



A Study on Quick Sofa Score as a Predictive Tool of Severity in Emergency Department Patients

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ABSTRACT

The Quick Sequential Organ Failure Assessment (qSOFA) score, composed of respiratory rate ≥ 22 ; systolic blood pressure ≤ 100 mm of Hg; altered mental status) is a validated score for assessment of life threatening organ failure in patients with infection. In this study relation between qSOFA score and outcome in emergency department with and without suspected infection was assessed.

Methods: *We performed an observational study of patients older than thirteen years of age presenting to medicine emergency department in July 2016. Patients of psychiatry, dentistry, with referral to higher centre were excluded from the study. Calculation of qSOFA score was done by vital signs and Glasgow Coma Scale for mental status. Patients receiving intravenous antibiotic in emergency department were presumed to have suspected infection. Appropriate statistical tests were used for analysis.*

Results: *550 patients were included in the study. 61.09% were men and 38.9% were women. qSOFA score was associated with mortality, ICU admission, length of hospital stay significantly. qSOFA score was associated significantly with mortality in both patients with and without infection.*

Conclusion: *qSOFA score may be an easy and quick tool to identify patients at risk of deterioration and need of utmost supervision. Further validation of qSOFA score in this regard in larger population may bring a ray of hope in prediction of prognosis in health resource constraint countries.*

Introduction

The Quick Sequential Organ Failure Assessment (qSOFA) score is derived and validated recently as a scoring system for patients with suspected sepsis. This score was calculated by assigning 1 point each for a respiratory rate greater than or equal to 22 breaths/min, systolic blood pressure less than or equal to 100 mm Hg, and any alteration in mental status. The total score was

then calculated by adding the individual scores for the 3 elements. qSOFA score was speculated in search of a scoring system to identify infection related life threatening multi organ dysfunction with low cost, rapidity, reliability, repeatability and validity. Utility of this novel score has been largely limited in use as a predictive score in patients with sepsis. But multi organ dysfunction due to various reasons is a common cause of mortality and morbidity in all emergency

department patients. In this study we tried to determine whether the qSOFA was predictive of poor outcomes in all ED patients both with and without suspected infection. The availability of a simple, generic tool that can be rapidly calculated in all ED patients, without the need for any laboratory or advanced testing, would be of great benefit to ED practitioners.

Materials and methods

Patients presenting to emergency department of Darbhanga Medical College, above thirteen years of age were included in the study in July 2016. Patients of psychiatry, dentistry and with referral to higher centre were excluded from the study. Systolic blood pressure, respiratory rate, pulse rate, temperature, Glasgow Coma Scale were recorded within two minutes of presentation in the department. Demographic data were recorded. Management of patients were done by separate group of doctors not related to the study. Patients getting antimicrobial agents in emergency department were considered as having suspected infection. qSOFA score was calculated for each patients. Score was ranged from 0 to 3. Patients were followed till discharge from hospital or death.

Assessment	Score
Systolic blood pressure(<100 mm of Hg)	1
Respiratory rate (>22/minute)	1
Altered mental status(GCS= <15)	1

The primary study outcome was in hospital mortality. Secondary outcomes were hospital admission, ICU admission, and total hospital length of stay from ED triage to discharge from the hospital. Appropriate statistical tests were used for data analysis. Chi square test was used to compare categorical variables, and t tests and ANOVA were used to compare continuous variables. All analyses were performed with SPSS (version 22.0).

Results

Total 550 patients presenting to the emergency department in Darbhanga Medical College in month of July in 2016 were included in the study.

Table1: Distribution of study population according to age group.

Age in years	Number of patients
<25	136(24.73%)
25-50	280(50.1%)
>50	134(24.36%)

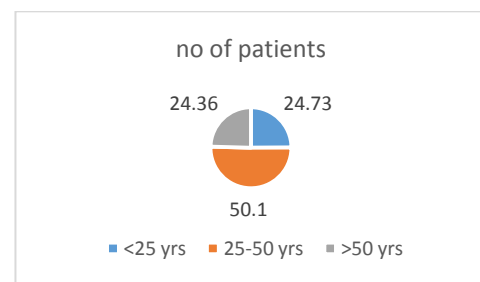


Figure 1

Table 2: Distribution according to sex

Sex	Number of patients
Male	336(61.09%)
female	214(38.9%)

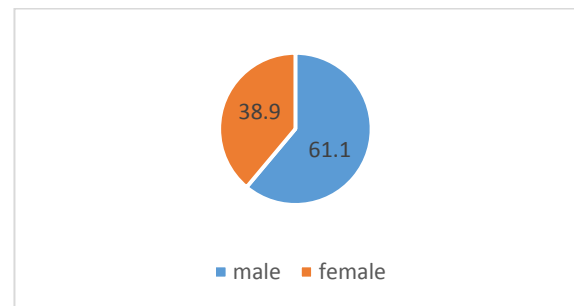


Figure 2

Table 3: Distribution of study population according to suspicion of infection

Provisional diagnosis	Number of patients
With suspected infection	178(32.36%)
Without suspected infection	372(67.63%)

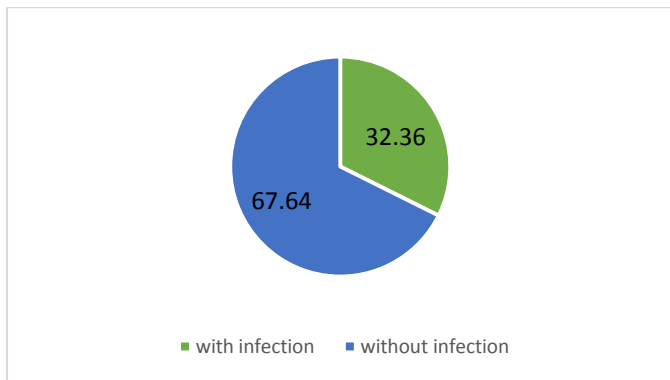


Figure 3

Table 4: Distribution according to qSOFA score

qSOFA score	With suspected infection	Without suspected infection	total
0	90	144	234
1	30	90	120
2	34	96	130
3	24	42	66

Table 5: Mortality in relation to qSOFA score

qSOFA score	Mortality	P value=<0.001 (significant)
0(n=234)	2(0.8%)	
1(n=120)	3(2.5%)	
2(n=130)	15(11.38%)	
3(n=66)	17(25.75%)	

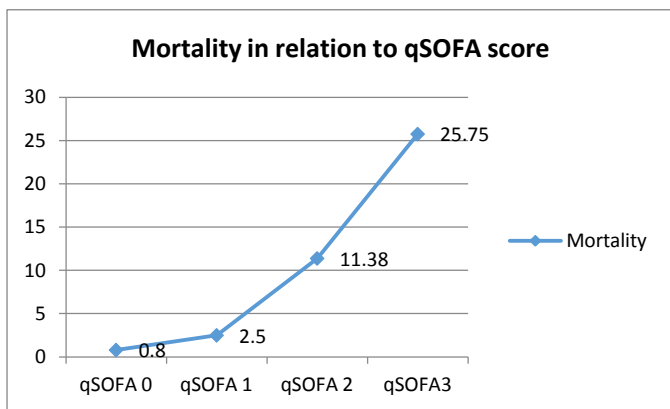


Figure 4

Table 6 Relation of mortality with qSOFA score in patients with suspected infection

qSOFA score	Mortality in patients with suspected infection	P value=<0.001 (significant)
0(n=90)	1(1.11%)	
1(n=30)	1(3.33%)	
2(n=34)	3(8.82%)	
3(n=24)	7(29.16%)	

Table 7: Relation of mortality with qSOFA score in patient without suspected infection

qSOFA score	Mortality in patients without suspected infection(n=372)	P value=<0.001 (significant)
0(n=144)	1(0.69%)	
1(n=90)	2(2.22%)	
2(n=96)	12(12.5%)	
3(n=42)	10(23.80%)	

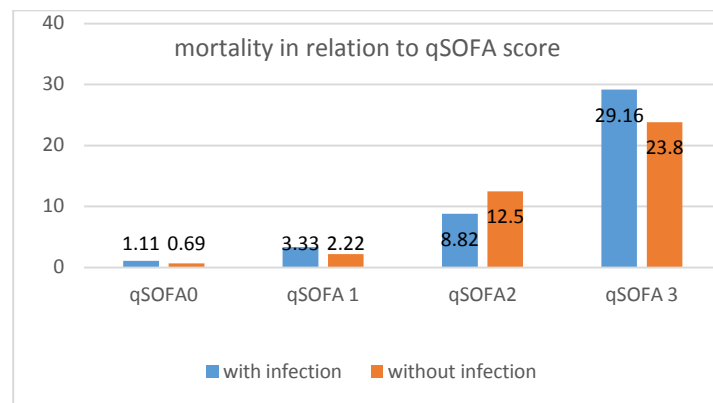


Figure 5

Table 8: ICU admission in relation to qSOFA score

qSOFA score	ICU admission	P value=<0.001 (significant)
0(n=234)	4(1.7%)	
1(n=120)	10(8.33%)	
2(n=130)	33(25.38%)	
3(n=66)	52(78.78%)	

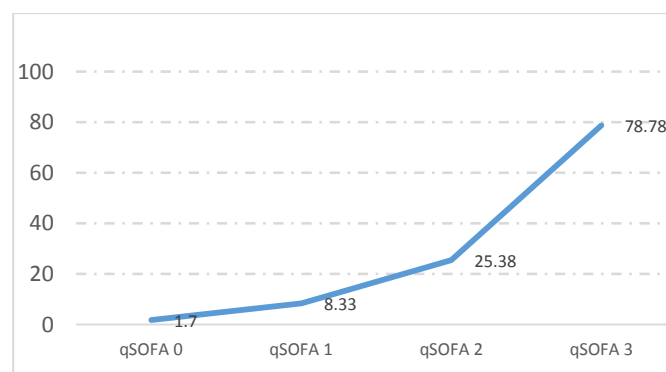


Figure 6: ICU admission in relation to qSOFA score

Table 4: Duration of hospital stay in survived patients

qSOFA score	Duration of hospital stay(Mean+/-SD)	P value=<0.001 (significant)
0	1.35+/-1.15	
1	2.66+/-1.34	
2	5.58+/-1.78	
3	7.57+/-1.71	

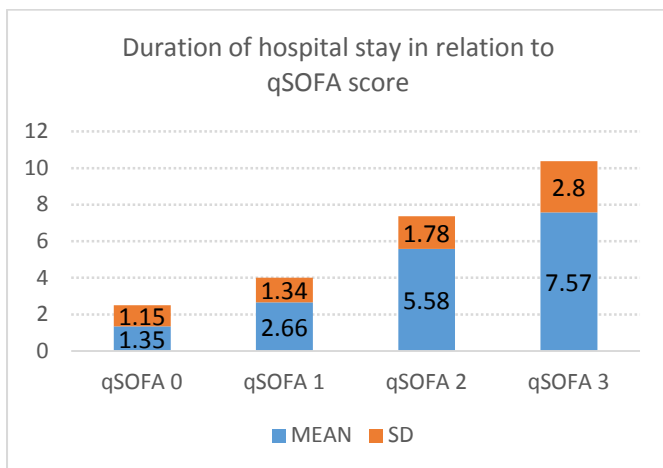


Figure 7

Discussion

Multi organ failure due to various reasons is a prominent cause of mortality and poor outcome in emergency department. In a busy emergency, a prognostic tool to identify the patients in maximum need of attention is of utmost need. Seymour et al. in their cohort of 148,907 patients with suspected infection validated qSOFA as a clinical prompt for sepsis. In their cohort of 148,907 patients with suspected infection, of whom 4% died, the predictive value for inpatient mortality among ICU encounters was 0.66 (95% CI 0.64 to 0.68). The predictive value among non ICU encounters was 0.81 (95% CI 0.80 to 0.82), It was statistically greater than for SOFA or systemic inflammatory response syndrome criteria. This report led to considerable debate in regard to the usefulness of qSOFA score. Initially qSOFA was limited as a validity tool only in patients with suspected infection. Adam J Singer, Jennifer Ng et al in their study in 2016 validated qSOFA score as a predictor of mortality in

patients presenting to emergency with and without suspected infection. They found qSOFA score to be significantly associated with all measured outcomes, including inpatient mortality, hospital admission, ICU admission, and overall hospital length of stay. In their cohort, the qSOFA score performed equally well in patients both with and without a suspected infection. They opined that qSOFA can potentially be used as a generic tool to predict clinically important outcomes for ED patients likely to be admitted regardless of whether infection is suspected. The advantage of the qSOFA score is its simplicity and lack of dependence on laboratory testing. A variety of clinical tools have been evaluated for their ability to predict outcomes, including mortality, in ED patients. In our study qSOFA score was associated with in hospital mortality, ICU admission, and hospital length of stay in patients both with and without suspected infection. qSOFA is an easy tool that can be used in the emergency department to predict outcomes. Further prospective validation of the qSOFA is required before widespread use.

Limitation

Our study has several limitation. Firstly age and sex modification for outcome assessment were not done. Sample size was small. Study duration was short so seasonal variation in outcome can't be excluded. Comparison with other well validated scores like SOFA, APACHEII was not done.

Conclusion

A number of clinical tools have been evaluated for prediction of outcome in emergency department patients. The advantage of qSOFA score is that it includes only three binary elements and does not require any calculator or reference table. It can be assessed by primary care givers even at peripheral centre and thus can be of utmost importance for allocation of health care system and referral in a health resource constraint country like us. qSOFA score was associated with mortality, ICU admission and hospital stay duration in patients

both with and without suspected infection. Further validation regarding its use in emergency department may confirm its utility as an easy and reliable tool for prediction of outcome.

Abbreviation: ICU: Intensive Care Unit; ED: Emergency Department

Conflict of interest: Nil

References

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