



## Preventive Measures regarding Fluid and Electrolyte Imbalance for Patients with Burn

Aya Mohamed Hassan<sup>(1)</sup>, Nadia Mohamed Taha<sup>(2)</sup>, Amal Hemed Hamad<sup>(3)</sup>, and Fatma Mohamed Abdelhamed<sup>(4)</sup>

<sup>(1)</sup> B.Sc. Nursing, Faculty of Nursing, Zagazig University, Egypt. <sup>(2)</sup> Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt. <sup>(3)</sup> Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt. <sup>(4)</sup> Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.

Corresponding Author: Aya Mohamed Hassan

**Received:** 28 October 2024, **Accepted:** 17 November 2024, **Published:** 20 November 2024

### ***Abstract***

**Background:** One of the most serious side effects of burn injuries is fluid and electrolyte imbalance. To lower morbidity and enhance patient outcomes, early prevention and appropriate care are crucial. The **aim** of The study was to assess preventive measures of fluid and electrolyte imbalance for patients with burn. **Research design:** The study employed descriptive research design. **Setting:** Hehia Burns Hospital in the Sharqia Governate of Egypt served as the study's site. **Subjects:** Forty nurses who are readily available. **Tools:** Two relevant tools were used to gather data: Questionnaires for structured interviews and electrolyte and fluid Resuscitation Checklist for Observations **Results :**The study's findings showed that 72.5% of the nurses were female, 87.5% were under 30 years old, and 62% were enrolled in burn training programs. 62.5% of the nurses in the study had technical institute education, and 80% of the nurses had not attended specialized training for fluid and electrolyte imbalance. Eighty percent of the nurses in the study had inadequate expertise. Preventive measures were inadequate for 57.5% of the nurses in the study. Of the nurses surveyed, 62.5% had insufficient practice. **In conclusion:** The total knowledge of the nurses under study about fluid and electrolyte imbalance and their overall practice experience were statistically positively correlated. The total practice and preventive measures of the nurses under study were statistically significantly correlated. The knowledge of all nurses and their preventive actions were positively and statistically significantly correlated. **Recommendations:** Increased focus on holding frequent health education events to increase understanding of the significance of preventing fluid and electrolyte imbalance in burn patients

**Keywords:** Burn, Electrolyte disturbance, Fluid balance, Preventive measures



## Introduction

Burns are one of the most severe injuries, and serious public health problems concerning global scale. Burn is a term used to describe skin and tissue damage brought on by a fire, scald, electrical shock, chemical burn, or radioactive radiation. Burn is a wide-reaching community health problem for an estimated 180000 deaths yearly common among low- and middle-income countries. Likewise, death rate from burns in low and middle income is now 7 over times more than among high income countries. Burns are the fourth most frequent cause of trauma in the world, behind accidents, falls, and interpersonal violence(**Ghasemi et al.,2025**).

Fluid and electrolyte imbalance is a critical complication in burn patients due to extensive fluid loss and shifts between body compartments. Severe burns cause increased capillary permeability, leading to leakage of plasma and proteins from the intravascular space into the interstitial tissues. This results in hypovolemia, edema formation, and reduced tissue perfusion. Additionally, may experience electrolyte disturbances as hyponatremia and hyperkalemia, which can further compromise cellular and organ function. Without prompt and adequate fluid resuscitation, these fluid and electrolyte imbalances can progress to burn shock (**Gavrilovska.,2025**).

The standard target is to provide adequate end-organ perfusion, taking into consideration the possible risks of fluid creep and over-resuscitation. Re-expanding the intravascular volume, providing sufficient sodium to restore cellular trans membrane potential, replacing electrolytes preventing extracellular life-threatening electrolyte disturbances that could cause cardiac arrhythmias, and correcting hypoproteinemia (**Irambona.,2025**).

Fluid and Electrolyte imbalance in burn patients can be prevented by taking early preventive measures like early and adequate fluid resuscitation using appropriate formulas such as the Parkland formula and balanced solutions like Ringer's lactate. Continuous monitoring of serum electrolytes is essential to detect and correct abnormalities early. Maintaining adequate urine output helps assess fluid and electrolyte status. Early enteral nutrition reduces electrolyte loss and metabolic stress. Prompt management of complications such as infection, vomiting, or diarrhea is important. Careful avoidance of over- or under-resuscitation further helps maintain electrolyte balance (**Ghosh.,2022**).

Nurses play a central role as first-line providers and partners to physicians. Their knowledge of rehydration and evidence-based practice allows them to implement protocols effectively and collaborate closely with doctors, directly influencing patient outcomes and prognosis. However, clear guidance on how to approach goal-directed fluid resuscitation and define key components of high-quality resuscitation is still lacking. To address this gap, a nursing protocol for early fluid resuscitation in burn was developed using available evidence, clinical experience, and real-life practice patterns, aiming to promote standardized and improved patient care(**Crowe., 2024**).

Nurses should have assessment skills, understand how to care for patients with burn and to be informed about the changes that happen following a burn. Providing care to patients with burns is not easy so nurses need skills in assessment, monitoring, fluid and electrolyte resuscitation, pain management, wound care and psychosocial support (**Cartotto.,2023**).

## Significance of the study:

Resuscitation of acute, severe burns is a challenge for burn care clinicians, particularly in the first twenty-four hours after the burn occurred. It is one of the key factors of burn victims' survival (**Soltany et al.,2022**). Appropriate fluid resuscitation after moderate to severe burns, is the single most important preventive measure and therapeutic intervention which reduces the early mortality following acute burns. Optimal care of the burn patient requires a distinctive multidisciplinary approach (**Kruse et al.,2025**). Although a lot of studies focused on fluid resuscitation and role of nurses, they did not focus on preventive measures that proceed with the problem, so there is a need to talk about this part in details .Hence, the aim of the study was to assess the preventive measures regarding fluid and electrolyte imbalance for patients with burns.



### **Aim of the study:**

This study aimed to evaluate Preventive Measures regarding Fluid and Electrolyte Imbalance for Patients with Burn

### **This aim was achieved through the following objectives:**

- 1- Assess the level of nurses knowledge regarding fluid and electrolyte imbalance for patients with burn.
- 2- Determine the preventive measures regarding fluid and electrolyte imbalance for patients with burn.
- 3- Assess the level of nurses practice regarding fluid and electrolyte imbalance for patients with burn.

### **Research questions:**

- What is the level of nurses knowledge regarding fluid and electrolyte imbalance for patients with burns?
- What are the preventive measures regarding fluid and electrolyte imbalance for patients with burns?
- What is the level of nurses practice regarding fluid and electrolyte imbalance for patients with burns?

### **Subjects and methods**

#### **Research design**

A descriptive design was utilized to accomplish the aim of this study and to answer the research questions.

#### **Study setting**

This study was conducted at Hehia Burns Hospital, Sharqia Governate, Egypt.

#### **Study subjects**

The study involved convenient sample of available nurses (40) working at Hehia Burn Hospital at Central Hehia Hospitals , Sharqia Governorate, Egypt

#### **Tools for data collection**

**Tool I: A structured Interview Questionnaire (AbdEl-salam&Mohammed.,2018 -Mohammed et al.,2021-Hafez, et al.,2022) included two parts as follows:**

**Part I: Demographic characteristics** related to nurses contained seven close ended questions included (age, gender, marital status, educational qualifications, years of experience in burn unit, and pervious participation in programs or workshops about burns, and training courses about fluids and electrolytes resuscitation for patients with burns).

**Part II: Nurses' Knowledge Assessment Questionnaire:**This part was used to assess nurse's knowledge regarding fluid and electrolyte imbalance for burn patients the questionnaire contained 35 items, divided into three subscales(Nurses knowledge Regarding Burns which consisted of eight items in the form of MCQ questions, nurses knowledge regarding fluid and electrolyte balance for patients with burns which consisted of nine items in the form of MCQ questions, nurses knowledge regarding the causes of fluid and electrolyte imbalance in burn patients which consisted of 18 items in the form of MCQ questions.

#### **Scoring system :**

The questionnaire using a two-point scale that ranges from one “correct answer”, zero “incorrect answer”. The total score is 35 grades (100%). these scores were summed and converted into percentage scores. Knowledge was considered satisfactory if the percent score was equal or above 75% and unsatisfactory if less than 75% was based on statistical analysis.

#### **part III : Preventive Measures Questionnaire(Cartotto et al.,2024).**

This part was used to assess nurse's knowledge regarding preventive measures for burn patients. It was adapted by the researcher after reviewing the related literature to assess nurses preventive measures. which included nine multiple choice questions about the first action taken during minor burns,the most important measures to prevent fluid loss in burn,measures to prevent fluid imbalance in burn, importance of monitoring vital signs in burn ,basic measures to prevent infections,purpose for strict isolation,factors of fluid replacement, Parkland formula calculation, role of vitamin c in wound healing.

#### **Scoring system :**



The questionnaire using a two-point scale that ranges from one “correct answer”, zero “incorrect answer”. The total score is 9 grades 100%. These scores were summed and converted into a percent score that was considered satisfactory if the percent score was equal or above 75% and unsatisfactory if less than 75% based on statistical analysis.

### **Tool II: Fluid and Electrolyte Resuscitation Observational Checklist (Appendix II) (Simpson & McIntosh 2021, Allam et al., 2022, Hafez, et al., 2022 Khan et al., 2024):**

It was adapted by the researcher after reviewing the related literature to assess nurse practice regarding fluid and electrolyte resuscitation for burned patients. The scale contained 50 items in the form of done or not done questions, divided into four subscales (fluid resuscitation that consists of 13 items - Fluids intake and output that consist of 17 items - central venous pressure that consist of nine items - blood transfusion that consist of 11 items).

**Scoring system :** The scale using a two-point scale that ranges from one “done”, zero “not done”. The total score is 50 grades. These scores were summed and converted into a percent score. It was classified into two categories: adequate if score  $\geq 75\%$  and Inadequate if score from  $<75\%$  Based on statistical analysis.

### **Content validity and reliability**

The tools were revised by a panel of five experts from medical and surgical nursing faculty staff, which included two professors of medical surgical nursing, two assistant professors of medical surgical nursing and one assistant professor of community health nursing reviewed the tool's content for clarity, relevance, comprehensiveness, applicability, and understanding. According to the expertise's modifications and the results of the pilot study, some modifications were applied in the form of rephrasing or rewording and sometimes changing of some questions. The final form had been drawn. Cronbach's Alpha that was used to measure the internal consistency (reliability of used tool) was 0.74 for Nurses' knowledge regarding fluid and electrolytes imbalance for patients with burn, Preventive measures regarding fluid and electrolyte imbalance for patients with burn was 0.78, Nurses' observation checklist regarding fluid and electrolytes imbalance for patients with burn was 0.73. Testing for reliability was done prior to the start of data collecting.

### **Field work**

The data collection phase lasted for seven months during the period from the beginning of August 2025 to the end of February 2026. Each nurse met individually, got a full explanation about the aim of the study and was invited to participate. The nurse who gave his/her verbal informed consent to participate was handed the self-administered questionnaire and was instructed during the filling. The data were collected two days a week (Saturday and Tuesday) in the morning and afternoon shifts, the time used for finishing the self-administered questionnaire ranged between 15-20 minutes for each nurse according to nurses' physical and mental readiness and for nurses practice, also the researcher was observing nurses' practical skills about studied procedures. The time needed to complete the checklist varies, ranging between 25- 40 minutes.

### **Pilot study**

A pilot study was carried out on four nurses (10%) of the total study sample to test whether the tools are clear, understandable, feasible, applicable, and time consuming. And identifying the difficulties may be faced during the application. Necessary modifications were made according to the pilot study results. Pilot subjects were later excluded from the main study sample. Since no modifications were made.

### **Administration and ethical consideration**



An official permission for data collection in Hehia burn Hospital was obtained from the hospital administrative personnel by the submission of a formal letter from the dean of the faculty of nursing Zagazig University explaining the aim of the study in order to obtain permission and help. At the interview, each subject (nurse) was informed about the purpose, benefits of the study, and they were informed that his/her participation is voluntary and they have right to withdraw from the study at any time without given any reason. In addition, confidentiality, and anonymity of the subjects were assured through coding of all data. The researcher assured that the data collected will be confidential and would be used only to assess preventive measures regarding fluid and electrolyte imbalance for patients with burn

( M.D. Zu. N U R /254/11/8/2024).

### Statistical analysis

The data obtained tabulated and statistically analyzed using SPSS, version 25.0. Quantitative data were expressed as the mean  $\pm$  SD and (range), and qualitative data were expressed as absolute frequencies (number) and relative frequencies (percentage). Percent of categorical variables were compared using Chi square test ( $\chi^2$ ) or Fisher's exact test when appropriate. Spearman's rank correlation coefficient (r) was calculated to assess relationship between various study variables, (+) sign indicate direct correlation and (-) sign indicate inverse correlation p-value  $< 0.05$  was considered statistically significant (S), and p-value  $\geq 0.05$  was considered statistically insignificant (NS). Also, multiple linear regression analysis was used to compare two classes. All tests were two sided. P-value  $< 0.05$  was considered statistically significant (S), and p-value  $\geq 0.05$  was considered statistically insignificant (NS).

### Results

**Table 1:** shows that, the majority (87.5%) of studied nurses' age was  $<30$  years with the mean age equal  $27.85 \pm 2.61$ , nearly three quarters (72.5%) of studied nurses were females, and more than half (52.5%) were unmarried. Regarding years of experience, more than two-thirds (67.5) of the studied nurses had  $<5$  years of experience, while less than one-third (32.5) of the studied nurses had  $\geq 5$  years of experience with mean equal  $3.65 \pm 2.1$ . Also, more than three fifth (62.5%) of studied nurses attended special training courses on caring for burn patients and the majority (80.0%) didn't attend special training courses on fluid and electrolyte imbalance in burn patients.

**Figure 1** Concerning total knowledge level regarding fluid and electrolyte imbalance for patients with burn ,three quarters (75.0%) of the studied nurses had unsatisfactory total knowledge with mean  $\pm$ SD=  $20.62 \pm 7.04$  and range from (6.0-32.0).

**Figure 2** Generally, three fifth (57.5%) of studied nurses had an unsatisfactory level regarding preventive measures of fluid and electrolyte imbalance in burn patients with mean  $\pm$ SD=  $5.30 \pm 2.46$ .

**Figure 3** illustrates that, more than three fifths (62.5%) of the studied nurses had inadequate level of total practice regarding fluid and electrolyte imbalance for patients with burn with Mean  $\pm$ SD  $35.60 \pm 9.48$  and range from 23.0-49.0.

**Table 2** Relation between Total Nurses' Level of Knowledge and Total Level of practice. The results showed that there was statistically significant relation between the studied nurses' total knowledge and their total practice experience with p value equal 0.041.

**Table 3** Relation between Total Nurses' Level of Practice and preventive measures. The results showed that there was statistically significant relation between the studied nurses' total practice and their total preventive measures p value equal 0.024. Higher levels of practical performance corresponded with better adherence to preventive measures, reinforcing the need for regular practical training sessions and supervision.

**Table 4** Relation between Total Nurses' Knowledge and total Preventive measures. showed that there was statistically significant relation between the studied nurses' total knowledge and their total preventive measures regarding fluid and electrolyte imbalance for patients with burn .

### Discussion



Related to age, the present study revealed that, the majority of studied nurses' age was  $\leq 30$  years with Mean  $\pm$ SD range of  $27.85 \pm 2.61$ . The finding of the present study in the same context with a study by **Ali et al., (2025)**. at Helwan University, where 70% of nurses were aged between 20 and 30 years, with Mean  $\pm$  SD  $29.31 \pm 3.04$ . But on the other hand, **Hafez et al., (2022)** at Mansoura University, It showed that 48.5% of nurses age more than 30 years old. From researcher point of view, young age might be due to the majority of nurses' work power that providing direct care for the patient in nursing field in our study are young while higher age category 'senior nurse ages form administrative role.

Regarding gender, The present study revealed that, nearly three quarters of studied nurses were female. The present findings agreed with **Atuhaire et al., (2022)**. conducted in Mbarara University. Showed that; more than half of the studied nurses were female. However, a different pattern was observed in the study by **Baiee & Ali (2025)**. at Babylon University, where more than half of nurses were male.

Regarding marital status, The present study revealed that more than half of studied nurse was not married. The finding of the present study in the same context with **Ouda et al., (2020)**, conducted in "Benha University". founded that most of the studied nurses were not married. In contrast to the study **Mahmoud et al., (2023)**, conducted in "Helwan University", said that two thirds of studied nurses were married.

Regarding education, The present study revealed that more than three fifths of studied nurses had technical institutes. This finding in line with **Abdelghany et al., (2022)**, Conducted in Ain -Shams University. It showed that more than two fifths had technical institutes. The findings of the present study, in contrast with **Hassan., (2021)** at Port Said University, reported a different trend, showing that approximately majority of the nurses held a Bachelor's degree in nursing.

Regarding years of experience, more than two thirds of the studied nurses are working in burn units for  $< 5$  years which means that most of studied nurses are fresh graduated. This findings supported by **Hassan., (2021)** conducted in "Port Said University". it founded that more than half of studied nurses had  $< 5$  years of experience. The findings of the present study in contrast with **Hegazy et al., (2025)** at Assiut University found that more than half of the nurses had more than five years of experience. Also, **Mohammed et al. (2021)** at Beni-Suef University demonstrating that more than half of nurses had extensive experience, spanning ten years or longer. reflecting a highly seasoned workforce.

Regarding attending special training courses on caring for burn patients, the present findings showed that more than three fifths of studied nurses attended special training courses on caring for burn patients. This findings supported by **Abdelghany et al., (2022)**. Conducted in Ain -Shams University. It showed that more than half of studied nurses attended special training courses on caring for burn patients. On the other hand, **Shaban., (2024)**, conducted in Helwan university. The study found that the majority of the studied nurses did not attend special training courses on caring for burn patients.

Regarding attending special training courses on fluid and electrolyte imbalance in burn patients, This study stated that the majority of studied nurses had not attend special training courses on fluid and electrolyte. The findings of the present study in harmony with **Mahmoud et al., (2023)**. The study was conducted in Helwan University. The study said that three fifths of the studied nurses did not attend special training courses on fluid and electrolyte. In contrast with **Ouda et al., (2020)**, the study conducted in Benha University. The study said that more than half of the studied nurses had courses on fluid and electrolyte imbalance .

Regarding Total Nurses Knowledge Score, the present study indicated that three quarters of studied nurses had unsatisfactory total knowledge scores. This finding is supported by **Abolwafa et al., (2023)** Minia university, said that two thirds of the studied nurses had unsatisfactory total knowledge scores. Also, **Baiee & Ali (2025)** at the University of Babylon in Iraq found that the majority of nurses had unsatisfactory total knowledge score. From the researcher point of view the majority of the studied nurses had technical institutes which made the nurses less qualified to be at the same level as the bachelor



nursing degree. Also, lack of refreshment of the nurses' knowledge and lack of motivation. Moreover, nurses in Egypt are not used the independent self-learning.

Regarding nurses knowledge preventive measures, This study revealed that three fifths of the studied nurses had unsatisfactory level of knowledge regarding preventive measures of fluid and electrolyte imbalance in burn patients. The majority of the studied nurses correctly calculated fluid requirements using Parkland formula, other areas, only one third of studied nurses aware of infection prevention and half of the studied nurses applying measures to prevent electrolyte disturbances. The overall mean score indicated a moderate level of adherence, suggesting that while some practices are consistently applied, others require reinforcement. Reinforcing the latter group of practices requires a dual approach, implementation of structured institutional protocols and providing ongoing training (Stavropoulou et al.,2025).

Regarding Total Practice score regarding fluid and electrolyte imbalance, the present study revealed that more than two thirds of studied nurses had inadequate level of total practice regarding fluid and electrolyte resuscitation for patients with burn , These findings validated by **Hafez et al., (2022)**. Conducted in Mansoura University. The study showed that the majority of the studied nurse had inadequate total scores of fluid resuscitation for burn patients. From the researcher point of view this condition occurs due to a shortage of nursing staff and workload in the hospital. Also some nurses consider monitoring fluid and electrolyte a routine Relation between Total Nurses' Level of Knowledge and Total Level of practice.

The results showed that there was statistically significant relation between the studied nurses' total knowledge and their total practice experience with p value equal 0.041. This study supported by **Mahmoud et al., (2023)**. conducted in Helwan University .That showed that there was highly statistically significant relation between total knowledge and total practice among studied nurses with p value equal 0.000\* .

Relation between Total Nurses' Level of Practice and preventive measures. The results showed that there was statistically significant relation between the studied nurses' total practice and their total preventive measures p value equal 0.024. Higher levels of practical performance corresponded with better adherence to preventive measures, reinforcing the need for regular practical training sessions and supervision.

This suggests that individuals who consistently apply preventive measures are more likely to engage in behaviors that reinforce or encourage proper health practices. Such a relationship is expected, as adherence to prevention often reflects a higher level of health awareness and a greater commitment to risk reduction. These findings align with the general trend in health-behavior research, which indicates that strong preventive practices frequently coexist with proactive behaviors aimed at promoting healthier actions among individuals (Salt et al., 2025).

Relation between Total Nurses' Knowledge and total Preventive measures. showed that there was statistically significant relation between the studied nurses' total knowledge and their total preventive measures regarding fluid and electrolyte imbalance for patients with burn . Nurses with higher knowledge tended to follow preventive procedures more consistently, highlighting the importance of continuous education and competency-based training to ensure patient safety. In general, the public-health literature supports the idea that knowledge plays an important role in shaping health-related practices. Therefore, the observed association in the current study aligns with the widely reported pattern that improved knowledge contributes to better compliance with preventive measures **Gustini et al.,(2024)**.

## Conclusion

On the light of the present study results. the study reveals a concerning gap in nurses' competency regarding fluid and electrolyte imbalance in burn patients. Most nurses (75%) had inadequate overall knowledge, while 57.5% showed poor understanding of preventive measures, and



62.5% demonstrated insufficient practical skills. Also, the findings show statistically significant positive relationships between knowledge, practice, experience, and preventive measures. This indicates that improving one area, especially through training and experience can influence others positively. Overall, the study highlights a clear disconnect between expected standards and actual performance, but also emphasizes that knowledge, practice, and preventive measures are strongly interconnected, offering a clear direction for targeted educational and training interventions.

### **Recommendations**

Based on findings, **For nurses :**

-Provide continuous education and update for nurses regarding evidence-based nursing practices about burn patients .

-Give current study booklet to burn units in the study settings to use as a guide for nurses during their care of patients as it was valid, applicable and reliable .

**For hospital administration :**

-Provide a training unit that is responsible for continuous training and observation

**for furthers research :**

-Replication of the study on a larger probability sample from different geographical areas in Egypt to obtain more generalizable data .

-Future studies have to be carried out in order to assess factors associated with poor level of practice regarding monitoring fluid and electrolyte balance and imbalance.

### **Authours' contributions**

A.M.H; Conceived and designed the study, developed the research tools, conducted data collection, and contributed significantly to data interpretation and manuscript writing. F.M.A ; Supervised all stages of the study, revised multiple drafts critically for intellectual content A.H.H; Provided the first draft of the manuscript before its publication, participated in all the steps of research. N.M.T; Conducted the overall supervision of the manuscript before its publication and approved the final version for publication. All authors reviewed and approved the final manuscript and take full responsibility for the integrity of the work.

### **Acknowledgment**

The author would like to express gratitude to nurses of Hehia burns hospital.

### **Declaration of conflicting interest**

The authors declare that there is no conflict of interest.

### **Funding source**

The author received no financial support for the research, authorship, and/or publication of this article.



**Table 1: Frequency and Percentage Distribution of Demographic Characteristics of Studied Nurses (n=40).**

<b>Demographic data</b>	<b>No</b>	<b>%</b>
<b>Age</b>		
< 30 years	35	87.5
≥30 years	5	12.5
<b>Mean ±SD</b>	27.85±2.61	
<b>Median(range)</b>	10.0 (23.0-33.0)	
<b>Gender</b>		
Male	11	27.5
Female	29	72.5
<b>Marital status</b>		
Married	19	47.5
Single	21	52.5
<b>Education</b>		
Nursing Diploma	2	5.0
Technical institute	25	62.5
Bachelor of Nursing	13	32.5
<b>Years of experience</b>		
<5 years	27	67.5
≥5 years	13	32.5
<b>Mean ±SD</b>	3.65±2.11	
<b>Median(range)</b>	7.0 (1.0-8.0)	
<b>Attended special training courses on caring for burn patients</b>		
Yes	25	62.5
No	15	37.5
<b>Attended special training courses on fluid and electrolyte imbalance in burn patients</b>		
Yes	8	20.0
No	32	80.0

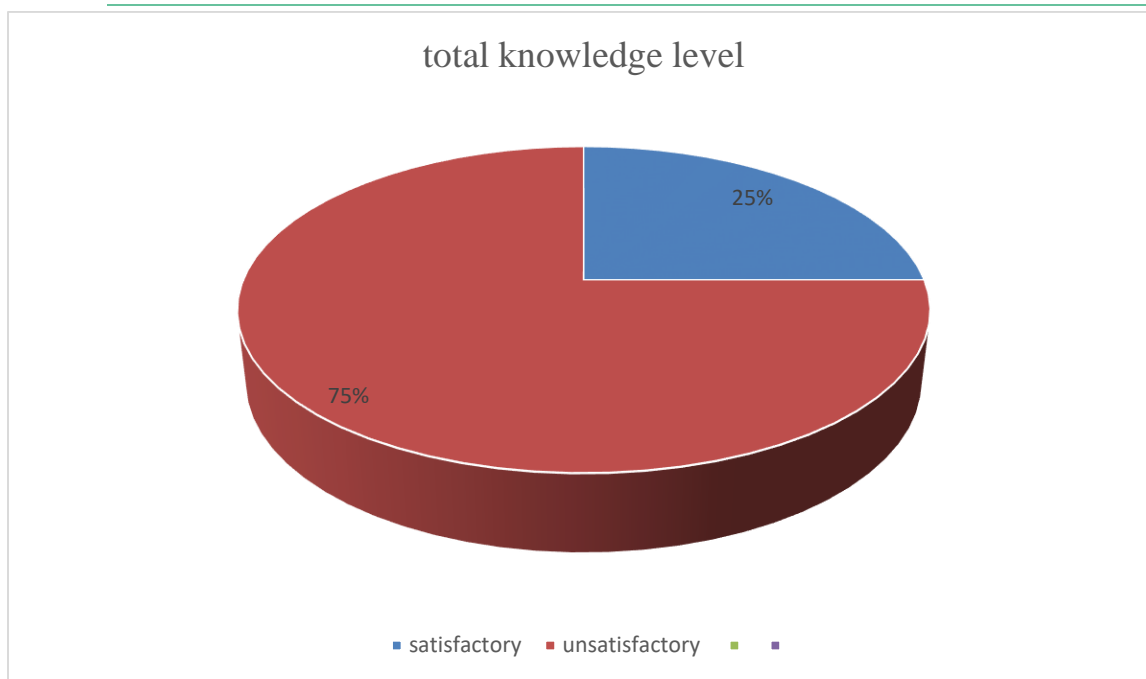


Figure 1: of Total Nurses' Knowledge regarding Fluid and Electrolyte Imbalance for Patients with Burn (n = 40).

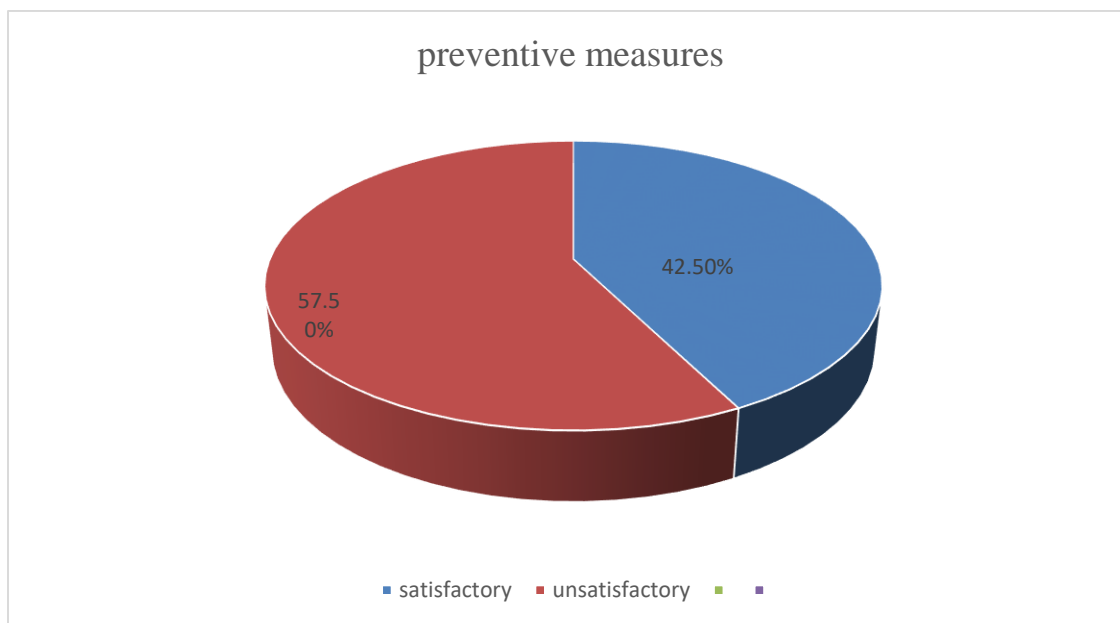
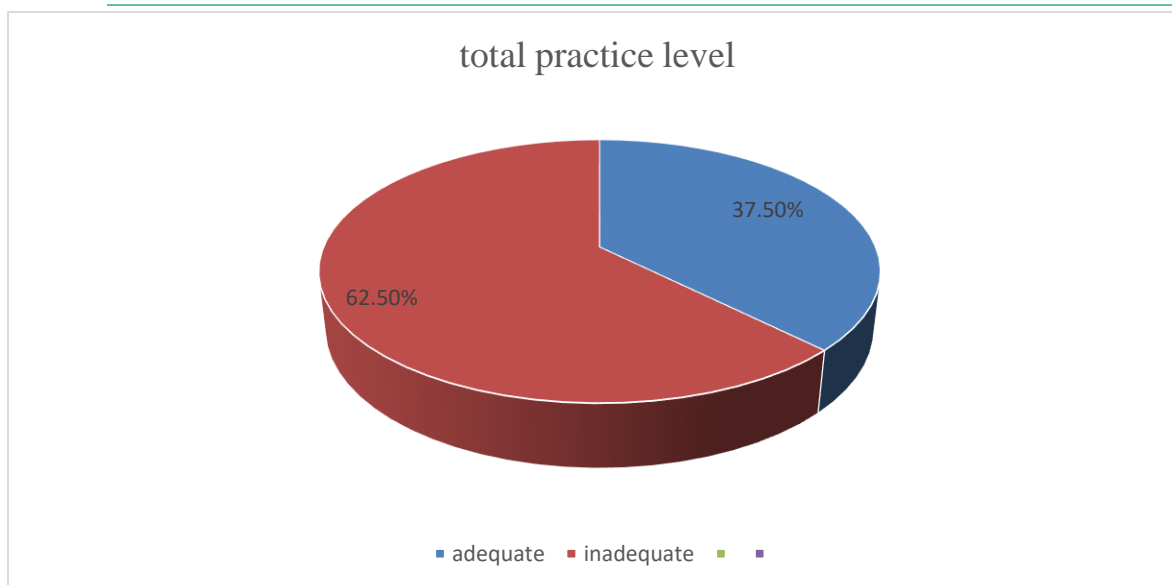


Figure 2: Frequency and Percentage Distribution for Studied Nurses' regarding Preventive Measures of Fluid and Electrolyte Imbalance in Patients with Burn (n=40).



**Figure 3: Total Practice Level of Studied Nurses regarding Fluid and Electrolyte Imbalance for Patients with Burn (n = 40).**

**Table 2 :Relation between Total Nurses' Level of Practice and Total Level of Knowledge Regarding Fluid and Electrolyte Imbalance for Patients with Burn (n=40).**

Total Nurses' knowledge	Total Nurses' practice				$\chi^2$	p-value
	adequate		inadequate			
	No	%	No	%		
Satisfactory	8	20.0	5	12.5	4.748	0.041*
Unsatisfactory	7	17.5	20	50.0		

$\chi^2$ =Chi square test

(\*) p<0.05 statistically significant

**Table 3: Relation between Nurses' Total Level of practice Regarding Fluid and Electrolyte Imbalance for Patients with Burn and Total Preventive Measures**

Total preventive measures	Total Nurses' practice				$\chi^2$	p-value
	adequate		inadequate			
	No	%	No	%		
Satisfactory	10	25.0	7	17.5	5.736	0.024*
Unsatisfactory	5	12.5	18	45.0		

$\chi^2$ =Chi square test

(\*) p<0.05 statistically significant



**Table 4: Relation between Nurses' Total Level of Knowledge Regarding Fluid and Electrolyte Imbalance for Patients with Burn and Total Preventive Measures (n=40).**

Total Nurses' knowledge	Total preventive measures				$\chi^2$	p-value
	Satisfactory		Unsatisfactory			
	No	%	No	%		
Satisfactory	8	20.0	2	5.0	7.673	0.009*
unsatisfactory	9	22.5	21	55.0		

$\chi^2$ =Chi square test

(\*) p<0.05 statistically significant

### References

- Gavrilovska-Brzanov, A. (2025).** Managing Severe Burns: A Multidisciplinary Perspective with Focus on Intensive Care. *Journal of Anesthesia/Anestezi Dergisi (JARSS)*, 33(11).
- Ghasemi, H., Omranifard, M., Bahrami, M., Moghimian, M., & Farzi, S. (2025).** Challenges in burn care management: a qualitative study of health professionals' and patients' perspectives. *Scientific Reports*, 15(1), 33-40.
- Ghosh, S. (2022).** Fluid Resuscitation in Burn. In *Handbook of Intravenous Fluids* (pp. 249-263). Singapore: Springer Singapore
- Irambona, G., Ahmed, N. T. M., Michael, B. N. B., & Abdallah, H. M. M. (2025).** Assessment of Electrolyte Disturbances Risk Factors among Traumatic Brain Injury. *Alexandria Scientific Nursing Journal*, 27(3), 85–96.
- Cartotto, R., Johnson, L. S., Savetamal, A., Greenhalgh, D., Kubasiak, J. C., Pham, T. N., Rizzo, J. A., Sen, S., & Main, E. (2024).** American Burn Association Clinical Practice Guidelines on Burn Shock Resuscitation. *Journal of Burn Care & Research*, 45(3), 565–589. <https://doi.org/10.1093/jbcr/irad125>
- Cartotto, R., Johnson, L., Rood, J. M., Lorello, D., Matherly, A., Parry, I., ... & Nedelec, B. (2023).** Clinical practice guideline: early mobilization and rehabilitation of critically ill burn patients. *Journal of Burn Care & Research*, 44(1), 1-15.
- Crowe, S. (2024).** Understanding nursing perceptions of intravenous fluid management practices. *Journal of the Association for Vascular Access*, 29(4), 49-55.
- Kruse, M., Lenz, I. K., Josuttis, D., Plettig, P., Hahnenkamp, K., Gümbel, D., & Gebhardt, V. (2025).** Characterisation of Fluid Administration in Burn Shock—A Retrospective Cohort Analysis. *European Burn Journal*, 6(2), 35.
- Soltany, A., & Al Aissami, M. (2022).** A scoping review of the role of ascorbic acid in modifying fluid requirements in the resuscitation phase in burn patients. *Annals of Medicine and Surgery*, 75, 36-46.
- Hafez Ramadan El-Shaboury, R., Hessin Yousef Heggy, E., Faried Abdelwanees Ali, A., & Mohamed Abdelfatah Sliman, A. (2022).** Effect of Implementing Fluid and Electrolyte Resuscitation Educational Package on Nurses' Performance and Outcomes of Patients with Burn. *Egyptian Journal of Health Care*, 13(3), 868–886. <https://doi.org/10.21608/ejhc.2022.255691>
- Mohammed, R. K., Hassan, M. S., & Mohammed, I. R. (2021).** Nurses' Knowledge, Practice, and Attitude Regarding Burn Injury Management. *Minia Scientific Nursing Journal*, 9(1), 97–103. <https://doi.org/10.21608/msnj.2021.189435>
- Simpson, D., & Mcintosh, R. (2021).** Measuring and monitoring fluid balance. *British Journal of Nursing*, 30(12), 706-710.
- Allam, Z. A., Weheida, S., Bahgat, Z. F., & Algendy, A. A. (2022).** Effect of Fluid Resuscitation Educational Intervention on Nurse's Knowledge, Practice and Fluid Creep Related Manifestations for Patients with Burn. *Assiut Scientific Nursing Journal*, 10(31), 153–167. <https://doi.org/10.21608/asnj.2022.143954.1394>
- Khan, M. S., Iqbal, T., Rehan, M., Tariq, M. H., Ain, Q. T., Khan, S., ... & Chatha, M. M. (2024).** Ideal burn resuscitation: a step toward resolving the dilemma in acute flame burn management. *International Journal of Burns and Trauma*, 14(6), 133.
- Ali, I. S. A., Ali, Z. H., Emara, S. F. A., & Elkattan, B. A. (2025).** " Assessment of Critical Care Nurses' Knowledge and Practice Regarding Electrolyte Imbalances Management. *Helwan International Journal for Nursing Research and Practice*, 4(12), 617. <https://hijnrp.journals.ekb.eg/>
- Mohamed, S. A., Taha, N. M., & Bayomi, R. R. (2021).** Nurses' Role Regarding Care of Patients with Fluid and Electrolyte



Imbalance undergoing urinary diversion. *Zagazig Nursing Journal*, 17(1), 55–65.

**Baiee, N. R., & Ali, S. A. (2025).** Critical care nurse's knowledge regarding fluid and electrolytes administration in Al-Hilla, Iraq. *Medical Journal of Babylon*, 22(3), 717–722. [https://doi.org/10.4103/MJBL.MJBL\\_737\\_23](https://doi.org/10.4103/MJBL.MJBL_737_23)

**Atuhaire, J., Kajjimu, J., Kanya, J. K., Opio, G., Lubega, F., Kakande, R., Mwanje, W., & Tagg, A. (2022).** A survey of the knowledge and practices of nursing students of Mbarara University of Science and Technology around Monitoring Fluid Requirements for burns patients on surgical ward at Mbarara Regional Referral Hospital. *BMC Nursing*, 21(1), 258. <https://doi.org/10.1186/s12912-022-01041-7>

**Mahmoud, F. H., Ammar, S. A., & Mohamed, A. S. M. (2023).** Nurse's Knowledge and Practice Regarding Care of Fluids and Electrolytes Imbalance among Critically Ill Patients. *Journal of Survey in Fisheries Sciences*, 10(3S), 57–66.

**Ouda Awad, M., Said Mohamed, S., & Mohamed Hamed, S. (2020).** Effect of an educational program on nurse's performance regard monitoring fluid and electrolyte replacement for burned patients. *Egyptian Journal of Health Care*, 11(4), 460–481.

**Abdelghany, S. K., Ouda, W. E., Mohammed, M. F., & Kaf, R. H. (2022).** Assessment of nurses' knowledge and practice regarding burn in children. *Trends in Nursing and Health Care Journal*, 5(2), 84–96.

**Hosny, A., Sherief, W., & Mohamed, M. (2022).** Assessment of Nurses' knowledge and Performance Regarding Fluid and Electrolyte Management for Cardiac Surgery Patients. *Mansoura Nursing Journal*, 9(1), 31-40.

**Hassan, H. M. A., El-Sayed, E. S. E., & Mohammad, S. Y. (2021).** Assessment of nurses' knowledge and practice regarding fluid and electrolyte imbalance in critical care units. *Port Said Scientific Journal of Nursing*, 8(2), 1–13.

**Hegazy, A. A., Abozead, S., El-Shazly, M., & Azer, S. Z. (2025).** Auditing nurses' knowledge and practices concerning the care of patients with burn injuries. *Assiut Scientific Nursing Journal*, 13(52), 128–135. <https://doi.org/10.21608/asnj.2025.384358.2081>

**Abd El-SalamSheta, H., & Mahmoud, M. H. (2018).** Effectiveness of structured educational program on knowledge and practice among nurses regarding body fluid balance assessment for critically ill patients. *IOSR J Nurs Health Sci*, 7(5), 74-83.

**El Sayed, H. I., Aly, A. A., Mahmoud, A., & Arcipal, L. (2022).** Knowledge and perception of nurses regarding fluid and electrolyte balance in intensive care units. *International Journal of Health Sciences*, 6(S3), 89-91.

**Ahmed, A. I. (2025).** Nurses' Knowledge and Practice Regarding Care of Patients with Fluid and Electrolytes Imbalance Post Urinary Diversion. *Helwan International Journal for Nursing Research and Practice*, 4(10), 606-621.

**Abolwafa, N. F., Hasan, A. S. G., & Shehata, H. B. (2023).** Effect of instructional guidelines on Nurses Performance regarding Burn Injury Management in children. *Minia Scientific Nursing Journal*, 14(2), 2-7.

**Stavropoulou, A., Kelesi, M., Baltagianni, M., Sigala, E., Tsapnidou, E., Gerogianni, G., & Katharakis, G. (2025).** The impact of Continuing Nursing Education on nurses' knowledge and quality of practice: A systematic review. *Health Professions Education*, 11(3), 5.

**Mansour, H. E. (2019).** Developing nursing standards for maintaining fluid and electrolyte balance for critically ill patients in intensive care units. *Journal of Intensive and Critical Care*, 5(1), 4.

**Gustini, G., Situmeang, L., Syaharuddin, S., Prasetyowati, P., & Suprpto, S. (2024).** Education has a significant effect on the performance of implementing nurses in hospitals. *Jurnal Ilmiah Kesehatan Sandi Husada*, 13(1), 111–116.

**Salt, C., Shepherd, L., Cooke, R., & Hurst, G. (2025).** Do burn injury prevention interventions change what people know and how people think? A systematic review investigating the impact on psychological constructs. *Burns*, 51(5), 107499.