on (10 %) 6 patients of the research population over one month in the selected setting to test the tools' applicability and clarity. The data from the pilot study were analyzed; no changes were made to the tools used, so the 10% of patients chosen for the pilot study were included in the study.

Ethical considerations:

Research proposal was approved by the Ethical Committee No (1120230745) to conduct the research proposal in the Faculty of Nursing, Assiut University. The permission needed to carry out the study was being obtained from the authorities of the hospital after explanation nature of the study. The study was not carrying any risk for study patients. The study followed the common ethical principles in clinical researches. Informed consent was being obtained from each patient, after explanation of the study nature and purpose. Data confidentiality was being assured. Patients were informed clearly that refusing to be in our study was not affect owning full benefit from available medical service and treatment. Study patients had the right to refuse to participate and or withdraw from the study without any rational any time. Study patients' privacy was considered during collection of data.

Implementation phase

▪ The researcher was visiting the settings (9.00 am to 3.00 pm) three days / week on morning and afternoon shifts. Eligible patients who agreed to participate were individually interviewed. The participants were divided into two groups, control group (30 patients) received routine nursing care, study group (30 patients) received the nurse caring intervention.

▪ The researcher began by introducing herself, explaining the purpose, goals, and benefits of the study to establish rapport and encourage collaboration.

▪ It was being achieved through interview the included patients in the ICU and emergency units by (**Tool I**).

▪ The nursing intervention involved clinical care as rapid assessment of consciousness, vital signs, and blood glucose to identify hypoglycemia or hyperglycemia. Followed by immediate treatment with glucose or insulin and IV fluids as needed.

Continuous monitoring of vital signs, neurological status was essential. Ensure the patient's safety by preventing falls and injuries, especially if they were disoriented or experiencing altered consciousness.

- During humanistic and relational care, the researcher was providing patients with advanced explanations of upcoming nursing activities and encouraged patients to participate in decisions about their treatment, making them feel empowered and collaboration with the health care team, and clear communication were emphasized with the patient and family. The researcher caring the patient in a calm, supportive and respectful manner to strengthen interaction with the patient. The strong interaction helped build trust and contributed to the patient's sense of safety and cooperation during crisis.

- During comfort care, the researcher taught the patient relaxation techniques such as deep breathing exercises, progressive muscle relaxation, guided imagery, or mindfulness meditation, explain reasons of alarms and other disruptive sounds, and implement basic comfort measures, including appropriate lighting, noise control, and sufficient blankets. to help the patient cope with stress and encouraged physical activity, such as walking, yoga, which could help reduce stress levels and improve blood sugar control.

Outcome Evaluation:

Assessment of ICU Stressors (Tool III–ICUESS):

- Patients completed the ICU Environmental Stressor Scale (ICUESS) to evaluate perceived ICU-related stress.

Assessment of Nurse-Patient Interaction (Tool II – CNPI-23):

- The CNPI-23 was administered to measure the quality and level of nurse-patient interaction, where higher scores indicated stronger interaction.

- The questionnaires were completed at the patient's own pace, averaging around 30 minutes.

Evaluation phase:

The two-group wear evaluated for outcomes by using study tools, control group evaluated once at admission and study group evaluated once at discharge day.

Results

Table (1): Percentage distribution of personal characteristics between the studied groups (No = 60)

Personal characteristics data	Control (G1) (no=30)		Study (G 2) (no=30)		χ^2	P. value
	No	%	No	%		
Age						
18-30 year	2	6.7	2	6.7	0.0	0.0
30-40 year	2	6.7	6	20	2.0	.157
40-50 year	9	30	8	26.7	0.67	0.796
50-60 year	17	56.7	14	46.7	0.290	0.590
M± SD	**48.12 ± 2.13**		**43.10 ± 4.16**		**T. test 0.265**	
Gender						
Male	13	43.3	15	50	.0527	0.468
Female	17	56.7	15	50	0.340	0.560
Marital status:						
Single	3	10	4	13.3	0.143	0.705
Married	18	60	17	56.7	0.029	0.866
Divorced	0	0	3	10	0.00	0.00
Widow	9	30	3	20	3.00	0.083
Level of education:						
Illiterate	7	23.3	3	10	1.600	0.206
Read & write	7	23.3	3	10	1.600	0.206
Primary/prep school	0	0	0	0	0.0	0.0
Secondary school	6	20	9	30	0.600	0.439
High education	10	33.3	15	50	1.000	0.317
Occupation:						
Student	0	0.0	1	3.3	0.0	0.0
Employee	11	36.7	12	40	0.043	0.835
House wife	2	6.7	6	20	2.000	1.57
Worked	17	56.7	11	36.7	1.286	0.257

*Chi-square test,*   * *Statistically significant difference (p<0.05),*

*** Highly statistically significant difference (p<0.01).*

Table (2): Comparison of Mean Scores (M±SD) for Caring Nurse-Patient Interaction Scale (CNPI-23) Domains Between Control and Study Groups

Domains of scale	Almost never		Sometimes		Often		Very often		Almost always	
	Control	Study	Control	Study	Control	Study	Control	Study	Control	Study
Clinical care	12.1±2.19	16.3±4.23	18.23±1.4	29.234±2.35	14.54±1.8	24.23±4.3	15.3±2.1	22.27±4.3	11.4.6±8.3	28.2.1±5.2
P. value	0.180		0.119		0.157		0.164		**0.001***	
Rational care	10.1±1.15	13.9±5.14	19.15±0.7	24.2.4±1.87	12.23±0.5	19.13±5.1	10.3±3.5	19.43±2.7	10.4.7±4.1	26.5.1±3.5
P. value	0.165		0.564		0.176		0.058		**0.001***	
Humanistic care	9.3±4.17	12.5±7.87	20.63±0.8	25.2.4±1.34	18.54±1.8	25.27±2.9	15.3±2.1	22.27±4.3	13.2.5±1.1	25.3.6±4.4
P. value	0.123		0.120		0.655		0.705		**0.001***	
Comfort care	14.1±2.19	18.2±1.53	21.44±5.1	27.2.4±0.87	14.54±1.8	24.23±4.3	15.3±2.1	22.27±4.3	13.4.6±8.3	27.5.2±6.1
P. value	0.13		0.152		0.564		0.164		**0.001***	

*T. test,   * Statistically significant difference (p<0.05),   ** Highly statistically significant difference (p<0.01). St. D = (Standard deviation)*
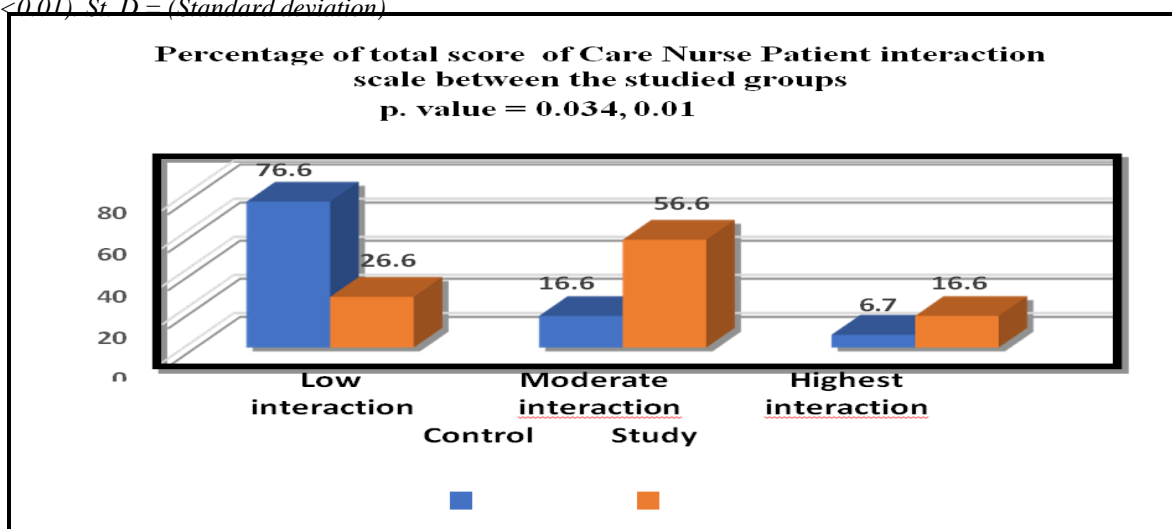
Figure (1): Percentage distribution of total score of Caring Nurse-Patient Interaction Scale: 23-Item between the both groups control and study (No = 60)

Table (3): Comparison of Mean Scores (M±SD) for ICU Environmental Stressor Scale (ICUESS) Between Control and Study Groups

Levels of scale	Control M±SD	Study M±SD	T. test	P. value
Not stressful	4.85 ± 2.312	53.097 ± 21.56	38.12	**0.001****
Moderate stressful	38.32 ± 3.056	13.471±4.78	19.45	**0.001****
Sever stressful	49.67 ± 8041	11.367± 2.341	31.98	**0.001****
Extremely stressful	29.234±2.35	3.931 ± 4.210	25.72	**0.001****

*T. test,   * Statistically significant difference (p<0.05),   ** Highly statistically significant difference (p<0.01). St. D = (Standard deviation)*
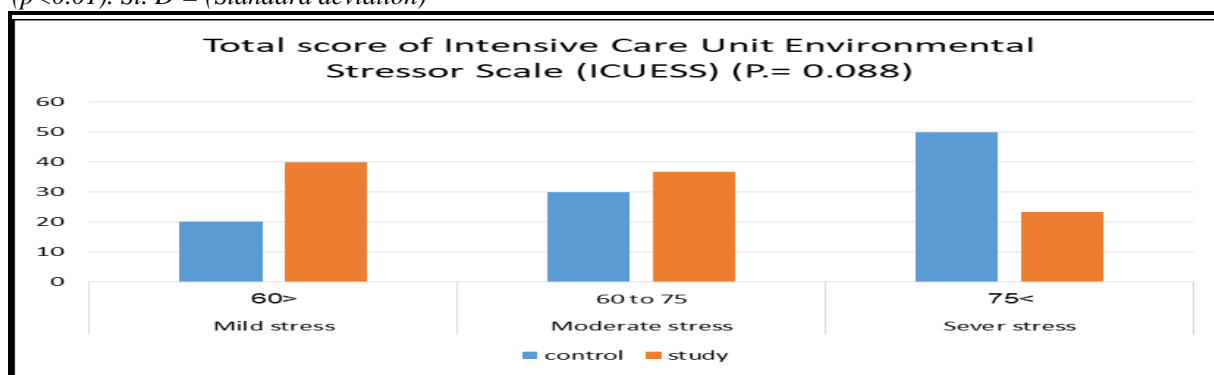
Figure (2): Percentage distribution of total score of Intensive Care Unit Environmental Stressor Scale (ICUESS)between the both groups control and study (No = 60)

Table (4): Relation between patient`s personal characteristics and total score of Caring Nurse-Patient Interaction Scale of both groups control and study

Personal characteristics	Control (no=30)						Study (no=30)						P. value (1)	P. value (2)
	Low (23)		Moderate (5)		High (2)		Low (8)		Moderate (17)		High(5)			
	No	%	No	%	No	%	No	%	No	%	No	%		
Age														
18-30 year	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	**0.072**	**0.001***
30-40 year	2	6.7	2	6.7	2	6.7	6	20	6	20	2	6.7		
40-50 year	9	30	9	30	9	30	8	26.7	8	26.7	9	30		
50-60 year	17	56	17	56.7	17	56	14	46.7	14	46.7	17	56.7		
Gender														
Male	13	43.3	13	43.3	13	43.3	15	50	15	50	13	43.3	0.172	0.493
Female	17	56.7	17	56.7	17	56	15	50	15	50	17	56.7		
Marital status:														
Single	3	10	3	10	3	10	4	13.3	4	13.3	3	10	0.808	**0.001**
Married	18	60	18	60	18	60	17	56.7	17	56.7	18	60		
Divorced	0	0	0	0	0	0	3	10	3	10	0	0		
Widow	9	30	9	30	9	30	3	20	3	20	9	30		
Level of education:														
Illiterate	7	23.3	7	23.3	7	23.3	3	10	3	10	7	23.3	0.796	***0.001**
Read & write	7	23	7	23.3	7	23	3	10	3	10	7	23.3		
Primary/prep school	0	0	0	0	0	0	0	0	0	0	0	0		
Secondary school	6	20	6	20	6	20	9	30	9	30	6	20		
High education	10	33	10	33.3	10	33	15	50	15	50	10	33.3		
Occupation:														
Student	0	0	0	0	0	0	1	3.3	1	3.3	0	0	**0.058**	***0.009**
Employee	11	36.7	11	36.7	11	36.7	12	40	12	40	11	36.7		
Retired	2	6.7	2	6.7	2	6.7	6	20	6	20	2	6.7		

studied groups (No =60)
Chi-square test,
* Statistically significant difference (p<0.05),
** Highly statistically significant difference (p<0.01).
p. value (1) = between personal characteristic & high total score of Caring Nurse-Patient Interaction Scale in control group,
p. value (2) = between personal characteristic & high total score of Caring Nurse-Patient Interaction Scale in study group

Table (1): Illustrates Overall, no personal characteristics variable showed a statistically significant difference between the two groups. In terms of age, the majority being aged 50-60 years (56.7% and 46.7%), respectively with mean and stander deviation (48.12 ± 2.13and 43.10 ± 4.16) respectively, P.= (0.265). Gender distribution was nearly equal, with slightly more females in (56.0 % and 50%) respectively. Marital status showed majority were married (60% and 56.7%) respectively. In terms of education, a higher percentage of patients with higher education (33.3% and 50%) respectively. In terms of occupation, more patients in the "worked" category (56.7% and 36.7%) respectively.

Table (2): Demonstrates caring Nurse-Patient Interaction Scale between the both groups control and study. Regarding clinical care, rational care, humanistic care and comfort care, it was found that there were statistical significance differences between the control and study groups with p. value = 0.001**.

Figure (1): Illustrates a statistically significant difference in patient interaction levels between the control and study groups. A greater proportion of patients in the control group (76.6%) demonstrated low interaction scores (23–53) compared to only 26.6% in the study group (p = 0.034). Regarding moderate interaction scores (54–84), 16.6% of the control group and 56.6% of the study group fell within this range (p = 0.011), indicating a marked improvement in patient engagement following the intervention. Although a higher percentage of patients in the study group (16.6%) achieved high interaction scores (85–115) compared to the control group (6.7%), this difference was not statistically significant (p = 0.257). Additionally, the mean CNPI-23 scores were significantly higher in the study group (24.33 ± 0.479) than in the control group (9.17 ± 0.379) with a highly significant p-value (p = 0.001). These findings collectively suggest that the nursing caring intervention was effective in enhancing nurse-patient interaction.

Table (3): Revealed highly significant differences in the Intensive Care Unit Environmental Stressor Scale (ICUESS) between the control and study groups, with the control group reporting higher levels of stress across all categories (not stressful, moderate stressful, severe stressful, and extremely stressful) compared to the study group, all with p-values of 0.001 or less.

Figure (2): Demonstrates of total score of Intensive Care Unit Environmental Stressor Scale (ICUESS) between the both groups, it was observed that 50 % in control group were sever stress while 23.3% in the study group and there were statistical significance differences between the both groups with p. value = 0.088.

Table (4): Reveals a significant association between age and marital status with satisfaction levels, particularly in the study group, as evidenced by the higher percentage of patients reporting moderate to high satisfaction among older adults and married individuals, while no significant relationship was found for gender and education level.

Discussion:
Successful diabetes crisis care also requires a systematic approach to supporting nurses and patients' interaction efforts. When patients are hospitalized, they have expectations about the care they were receive. Nurses are the caregivers who render the most direct care and have the most contact with patients while they are hospitalized, by providing emotional support, stress management techniques, and fostering better patient-nurse relationships, nurses can help reduce stress levels, stabilize blood glucose, and enhance patient compliance with treatment **(Shchaslyvyi et al., 2024).**

The findings of the current study indicated that, overall, none of the personal characteristic variables demonstrated a statistically significant difference between the control and study groups. However, these factors may still subtly influence how patients perceive and respond to the intervention

Regarding the age, it was observed that the majority being aged 50-60 years with mean and stander deviation 48.12 ± 2.13and 43.10 ± 4.16 respectively, P.= 0.265. The researcher suggested that this age period where diabetes management often becomes more challenging due to age-related declines in insulin sensitivity, the presence of co-morbidities, and slower recovery from health complications.

In this line, **Bellary et al., (2021)** found that stress management is particularly important in adults with diabetes, as chronic stress can exacerbate blood sugar imbalances, increase the risk of diabetic crises and demonstrate that interventions targeting stress reduction in adults resulted in better glycemic control and fewer hospitalizations related to diabetic emergencies.

In the other hand, **Whitehead & Bergeman, (2020)** and **Blaxton et al., (2023)** who suggested that while stress impacts diabetes management, the relationship between age and stress-induced glycemic control might not be as strong as previously thought and they found that younger patients with diabetes may be more affected by stress-related fluctuations in blood glucose than adults patients, suggesting that age-related factors such as resilience to stress or better coping mechanisms may mitigate the impact of stress on diabetic crises in the adults.

Regarding the gender, it was found that the distribution was nearly equal, with slightly more

females than males. In this context, **Shchaslyvyi et al., 2024** highlighted the significant role that stress plays in glucose dysregulation for both men and women, showing that stress-reduction interventions can benefit both genders and supports the idea that nurse caring behaviors and stress management could be equally effective in preventing diabetic crises for both men and women.

While, **Thayer et al., (2021)** found that women with diabetes often report higher levels of stress and may benefit more from stress-reduction interventions. This could suggest that protocols targeting stress management might have a more pronounced effect in females, though both genders benefit overall.

The researcher opinion that Gender-related differences in stress perception or coping mechanisms are unlikely to confound the results, meaning any observed improvements in diabetic crisis outcomes can be attributed to the protocol's effectiveness across both genders. Reduced stress, improved coping, and better patient-nurse relationships could help mitigate the progression of diabetic crises.

The present study revealed that the majority of patients in both the control and study groups were married. This suggests the presence of a social support system, which may positively influence patients' ability to cope with stress and manage diabetes effectively. According to the researcher's interpretation, having a spouse or partner can offer both emotional and practical support during times of crisis, potentially aiding in glucose regulation and reducing the severity of diabetic episodes. This match with **Mphasha et al., (2022)** demonstrated that married individuals often have better glycemic control due to the emotional and practical support from spouses.

In the other hand **Soriano et al., (2021)** found that marital status does not significantly affect diabetes management outcomes in all cases, suggesting that personal resilience and self-management behaviors might be more important than spousal support.

The current study found that a higher proportion of patients had attained higher levels of education. The researcher posits that educational attainment has a positive influence on healthcare outcomes. Patients with higher education are generally more informed, engaged, and communicative, which enhances their understanding of medical instructions, promotes adherence to treatment plans, and encourages active participation in decision-making. This dynamic not only improves the overall quality of care but also fosters mutual respect between patients and healthcare providers, ultimately leading to more favorable health outcomes.

 This match with **Fontecha et al., (2022)** showed that individuals with higher education levels are generally

more health literate and thus more likely to engage with and benefit from health interventions.

In the other hand, **Guo et al., 2021** argued that while education plays a role, it is not the sole determinant of a patient's ability to manage diabetes effectively. They found that patients with lower education levels can still benefit from well-structured health interventions when appropriate support is provided.

The present study demonstrated that the study group, which received nurse caring interventions, exhibited significantly higher levels of nurse-patient interaction across all four domains—clinical care, relational care, humanistic care, and comfort care—compared to the control group (p = 0.001). Moreover, a significantly greater proportion of patients in the control group reported low levels of interaction, while the study group showed notably improved interaction levels (p = 0.034).

These findings suggest that the implementation of caring interventions had a substantial impact on enhancing nurse-patient interaction, highlighting their importance in ICU settings, particularly for patients experiencing acute diabetic crises.

This aligns with the findings of **Wang et al., (2021) & Mlinar (2020),** who emphasized that nurse-patient interactions offering emotional and psychological support in intensive care settings contribute to increased patient satisfaction and reduced stress-related complications.

Conversely, studies by **Smith et al., (2021) & Jones et al., (2020)** argued that environmental stressors in ICUs—such as excessive noise, medical equipment, and high staff workload—may have an even greater influence on patient stress than interpersonal interactions alone.

The present study revealed highly statistically significant differences in the Intensive Care Unit Environmental Stressor Scale ICUESS between the control and study groups, with the control group reporting higher levels of stress across all categories not stressful, moderate stressful, severe stressful, and extremely stressful compared to the study group, all with p-values of 0.001 or less.

In this line, **Renet et al., (2024) & Larsen et al., (2022)** found that ICU patients are often subjected to various environmental stressors, such as noise, light, and lack of privacy, which can negatively impact their psychological well-being. This study supports the notion that reducing these stressors can lead to improved patient satisfaction and outcomes.

While, **Cuzco et al., (2021)** showed that when healthcare teams focus on patient-centered care, including addressing environmental factors, patients report lower stress levels and higher satisfaction with their care. This supports the effectiveness of interventions aimed at reducing ICU stressors.

The researcher opinion that the importance of addressing environmental factors as part of holistic patient care in intensive settings. It would be beneficial to explore the specific elements of the intervention that contributed most to stress reduction, as this could guide future practices and policies aimed at enhancing patient care in ICUs. This perspective reinforces the importance and effectiveness of implementing interventions aimed at reducing environmental stressors in critical care settings.

In the present study, found that marital status and age significantly influenced patient satisfaction with nurse caring intervention, particularly in the study group, while gender and education level showed no significant correlations.

In this line, **Simonsen et al., (2021) & Onu et al., (2022)** indicated that married patients often report higher satisfaction levels due to better emotional and social support during healthcare experiences.

While, **Presley et al., (2021) & Thi et al., (2021)** in the other opinion and suggested that gender may play a significant role in patient satisfaction, particularly in how male and female patients communicate their needs and preferences in healthcare settings.

The researcher opinion that the significant influence of marital status and age on patient satisfaction with nurse caring intervention and interaction underscores the importance of considering patients' social contexts when designing and implementing care strategies.

The researcher noted that the influence of age and marital status on patient satisfaction underscores the importance of considering personal characteristics factors in healthcare settings, suggesting that tailored approaches might enhance patient experiences and outcomes, especially for specific age groups and marital statuses.

Conclusion:

The significant improvement in Caring Nurse-Patient Interaction Scale scores and the reduction in ICU Environmental Stressor Scale scores among the study group highlight the effectiveness of structured caring interventions. These results emphasize the value of implementing patient-centered care approaches in critical care settings. Furthermore, the findings indicate that age and marital status were influential factors in patient satisfaction, whereas gender and educational level did not have a statistically significant effect.

Overall, the results support the incorporation of structured caring practices into ICU nursing protocols to enhance patient interaction and reduce environmental stressors, particularly for patients experiencing a diabetic crisis.

Recommendations:

- Implement Structured Nursing Interventions for patients with diabetic crises in intensive care units to enhance nurse-patient interaction and reduce ICU-related stress.
- Provide educational booklets, handouts for nurses available in ICU.
- Replicate this study on large sample in the different geographic location at the Arab republic of Egypt for generalization.

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