Barriers of Implementing Early Goal-Directed Therapy Among Critically Ill Patients with Sepsis

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Abstract

Although early goal-directed therapy (EGDT) has been found to improve mortality in critically ill patients with severe sepsis/septic shock, its implementation in the emergency department (ED) can be challenging. objectives. to identify barriers of implementing early goal-directed therapy among critically ill patients with sepsis. setting. This study was conducted in the emergency department units of Alexandria Main University Hospital (AMUH), namely the reception unit and resuscitation unit. Semoha University Hospital (SUH) namely the reception unit. Subjects: All nurses of both gender (60) who are assigned to the direct care of the newly admitted patients with sepsis at the previously mentioned units were included in the study. Tool. One tool was utilized for data collection in this study. "Barriers of implementing early goal-directed therapy among critically ill patients with sepsis questionnaire. Result.: The study showed that there was a significant relationship between pt related barriers and the implementation of early goal-directed therapy $p= (0.041^*)$, also, there was a significant relationship between ECNs barriers and the implementation of early goal-directed therapy, $p= (0.034^*)$, there was a significant relationship between organizational barriers and the implementation of early goal-directed therapy, $p=(0.049^*)$. Conclusion: The most common barriers according to emergency care nurses related barriers regarding patients were the presence of relatives at the time of admission, barriers related to nurses as a Shortage of staff, barriers related to the organization including lack of collaboration and communication between different departments, furthermore, other health team barriers such as delay in diagnosis. Recommendations. Incorporate EGDT protocol into the undergraduate curriculum, teach emergency care nurses about sepsis and sepsis management using early goal-directed therapy.

Keywords: Barriers, Early Goal-Directed Therapy, Critically Ill Patients, Sepsis.

Introduction

Sepsis is thought to impact around 30 million people worldwide each year, causing 6 to 11 million fatalities. Between 780,000 and 970,000 cases of sepsis are thought to occur annually throughout the Middle East and North Africa. One-fourth of sepsis patients pass away while they are hospitalized. The most fatal conditions have death rates that are close to 50% (Paoli et al., 2018 , Dugar et al., 2020).

The Surviving Sepsis Campaign (2021) states that sepsis is an organ failure that may

be fatal and is brought on by an improperly controlled host response to infection. Additionally, as sepsis is a systemic reaction to an infection, a patient must also exhibit two or more Systemics inflammatory response syndrome (SIRS) criteria in addition to a suspected infection. Early goal-directed therapy is a three-hour protocolized resuscitation approach to certain objectives in the treatment of sepsis. EGDT has significantly enhanced patient outcomes, including a 16% decrease in mortality. Among the interventions are taking blood cultures and lactate levels, giving empirical antibiotics, giving 30 ml/kg IV fluids to treat hypotension or lactate >4 mmol/L, and starting vasopressors in life-threatening situations. Following these guidelines has continued to be essential for improving clinical outcomes and quality of care for sepsis patients (Jahangiri et al., 2023,You et al., 2022,Nadeem et al., 2022).

There are many difficulties associated with early Goal Directed Therapy (EGDT), but the two biggest obstacles that nurses face are a lack of knowledge regarding the presentation and care of sepsis and septic shock, and a lack of resources in the ED to fully implement the protocol. Early EGDT is beneficial in reducing morbidity and mortality associated with severe sepsis and septic shock. (Salameh & Aboamash, 2022).

By identifying physiological changes that may signal the onset of sepsis, enhancing adherence to the implementation of early goal-directed therapy, and educating staff about sepsis management through the translation of best practices, nurses play a critical role in identifying early sepsis-related manifestations. All of these factors are crucial in improving sepsis-related outcomes.(Harley et al., 2021; Mims, 2022).

Aims of the Study

This study aimed to identify the barriers of implementing early goal directed therapy among critically ill patients with sepsis.

Research Question:

What are the barriers of implementing early goal directed therapy among critically ill patients with sepsis?

Research Design:

Exploratory research design was used in this study.

Settings:

This study was conducted in the emergency department units of:

Alexandria Main University Hospital (AMUH) namely reception unit and resuscitation unit & Semoha University Hospital (SUH) namely reception unit

Subjects: All nurses of both sex (60) who are assigned in the direct care of the newly admitted patients with sepsis to the previously mentioned units was included in study.

Tools:

One tool was used in the current study namely "**Barriers of implementing early goal directed therapy among critically ill patients with sepsis questionnaire.**

This tool was adapted from The Surviving Sepsis Campaign 2021 by the researcher after reviewing the related literatures (Gripp et al., 2021) (Lester et al., 2018) (Pruinelli et al., 2018)(Shock et al., 2022) to identify barriers of implementing early goal directed therapy among critically ill patients with sepsis. This tool was included five parts:

Part I: Sociodemographic Data:

It included age, gender, level of education, years of experiences, implementation of early goal directed therapy.

Part II: Patient related barriers:

This part included time of admission, diagnosis, severity of disease, comorbidity conditions which are complicating initial management, presence of relatives at the time of admission, etc. These items will be rated on a dichotomous scale of (yes or no) and the score will be assigned for each item as follow: Yes (for correct answer) and equal one, While No (for incorrect answer) and equal zero.

Part III: Nurses related barriers:

It was used to assess nurse related barriers as job/ skill related data as skill competencies, lack of awareness about early goal directed therapy protocol, lack of supervision, lack of training program.

Part IV: Organization related barriers:

It was used to assess organization related barriers as lack of resources, lack of collaboration and communications.

Part V: Health care team related barriers:

This part included shortage of staff members, difficult in recognition of the patient condition, delay in diagnosis, delay in prescription of medications, delay in insertion of central venous catheter, etc.

Method

Approval of the ethics committee of the faculty of nursing was obtained. An official approval to conduct this study was obtained after providing explanation of the aim of the study. An informed

consent was obtained from the patients. The study tools were tested for content validity by 7 experts in the field of the study. The necessary modifications were done accordingly. A pilot study was carried out on 10% of the study sample to test the clarity and applicability of the research tools. Reliability of the tools was tested using Cronbach's Alpha test. The reliability coefficient was for tool *0.87% which is accepted.*

Ethical considerations:

Written informed consent was obtained from patient after explaining the aim of the study and the right to refuse to participate in the study and/ or withdraw at any time. Patient's privacy was respected. Data confidentiality was during implementation of the study.

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The **Kolmogorov-Smirnov** test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the obtained results was judged at the 5% level.

Results

Table (1) denotes the relationship between socio-demographic data of the studied emergency nurses and mean score of the patient related barriers It can be noted that there was a statistical significant relationship between age of ECNs and patient related barriers p=(0.030*)As regard education level, there was a statistically significant relationship between education level and

patient related barriers (p= 0.037*)As regard years of experiences, there was a statistically significant relationship between years of experiences and patient related barriers (P= 0.009*). As regard implementation of early goal directed therapy, there was a statistically significant relationship between implementation of early goal directed therapy and patient related barriers (P= 0.041*).

Table (2) represents the relationship between socio-demographic data of the ECNs and mean percentage score of EGDT implementation barriers regarding nurses. It can be noted that there was a statistically significant relationship between age of ECNs and nurses related barriers p= (0.005*). Similarly, education level p= (0.004*), years of experiences p= (<0.001*), and implementation of early goal directed therapy p= (0.034*).

Table (3) shows the relationship between socio-demographic data of the ECNs and mean percentage score of EGDT implementation barriers regarding organization. It can be noted that there was a statistically significant relationship between age of ECNs and organizational barriers p = (0.016*). As regard education level, there was a statistically significant relationship between education level and organizational barriers (p=0.047*). As regard years of experiences, there was a statistically significant relationship between years of experiences and organizational barriers (P= 0.011*). As regard implementation of early goal directed therapy, there was a statistically significant relationship between implementation of early goal directed therapy and organization related barriers (P= 0.049*).

Tables (4) denotes the relationship between socio-demographic data of the ECNs and

percent score mean score of EGDT implementation barriers regarding other health team. It can be noted that there was a statistically significant relationship between age of ECNs and health team related barriers p= (0.019*). As regard education level, there was a statistically significant relationship between education level and health team related barriers (P=0.045*). As regard years of experiences, there was a statistically significant relationship between years of experiences and health team related barriers (P=0.014*). As regard implementation of early goal directed therapy, there was a statistically significant relationship between implementation of early goal directed therapy and health team related barriers (P=0.013*).

Discussion

The main conclusions of the current study identified the major obstacles to initiating early goal-directed therapy in critically sick sepsis patients. Patient-related obstacles include diagnosis, comorbidities, and the presence of family at the time of admission. In addition, obstacles specific to nurses exist, such as a staffing shortage and the stress of caring for multiple patients (which increases the workload of nurses). Additionally, there are organizational obstacles such poor departmental coordination and communication, lengthy admissions processes, and extended turnaround times in laboratories. Additional health team-related obstacles include the lack of healthcare teams and delays in sepsis patients' diagnoses. These results can be attributed to a lack of EGDT knowledge and expertise, a staffing shortfall, or a lack of early goal-directed treatment training programs.

One study (Salameh & Aboamash, 2022; Castro 2015; Mikkelsen et al., 2010)

explored the challenges faced in implementing early goal-directed therapy. (Salameh & Aboamash, 2022) sought to identify the emergency nurses' and doctors' knowledge, attitudes, practices, and barriers regarding the management of sepsis. It is clear that both emergency nurses and physicians, the largest obstacle to giving effective care to patients with sepsis is the lack of monitoring equipment given that both emergency nurses and physicians had poor-to-moderate levels of sepsis knowledge. They also discovered that programs for ongoing education are necessary to give nurses and doctors with consistent knowledge on sepsis management. The creation of a recognized procedure can enhance nurses' expertise, outlooks, and methods.

Another study (Castro 2015) aimed to synthesize current research findings regarding nursing barriers associated with EGDT. The results showed that there were two main obstacles that prevented the EGDT from being implemented: a lack of resources in the ED and a lack of information about how to present and treat sepsis and septic shock. These findings may be related to funding issues and a lack of training opportunities.

(Mikkelsen et al., 2010) state as such. The study sought to discover the variables linked to not starting EGDT in the ED. At the levels of the patient, doctor, and organization, they identified potential obstacles to starting EGDT. At the patient level, sex and the seriousness of the condition seemed to affect whether EGDT was started. At the organizational level, they discovered that EGDT was much less likely to be started and less likely to be finished in individuals in whom EGDT was started while the Severe Sepsis Service was not active. Additionally,

there are numerous obstacles to successfully integrating evidence into clinical practice.

Conclusion

Regarding EGDT implementation barriers among studied emergency care nurses, it was clear that the majority of EGDT implementation barriers were Health care team related barriers in nature, followed by patient related barriers and nurses related barriers in nature. Barriers related to health team such as shortage of health care team, delay in diagnosis is a barrier to them, lack of multidisciplinary collaboration, resistance to change to the new guidelines of EGDT (doesn't participate in training programs and delay prescription, ordering and delivery of fluids, medications, and vasopressors. Furthermore, patient related barriers such as the presence of relatives at the time of admission, age of the patients (greater than 60 years) diagnosis and comorbidity, severity of the illness(**SOFA score)** and immunity status of the patient, moreover, nurses related barriers such as Shortage of the staff, the burden of caring for several patients (Increase nurses' workload),delay recognition of sepsis and septic shock, lack of training program, lack of motivations, lack of awareness and familiarity with EGDT protocol, delay in obtaining samples from the patient for sepsis workup Finally organization related barriers such as lack of collaboration and communication between different departments, prolonged laboratory turnaround times, presence of logistics barriers (as places, administration affairs& papers), time consumed in admission procedures, lack of expertise of the multidisciplinary team.

Recommendations

In line with the findings of the study, the following recommendations are made:

- Educate emergency care nurses about sepsis and sepsis management using early goal directed therapy.

- Regular staff meetings, training sessions, and conferences should be held to go over implementation impediments, their classification, and their management.

Table (1): The distribution of the studied emergency care nurse's sociodemographic data. (n = 60)

Sociodemographic data	No.	%
Gender		
Male	29	48.3
Female	31	51.7
Age (years)		
<30	29	48.3
30-<40	22	36.7
≥40	9	15.0
Mean ± SD.	32.02 ± 6.71	
Marital status		
Single	29	48.3
Married	30	50.0
Widowed	1	1.7
Education level		
Diplome	15	25.0
Technical	23	38.3
Bachelor's	21	35.0
Years of experiences		
<10	35	58.3
10-<20	15	25.0
≥20	10	16.7
Mean ± SD.	10.38 ± 7.66	
Unit		
AMUH Reception	47	78.3
Semoha Reception	13	21.7
Do You implement early goal directed therapy?		
Yes	7	11.7
No	53	88.3

SD: **Standard deviation**

Table (2): Frequency of patients related- barriers regarding EGDT implementation. (n = 60)

Patient related barriers	No.	%
Presence of relatives at the time of admission		
Yes	54	90.0
No	6	10.0
Age of the patient		
Yes	43	71.7
No	17	28.3
Level of consciousness		
Yes	37	61.7
No	23	38.3
Gender		
Yes	41	68.3
No	19	31.7
The severity of illness (SOFA score)		
yes	40	66.7
no	20	33.3
Immunological state		
Yes	39	65.0
No	21	35.0
Level of consciousness		
Yes	37	61.7
no	23	38.3

Table (3): Frequency of nurses-related barriers regarding EGDT implementation. (n = 60)

Nurses related- barriers	Yes		No	
	No.	%	No.	%
Shortage of the staff	56	93.3	4	6.7
The burden of caring for several patients (Increase nurses' workload)	51	85.0	9	15.0
Delay recognition of sepsis and septic shock.	44	73.3	16	26.7
Lack of training program	42	70.0	18	30.0
Lack of motivations	42	70.0	18	30.0
Lack of awareness and familiarity with EGDT protocol	41	68.3	19	31.7
Delay in obtaining samples from the patient for sepsis workup	41	68.3	19	31.7
Insufficient knowledge about the importance of early goal-directed therapy	40	66.7	20	33.3
Delay in sending sample to the lab	40	66.7	20	33.3
Lack of authority regarding initiation of fluid or vasopressors	38	63.3	22	36.7
Failure of communication between the staff (Handoff failure)	36	60.0	24	40.0
Lack of knowledge about sepsis	35	58.3	25	41.7
Lack of continuous supervision, mentorship, and support by the senior manager	34	56.7	26	43.3

There are no clinical guidelines for implementing EGDT	32	53.3	28	46.7
Delay in starting management	32	53.3	28	46.7

Table (4): Frequency of the studied emergency care nurse's organization-related barriers regarding EGDT implementation. (n = 60)

Organization-related barriers	Yes		No	
	No.	**%**	**No.**	**%**
Lack of collaboration and communication between different departments	46	76.7	14	23.3
Prolonged laboratory turnaround times.	46	76.7	14	23.3
Presence of Logistics barriers (as places, administration affairs& papers)	41	68.3	19	31.7
Time consumed in admission procedures	40	66.7	20	33.3
Lack of expertise of the multidisciplinary team.	38	63.3	22	36.7
Lack of Supplies for taking blood culture under aseptic technique	37	61.7	23	38.3
Lack of laboratory supplies	37	61.7	23	38.3
Lack of agreement with clinical protocol on EGDT	36	60.0	24	40.0
Lack of training sessions related to applying sepsis management	35	58.3	25	41.7
Prolonged turnaround time in implementing EGDT	35	58.3	25	41.7
Day of admission (working days and holidays)	34	56.7	26	43.3
Lack of cardiac monitor devices, infusion pump	34	56.7	26	43.3
Policy-related barriers to implementing EGDT	33	55.0	27	45.0
Lack of continuous monitoring and lack of supervision	27	45.0	33	55.0
Lack of medications such as vasopressor medications and fluid	25	41.7	35	58.3

Table (5): Frequency of the studied emergency care nurse's other health team related barriers regarding EGDT implementation. (n = 60)

Health care team related barriers	Yes		No	
	No.	**%**	**No.**	**%**
Shortage of health care team	52	86.7	8	13.3
Delay in diagnosis	42	70.0	18	30.0
Lack of multidisciplinary collaboration	40	66.7	20	33.3
Resistance to change to the new guidelines of EGDT (doesn't participate in training programs	39	65.0	21	35.0
Delay prescription, ordering and delivery of fluids, medications, and vasopressors.	36	60.0	24	40.0
Difficult in recognizing the patient's condition	36	60.0	24	40.0
Response time to patient (delay in placement of central venous catheter	35	58.3	25	41.7
Delay in the insertion of invasive devices (central venous catheter, foley catheter	28	46.7	32	53.3

References

- Dugar, S., Choudhary, C., & Duggal, A. (2020). Sepsis and septic shock: Guideline-based management. *Cleveland Clinic Journal of Medicine*, *87*(1), 53–64. https://doi.org/10.3949/ccjm.87a.18143

- Gripp, L., Raffoul, M., & Milner, K. A. (2021). Implementation of the Surviving Sepsis Campaign one-hour bundle in a short stay unit: A quality improvement project. *Intensive and Critical Care Nursing*, *63*, 103004.

- Harley, A., Schlapbach, L. J., Johnston, A. N. B., & Massey, D. (2021). Challenges in the recognition and management of paediatric sepsis—The journey. *Australasian Emergency Care*.

- Jahangiri, S., Abolghasemian, M., Ghasemi, P., & Chobar, A. P. (2023). Simulation-based optimisation: analysis of the emergency department resources under COVID-19 conditions. *International Journal of Industrial and Systems Engineering*, *43*(1), 1–19.

- Lester, D., Hartjes, T., & Bennett, A. (2018). CE: A review of the revised sepsis care bundles. *AJN The American Journal of Nursing*, *118*(8), 40–49.

- Mims, B. C. (2022). *Septic Shock and Vasopressor Therapy: The Impact of Excessive Mean Arterial Pressure Values*. The Catholic University of America.

- Nadeem, A., Ahmad, S. F., Al-Harbi, N. O., Al-Ayadhi, L. Y., Sarawi, W., Attia, S. M., Bakheet, S. A., Alqarni, S. A., Ali, N., & AsSobeai, H. M. (2022). Imbalance in pro-inflammatory and anti-inflammatory cytokines milieu in B cells of children with autism. *Molecular Immunology*, *141*, 297–304.

- Paoli, C. J., Reynolds, M. A., Sinha, M., Gitlin, M., & Crouser, E. (2018). Epidemiology and costs of sepsis in the United States-an analysis based on timing of diagnosis and severity level. *Critical Care Medicine*, *46*(12), 1889–1897. https://doi.org/10.1097/CCM.0000000000003342

- Pruinelli, L., Westra, B. L., Yadav, P., Hoff, A., Steinbach, M., Kumar, V., Delaney, C. W., & Simon, G. (2018). Delay Within the 3-Hour Surviving Sepsis Campaign Guideline on Mortality for Patients With Severe Sepsis and Septic Shock. *Critical Care Medicine*, *46*(4), 500–505. https://doi.org/10.1097/CCM.0000000000002949

- Salameh, B., & Aboamash, A. E. M. (2022). Predictors of Knowledge, Attitudes, Practices and Barriers Regarding Sepsis and Sepsis Management Among Emergency Nurses and Physicians in Palestine: A Cross-Sectional Analysis. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *59*, 00469580221115265.

- Shock, S., Saturation, O., Pressure, C. V., & Acid, L. (2022). *Early Goal-Directed Therapy Liver failure*.

- You, J. S., Zhang, S., Chen, N., Chen, M., & Zhang, W. (2022). Critical care ultrasound goal-directed versus early goal-directed therapy in septic shock. *Intensive Care Medicine*, *48*(1), 121–123.

- Huang, S., Yang, B., Peng, Y., Xing, Q., Wang, L., Wang, J., Zhou, X., Yao, Y., Chen, L., & Feng, C. (2023). Clinical effectiveness of sodium bicarbonate therapy on mortality for septic patients with acute moderate lactic acidosis. *Frontiers in Pharmacology*, *13*, 5488.

- Nadeem, A., Ahmad, S. F., Al-Harbi, N. O., Al-Ayadhi, L. Y., Sarawi, W., Attia, S. M., Bakheet, S. A., Alqarni, S. A., Ali, N., & AsSobeai, H. M. (2022). Imbalance in pro-inflammatory and anti-inflammatory cytokines milieu in B cells of children with autism. *Molecular Immunology*, *141*, 297–304.

- Baker, E. (2022). Improving sepsis recognition through use of the Sepsis Trust's community screening tool. *British Journal of Community Nursing*, *27*(2), 69–75.

- Kariuki-Barasa, I., & Adam, M. B. (2022). Living on the Edge of Possibility: Ethical Issues in the Care of Critically Ill Patients in Resource-Limited Settings. *Critical Care Clinics*. https://doi.org/https://doi.org/10.1016/j.ccc.2022.06.009

- Evans, L., Rhodes, A., Alhazzani, W., Antonelli, M., Coopersmith, C. M., French, C., Machado, F. R., Mcintyre, L., Ostermann, M., & Prescott, H. C. (2021). Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. *Intensive Care Medicine*, *47*(11), 1181–1247.

- Skurzak, S., Gallo, M., Lavezzo, B., Iannandrea, S., & Balagna, R. (2022). Goal-directed therapy in sepsis strikes back. *Intensive Care Medicine*, *48*(4), 502–503.

- Rababa, M., Bani Hamad, D., & Hayajneh, A. A. (2022). Sepsis assessment and management in critically Ill adults: A systematic review. *Plos One*, *17*(7), e0270711.

- Laux, L., Campbell, T., Latouf, K. M., Saunders, K., Schultz, J., & Schwartzmier, M. (2022). Emergency Department Initiative to Improve Sepsis Core Measure Compliance: A Hospital Network Approach. *Critical Care Nursing Quarterly*, *45*(1), 25–34.

- Barichello, T., Generoso, J. S., Singer, M., & Dal-Pizzol, F. (2022). Biomarkers for sepsis: more than just fever and leukocytosis—a narrative review. *Critical Care*, *26*(1), 14.

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