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Assessment of sepsis knowledge and recognition among healthcare professionals in medical unit

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ABSTRACT

Objectives: To assess knowledge and recognition of sepsis among healthcare professionals in medical unit.

METHODS:

This was a cross-sectional study conducted in Divisional Headquater Teaching Hospital, Mirpur Azad Kashmir from June 2023 to February 2024. The International Sepsis Survey questionnaire was adapted, and it was distributed to trainee physicians as well as specialists, and consultants practicing in various hospitals as hard copies and collected back after the response from the health professional. Knowledge and perception were scored and 50% was considered the cut-off score for adequacy. Data was analyzed using SPSS version 22.

RESULTS:

The survey gathered responses from 176 participants, revealing that 45.7% of them demonstrated sufficient knowledge on the subject. Regarding knowledge about the sepsis, Statistical analysis revealed a significant association between the specialty, the duration of working experience, position and age of the responding medical professionals ($p < 0.05$), whereas there was no statistically significant difference in gander regarding the knowledge about the sepsis ($p> 0.05$). Regarding the recognition of sepsis there was statistically significance only in duration of the medical practice and the specialty ($p < 0.05$), while recognition of sepsis was not statistically significant in duration of medical practice, age and gender of the participants ($P> 0.05$). A significant majority of respondents, accounting for 76.14%, reported a lack of awareness regarding the qSOFA (quick Sequential Organ Failure Assessment) scoring system, indicating it remains an unmet need in this field.

CONCLUSION:

Sepsis stands as one of the most commonly misdiagnosed conditions in critical care settings, underscoring a pressing necessity for its early and accurate diagnosis. Furthermore, the timely initiation of appropriate management protocols for suspected sepsis is deemed imperative to enhance patient outcomes

KEYWORDS: Critical Care, health care professionals, Intensivists, Physicians knowledge, Sepsis, Septic Shock

INTRODUCTION:

Sepsis is a life-threatening condition that occurs when the body's response to an infection causes inflammation throughout the body, leading to organ dysfunction and failure.[1] It is a medical emergency that requires prompt recognition and treatment to prevent further deterioration and improve outcomes.[2] However, the challenge lies in the fact that sepsis can present in many different ways, making it difficult for healthcare providers to quickly identify and initiate appropriate treatment.[3]

The lack of a definitive diagnostic test for sepsis further complicates matters, as healthcare providers must rely on a combination of clinical signs and symptoms, laboratory tests, and imaging studies to make a diagnosis. This can lead to delays in treatment, which have been shown to significantly increase mortality rates in septic patients.[4,5]

In order to improve outcomes for septic patients, healthcare providers must be vigilant in recognizing the signs and symptoms of sepsis, and be prepared to initiate treatment quickly. This includes administering antibiotics, fluids, and other supportive measures as soon as sepsis is suspected.[6] Additionally, ongoing research is needed to develop better diagnostic tools and treatment strategies for sepsis, in order to reduce mortality rates and improve outcomes for critically ill patients. Early intervention with established therapeutic protocols can help decrease the morbidity and mortality associated with sepsis. The team managing the patient needs to promptly recognize sepsis.[6,7] Studies have shown limited knowledge about sepsis among healthcare professionals, especially physicians.[3] It is essential for physicians from all specialties to be able to identify sepsis early on for timely diagnosis and treatment.[8] This research aims to identify knowledge gaps among healthcare professionals regarding sepsis and improve their ability to recognize and manage this life-threatening condition.

MATERIALS AND METHODS: This was a cross-sectional survey conducted from June 2023 to February 2024, at Divisional Headquater Teaching Hospital, Mirpur Azad Kashmir. The study was started after the ethical approval from Institutional Review Board. International Sepsis Survey was

used to develop the survey questions. Questions tested knowledge of the SIRS criteria; definitions of sepsis, severe sepsis and septic shock; and the Sepsis Six. Responses were assessed against definitions set by the 2001 International Sepsis Definitions Conference.[9,10] A detailed survey form was design on Microsoft word and printed forms were distributed to the health professionals in hard copies by hand and they were requested to fill and return the forms after complition.

INCLUSION CRITERIA:

The health professionals were trainee physicians at the postgraduate level, specialist physicians and consultants of different specialties.

EXCLUSION CRITERIA:

Undergraduate medical students, nurses, paramedical staff, physiotherapists, and other non-healthcare-related personal were excluded from the study. The study was started after the ethical approval from Institutional Review Board.

Data were analyzed using SPSS version 22. Quantitative variables were summarized with mean ± SD or median (IQR), while categorical variables were presented as frequencies and percentages. A questionnaire assessed knowledge of sepsis symptoms, definitions, and diagnostic methods, as well as physicians' perceptions and attitudes towards sepsis diagnosis and treatment, based on Poeze et al.'s survey.[9] Knowledge was evaluated using SIRS, SOFA, and qSOFA criteria, with a 50% correct response rate considered adequate.[11] Chi-square tests determined significant associations ($p < 0.05$) between covariates and knowledge or perception.

RESULTS:

In this survey, a total of 200 doctors participated, with 176 (88%) completing the study. The analysis was conducted on these 176 respondents. Among them, 98 (55.68%) were female and 78 (44.32%) were male. The mean age of the participants was 32 ± 2.4 years, with a significant majority, 132 (75%), being 30 years old or younger. The majority, 81 respondents (46.02%), had 2-4 years of working experience, followed by 30 respondents (17.05%) with 1-2 years of

experience. The mean duration of practice among the respondents was 4.0 ± 2.1 years. Most of the respondents were residents, accounting for 124 (70.5%) of the participants, with 63 (35.80%) being first-year residents. The largest group of respondents, 40 (22.73%), were from the Department of General Medicine, followed by 37 (21.02%) from General Pediatrics, and 33 (18.75%) from Anesthesia. Additionally, a notable proportion of respondents, 98 (55.79%), reported having experience working in intensive care units (ICUs), critical care units (CCUs), or high dependency units (HDUs).

Regarding sepsis knowledge, 61 respondents (34.66%) were found to have adequate knowledge about sepsis. Furthermore, 113 respondents (64.21%) were able to correctly recognize the symptoms and signs pertinent to the current diagnosis and treatment of sepsis. (Table-1)

Table-1: Characteristics of the participants (n=176)

Variable		n (%)
Gender	Male	98 (55.68)
	Females	78 (44.32)
Age	<30 years	132 (75)
	>30 years	44 (25)
Position	Consultant/ Specialist	52 (29.5)
	Resident	124 (70.5)
Specialty	General Medicine	40 (22.73)
	Paediatrics	37 (21.02)
	Anaesthesia	33 (18.75)
	Emergency	24 (13.64)
	General Surgery	23 (13.06)
	Gynaecology	14 (7.95%)
	Others	05 (2.84%)
Medical practice duration	1-2 year	30 (17.05)
	2-4 years	81 (46.02)
	4-6 years	27 (15.34)
	6-8 years	20 (11.36)
	>8 years	18 (10.23)
Working experience ICU/CCU/HDU		98 (55.79)
Knowledge regarding sepsis	Adequate knowledge	61 (34.66)
	Inadequate knowledge	115 (65.34)
Recognition of sepsis diagnosis & treatment	Able to recognize	113(64.21)
	Unable to recognize	63 (35.79)

Regarding knowledge about the sepsis, Statistical analysis revealed a significant association between

the specialty, the duration of working experience, position and age of the responding medical professionals ($p < 0.05$), whereas there was no statistically significant difference in gander regarding the knowledge about the sepsis ($p > 0.05$). Regarding the recognition of sepsis there was statistically significance only in duration of the medical practice and the specialty ($p < 0.05$), while recognition of sepsis was not statistically significant in duration of medical practice, age and gender of the participants ($P > 0.05$). Regarding duration of working, 2-4 years of working experience was associated with highest proportion 35 (57.34%) followed by 09 (14.74%) of 4-6 years working experience of adequate knowledge. Regarding the ability to recognize the sepsis same 2-4 years of working experience had the highest proportion 52 (46.01%) followed by 1-2 years of working experience 20 (17.70%). The consultants 40 (65.57%) had more knowledge of sepsis than 21 (34.43%) residents but in contrary 42 (37.17%) consultants were able to recognize the sepsis as compared to the 71 (62.83%) residents (Table-2).

When examining the distribution of adequate sepsis knowledge across different departments, it was found that the Internal Medicine and Anesthesia departments had the highest proportion of doctors with sufficient knowledge, with 13 respondents each (21.31%). This was followed by the General Pediatrics department, with 12 respondents (19.67%), and the General Surgery department, with 9 respondents (14.75%) demonstrating adequate understanding of sepsis. In terms of the ability to recognize sepsis, the General Medicine department had the highest proportion, with 25 respondents (22.12%), followed by the General Pediatrics department with 24 respondents (21.24%), and the Anesthesia department with 21 respondents (18.55%) (Table-2)

When assessing knowledge about sepsis, 125 respondents (66.49%) correctly identified sepsis as a state of dysregulated host response to infection, whereas 88 respondents (42.55%) described sepsis as a systemic inflammatory response syndrome (SIRS). Regarding the qSOFA score, 45 respondents (23.93%) were familiar with it, while 144 respondents (76.61%) were not. In terms of recognizing the signs and symptoms of sepsis, fever was identified by 168 respondents (89.36%), tachycardia by 145 respondents (77.13%), and tachypnea by 122 respondents (64.89%). Increased total leukocyte

count (TLC) was considered the primary laboratory indicator for sepsis by 140 respondents (74.47%), followed by thrombocytopenia, which was noted by 34 respondents (18.08%). Regarding the causes of sepsis, 120 respondents (63.83%) identified infection as the primary cause, with 102 respondents (54.25%) specifically noting bacteria. For the treatment of sepsis, 102 respondents (54.25%) recommended anti-shock and organ support therapy, followed by 45 respondents (23.94%) who advised administering antibiotics or collecting blood for culture and starting broad-spectrum antibiotic therapy (Table-3)

Table-2: Distribution of Adequate Sepsis Knowledge and Ability to Recognize Sepsis (n=176)

Variable		**Knowledge**		**p-value**	**Able to recognize sepsis**		**p-value**
		Adequate n=61	**Inadequate** n=115		Yes n=113	No n=63	
Gender	Male	33 (54.01%)	65 (56.52%)	0.50	56 (49.56%)	42 (66.66%)	0.051
	Females	28 (45.09%)	50 (43.48%)		57 (50.44%)	21 (33.33%)	
Age	<30 years	35 (57.38%)	97 (84.35%)	0.023	85 (75.0%)	47 (74.60%)	0.58
	>30 years	26 (42.62%)	18 (15.65%)		28 (25.0%)	16 (25.40%)	
Position	Consultant/ Specialist	40 (65.57%)	12 (10.43%)	0.011	42 (37.17%)	10 (15.87%)	0.014
	Resident	21 (34.43%)	103 (89.57%)		71 (62.83%)	53 (84.13%))	
Specialty	General Medicine	13 (21.31%)	27 (23.48%)	0.013	25 (22.12%)	15 (23.81%)	0.045
	Paediatrics	12 (19.67%)	25 (21.74%)		24 (21.24%)	13 (20.63%)	
	Anaesthesia	13 (21.31%)	20 (17.39%)		21 (18.55%)	12 (19.05%)	
	Emergency	08 (13.11%)	16 (13.91%)		17 (15.04%)	07 (11.11%)	
	General Surgery	09 (14.75%)	14 (12.17%)		13 (11.50%)	10 (15.87%)	
	Gynaecology	04 (6.56%)	10 (8.69%)		10 (8.85%)	04 (6.35%)	
	Others	02 (3.29%)	03 (2.62%)		03 (2.65%)	02 (3.17%)	
Medical practice duration	1-2 year	08 (13.11%)	22 (19.13%)	0.031	20 (17.70%)	10 (15.87%)	0.056
	2-4 years	35 (57.34%)	46 (40%)		52 (46.01%)	29 (46.03%))	
	4-6 years	09 (14.74%)	18 (15.65%)		17 (15.04%)	10 (15.87%)	
	6-8 years	08 (13.11%)	12 (10.43%)		12 (10.62%)	08 (12.70%)	
	>8 years	01 (1.64%)	17 (14.79%)		12 (10.62%)	06 (9.52%)	

Table-3: Assessment of knowledge regarding sepsis (n=176)

Question	Responses	n (%)
What is the definition of sepsis?	State of dysregulated host response to infection	125 (71.02)
	Sepsis is a Systemic inflammatory response syndrome (SIRS)	88 (50.0).
	Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection	35 (19.88)
	Multi-organ failure in response to bacteremia/ infection	32 (18.18)
	Clinical conditions (e.g. Vital instability, fever, increases TLC and SOFA score, 23 (10.4%) abnormal heart and respiratory rate, metabolic collapse, poor immunity)	20 (11.36)
	Infection causing circulatory collapse	8 (4.54)
	Bacterial infection in blood	7 (3.72)
Have you ever heard about the qSOFA score?	No	134(76.14)
	Yes	42 (23.86)
What are the causes of sepsis are	Infection	120 (68.18)
	Bacteria	102 (57.95)
	Viruses	56 (31.81)
	Fungi	30 (17.04)
	Viruses, bacteria, fungi or any pathogen	29 (16.48)
	Release of inflammatory markers or inflammation	10 (5.68)
	Immunocompromised states or immunodeficiency	6 (3.41)
Do you think the following symptoms and signs could be associated with sepsis?	Fever	168 (95.45)
	Tachycardia	145 (82.38)
	Tachypnea	122 (69.32)
	Hypotension	60 (34.09)
	Altered mental status	56 (31.81)
	Respiratory distress	48 (27.27)
	Low GCS	20 (11.36)

	Unstable vitals	17 (9.6)
	Organ/s failure	12 (6.8)
	Any symptom of SIRS	4 (2.27)
Which laboratory Laboratory values do you consider while diagnosing the sepsis?	Increased TLC	140 (79.54)
	Thrombocytopenia	20 (11.36)
	Low leukocyte count	14 (9.09)
Which of the following therapies do you yourself use to treat these sepsis patients?	Anti-shock/organ support therapy	102(57.95)
	Antibiotics or Collect blood for blood culture and start broad-spectrum antibiotic therapy	30 (17.04)
	Depend upon the patient	20 (11.36)
	If hypotension, initially resuscitate with crystalloid	14 (7.95)
	Maintain good oxygen saturation	8 (4.54)
	Use of vasopressor	2 (1.13)

DISCUSSION:

Timely management of sepsis is crucial for reducing mortality and morbidity. This necessitates prompt recognition and decisive intervention by the healthcare team.[5] Our study evaluated the knowledge about the sepsis among medical professionals, which showed a significant association of knowledge and ability to recognize the sepsis specialty wise. These results were comparable to the findings of an other similar study conducted in Karachi, Pakistan by Ahmed F et al.[8] In our study General Medicine specialty has highest proportions (21.31%) of health professionals with adequate knowledge about sepsis similar to (26.1%) in a study by Ahmed F et al. This was followed by General Pediatrics (19.67%) in our study in contrary to the anesthesia (11.6%) in the above mentioned study.[8] Similar findings were also documented in studies by Arjyal B. et al and Bajracharya A et al.[12,13]

Regarding recognition of sepsis, the General Medicine health professional also had the highest proportion (22.12%) in our study, contrary to the findings of Ahmed F et al., where only (7.2%) had adequate perception of the sepsis. However, same study reported the (14.4%) of anesthesia

professional as highest proportion with adequate perception of sepsis.[8]

There was also no gender difference in knowledge and recognition of sepsis in our study similar to the findings of Ahmed F et al, Cowan SL et al., and Bajracharya A et al.[8,13,14]

In our study consultants had the adequate knowledge of sepsis similar to the study by Ahmed F et al, and Arshad A et al.[8,15] However, in contrast residents in our study were abler to recognize the sepsis than consultants. Similar results were reported by a study conducted by Rahman NIA et al.[16]

In our study 76.14% respondents did not know about the qSOFA, similar to 73.9% in a study by Adegbite BR et al.[17] This shows that knowledge about sepsis is not updated and adequate among health care professionals which needs to be updated. Based on the findings of our study, we propose several recommendations aimed at enhancing sepsis detection and management practices within clinical settings. Firstly, we advocate for more frequent and comprehensive training programs for physicians working in critical care areas. These programs should emphasize the early recognition and effective management of sepsis, considering its significant impact on patient outcomes. Secondly, we suggest the implementation of internationally recognized sepsis guidelines in hospitals. These guidelines serve as essential frameworks for standardizing sepsis care practices and ensuring optimal patient management. Regular audits should be conducted to evaluate physicians' adherence to these guidelines, promoting consistency and quality in sepsis care delivery. Moreover, we recommend the implementation of regular refresher courses focused on sepsis detection and management for both trainees and experienced consultants. These courses should incorporate updates on the latest advancements in sepsis diagnosis and treatment modalities, ensuring that healthcare professionals remain abreast of current best practices. By prioritizing ongoing education and training initiatives, as well as ensuring adherence to established guidelines, healthcare institutions can enhance their capacity to effectively detect, manage, and ultimately improve outcomes for patients with sepsis.

Limitations of the study:

This study has several limitations that should be acknowledged. First, the sample size was

relatively small, which may have limited the statistical power of the analysis to detect significant differences between groups. Consequently, some real differences may have gone undetected. Second, the study was conducted at a single center, which restricts the generalizability of the findings to other settings or populations. The results may not be applicable to different hospitals or regions with varying practices and demographics. Third, although the questionnaire was developed based on established guidelines and literature, it may have had inherent limitations in its ability to comprehensively evaluate perceptions and knowledge of sepsis. The scope and design of the questionnaire might not have fully captured all relevant aspects of sepsis understanding among the participants. Finally, our study did not evaluate the knowledge and perceptions of nurses, despite their integral role in patient care management, especially in critical care settings. Nurses are key players in the early identification and management of sepsis, and their insights are crucial for a comprehensive understanding of sepsis care. The exclusion of this significant group may have left a gap in our assessment, as their experiences and perspectives could provide valuable information on the practical aspects of sepsis management and the multidisciplinary approach required in critical care environments. Future studies should include nurses to obtain a more holistic view of sepsis knowledge and perceptions across the entire healthcare team.

Conclusion:

Sepsis continues to be one of the most frequently misdiagnosed conditions in critical care settings, underscoring the urgent need for its early and accurate detection. Timely intervention remains paramount in improving patient outcomes. While advancements in medical technology have introduced newer markers for sepsis diagnosis, their widespread availability remains limited. Consequently, these markers are not universally adopted and utilized to their full potential. Even if accessible, it is unlikely that these newer markers would entirely replace the gold standard of blood culture in sepsis diagnosis. Instead, they would likely complement existing diagnostic approaches, offering additional insights into patient management. Comprehensive efforts are needed to address the broader issues surrounding sepsis, including early detection, effective management, and

preventative measures aimed at reducing its incidence and impact on individuals' health.

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