

Increase Mortality Rate in Sepsis Patients with qSOFA Score Greater than Two

Raja Muhammad Waqar Khan, Asad Mahmood, Mohsin Qayyum, Zahid Younas

Combined Military Hospital, Sialkot/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To look for patients of sepsis with a qSOFA score of more than two and an association of a high qSOFA score with mortality and other socio-demographic factors.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: Department of Medicine, Combined Military Hospital, Sialkot Pakistan, from Nov 2021 to May 2022.

Methodology: All baseline and relevant investigations were carried out at the time of initial clinical assessment, and the qSOFA score was calculated by a consultant medical specialist for all the patients diagnosed with the septic condition. Patients were followed up for two weeks to look for mortality.

Results: A total of 500 patients, managed for sepsis during the study period were included in the study. Of them, 298(59.6) were males, while 202(40.4) were females. Out of all the patients in the study, 379(75.8) had a qSOFA score of two or less than two, while 121(24.2) had a qSOFA score of more than two. Increased mortality, patients with more than 50 years and comorbid illnesses were found statistically significantly more in the group having a qSOFA score of more than two (p -value<0.001).

Conclusion: Mortality was significantly high in patients with sepsis who had a qSOFA score greater than two at the time of initial assessment compared to those with a score of two or less.

Keywords: Mortality, qSOFA score, Sepsis.

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INTRODUCTION

Septic conditions are commonly encountered in various forms by clinicians in developing countries. They may range from mild conditions imposing minimum damage to the individual to severe, potentially life-threatening conditions.¹ Timely diagnosis and the start of appropriate anti-microbial treatment is usually the key to adequate management in these patients.² Clinicians have developed various screening and prediction tools to screen high-risk cases or patients with presumably poor outcomes incorporating various clinical and laboratory parameters.^{3,4} qSOFA score, SOFA score, and SIRS have been used in routine by treating teams to categorize the patients according to disease severity.^{5,6}

Some work has been published in recent years regarding the role of various scores in predicting mortality in patients with sepsis. Andaluz *et al.* compared qSOFA and SOFA in patients with infections at an emergency department. They found that qSOFA was a simple, rapid, inexpensive and valid way to assess the severity of sepsis and chances of organ failure or mortality.⁷ A study was published in India

regarding the role of qSOFA score in predicting the outcome of patients with sepsis in the emergency department. They concluded that qSOFA had an acceptable value for risk stratification of severity of sepsis, multi-organ failure, and mortality.⁸ Koch *et al.* revealed that SOFA was more useful in critically ill patients for predicting outcomes. At the same time, qSOFA was more useful in patients in intermediate care units to predict mortality. No scoring system was free of errors or fully useful in all clinical settings.⁹

Primary or secondary septic conditions pose a big toll on our health care services. Patients of almost all age groups are affected by these conditions.¹⁰ Therefore, clinicians from all specialities need to be well-equipped to identify and manage these conditions to some extent. Therefore, we planned this study with the rationale of looking for sepsis patients with a qSOFA score of more than two and an association of a high qSOFA score with mortality and other socio-demographic factors.

METHODOLOGY

This comparative cross-sectional study was conducted at the Medicine/Emergency Medicine Department, Combined Military Hospital, Sialkot Pakistan, from November 2021 to May 2022. Approval from the Ethical Review Board Committee (via IREB

Correspondence: Dr Raja Muhammad Waqar Khan, Department of Medicine, Combined Military Hospital, Sialkot, Pakistan

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letter no. ERC/05/22) was taken. The sample size was calculated by WHO Calculator using the population proportion of mortality in patients with sepsis as 24.4.¹¹ Non-probability Consecutive sampling technique was used to gather the sample.

Inclusion Criteria: All patients aged 18 to 65 years, with evidence of infection and sepsis diagnosed by a consultant medical specialist, were included in the study.

Exclusion Criteria: Patients with an unclear diagnosis or uncontrolled medical illness were excluded. Patients who had any evidence of being immunocompromised (neoplastic conditions of solid or haematological origin, autoimmune illness, taking long-term steroids or cytotoxic drugs) were also excluded. Patients who did not engage in treatment at our hospital were also part of the exclusion criteria.

Written informed consent from the patients or their caregivers (in case they were delirious), were taken. The consultant physician confirmed the presence of sepsis based on clinical and laboratory findings. The same physician calculated qSOFA at the time of initial assessment by incorporating breathing rate, blood pressure and findings of altered mental state. Presence of delirium or altered mental state was confirmed by classified medical or surgical specialist looking after the patient with the help of Confusion Assessment Method (CAM).¹²

Characteristics of patients with sepsis participating in the study and the outcome variables were described with the help of descriptive statistics. In addition, Pearson chi-square analysis was done to evaluate the association of age, gender, mortality and presence of comorbid illnesses with high qSOFA scores in study participants. Statistics Package for Social Sciences version 24.0 (SPSS-24.0) was used for data analysis. The *p*-values less than or equal to 0.05 were considered significant for ascertaining the association.

RESULTS

A total of 500 patients managed for sepsis during the study period were included. Of them, 298(59.6%) were males, while 202(40.4%) were females. The mean age of the mothers of newborns included in the study was 53.85±6.79 years. Out of all the patients in the study, 379(75.8%) had a qSOFA score of two or less than two, while 121(24.2%) had a qSOFA score of more than 2. 104(20.8%) patients died within two weeks while 396(79.2%) survived first two weeks. 390(78.0%) had comorbid clinical conditions, while 110(22.0%) had no comorbid clinical conditions (Table-I).

Table-I: Characteristics of patients managed for sepsis included in the study (n=500)

Study parameters	n(%)
Age (years)	
Mean±SD	53.85±6.79 years
Range (min-max)	18-65 years
Gender	
Male	298(59.6)
Female	202(40.4)
Mortality within two weeks	
No	396(79.2)
Yes	104(20.8)
Comorbid Diseases	
No	390(78)
Yes	110(22)
Underlying Condition	
Medical	300(60)
Surgical	200(40)
qSOFA Score	
Two or less	379(75.8)
More than two	121(24.2)

It was revealed that increased mortality (*p*-value<0.001), patients with age more than 50 years (*p*-value<0.001) and comorbid illnesses (*p*-value<0.001) were found statistically significantly more in the group having qSOFA score more than two while the gender of patients (*p*-value-0.407) had no such relationship in our study participants (Table-II).

Table-II: Factors Associated with Mortality in Patients of Sepsis with qSOFA Score More than Two at Time of Initial Assessment (n=500)

Factors	qSOFA score two or less (n=379) n(%)	qSOFA score more than two (n=121)n(%)	<i>p</i> -value
Age			
≤50 years	292(79.1)	50(41.3)	<0.001
>50years	87(20.9)	71(58.7)	
Gender			
Male	222(58.6)	76(62.8)	0.407
Female	157(41.4)	45(37.2)	
Presence of Comorbid Illness			
No	315(83.1)	75(61.9)	<0.001
Yes	64(16.9)	46(38.1)	
Mortality			
No	353(93.1)	43(35.5)	<0.001
Yes	26(6.9)	78(64.5)	

DISCUSSION

Increased mortality was seen in patients with sepsis with a qSOFA score of more than two. Infective diseases remain the top cause of mortality and morbidity, especially in vulnerable individuals of lower and middle-income countries.^{13,14} High-risk individuals, if picked up early and dealt with aggressively, may

result in the saving of a large number of useful lives. Various screening tools or scales have been devised for this purpose to screen patients with sepsis who are at high risk of mortality. qSOFA is one of the commonly used tools for this purpose globally. However, local data regarding the utility of this score is lacking. Therefore, we conducted this study to look at sepsis patients with a qSOFA score of more than two and the association of a high qSOFA score with mortality and other sociodemographic factors.

Hu *et al.* compared different versions of the qSOFA score in predicting the mortality of patients. They revealed that all versions helped predict mortality in various clinical settings depending on the presentation of patients.¹⁵ We just studied qSOFA and concluded that a score of greater than two had a statistically significant relationship with increased mortality within two weeks of the assessment of the patient.

Post hoc analysis of the Russian multi-centre trials was conducted regarding qSOFA score for predicting outcomes in surgical patients in intensive care units. It was concluded that an increased qSOFA score was associated with the increased mortality rate in their study participants.¹⁶ Our results supported their findings, but our target population was slightly different, and we used a cut of the score of more than two and saw increased mortality in these patients.

A South African study analysed the utility of the qSOFA score in critically ill patients. They concluded that this score is very useful in resource-limited intensive care settings in predicting mortality among critically ill medical or surgical patients having sepsis.¹⁷ We had similar results, and a score of greater than two was associated with increased mortality in our study participants.

López-Izquierdo *et al.* determined the usefulness of qSOFA and SOFA scores for the detection of early (two-day) mortality in patients coming with suspected septic conditions at the emergency department.¹⁸ They concluded that SOFA score was more useful in assessing patients for organ failure while qSOFA was more useful in predicting mortality. We did not compare the two scores, followed up with patients for two weeks, and found that a qSOFA score of more than two at the initial assessment was associated with increased mortality.

STUDY LIMITATIONS

Multiple factors could lead to increased mortality in these patients after initial presentation; therefore, current study design may not be best to generalize results regarding

high qSOFA score and increased mortality. Moreover, only two weeks of follow-up were done, and parameters other than mortality, like HDU or CCU admission, were not considered. Therefore, results may not truly reflect mortality or morbidity in sepsis patients with high qSOFA scores at initial assessment.

CONCLUSION

Mortality was significantly high in patients with sepsis who had a qSOFA score greater than two at the time of initial assessment compared to those with a score of two or less. Patients older than 50 years or those with comorbid medical illnesses were also more at risk of having increased qSOFA scores.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

RMWK & AM: Conception, study design, data acquisition, data analysis, approval of the final version to be published.

MQ & ZY: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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