A Comparison of the Quick-SOFA and Systemic Inflammatory Response Syndrome Criteria for the Diagnosis of Sepsis and Prediction of Mortality

A Systematic Review and Meta-Analysis

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BACKGROUND: Several studies were published to validate the quick Sepsis-related Organ Failure Assessment (qSOFA), namely in comparison with the systemic inflammatory response syndrome (SIRS) criteria. We performed a systematic review and meta-analysis with the aim of comparing the qSOFA and SIRS in patients outside the ICU.

METHODS: We searched MEDLINE, CINahl, and the Web of Science database from February 23, 2016 until June 30, 2017 to identify full-text English-language studies published after the Sepsis-3 publication comparing the qSOFA and SIRS and their sensitivity or specificity in diagnosing sepsis, as well as hospital and ICU length of stay and hospital mortality. Data extraction from the selected studies followed the recommendations of the Meta-analyses of Observational Studies in Epidemiology group and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.

RESULTS: From 4,022 citations, 10 studies met the inclusion criteria. Pooling all the studies, a total of 229,480 patients were evaluated. The meta-analysis of sensitivity for the diagnosis of sepsis comparing the qSOFA and SIRS was in favor of SIRS (risk ratio [RR], 1.32; 95% CI, 0.40-2.24; P < .0001; I² = 100%). One study described the specificity for the diagnosis of infection comparing SIRS (84.4%; 95% CI, 76.2-90.6) with the qSOFA (97.3%; 95% CI < 92.1-99.4); the qSOFA demonstrated better specificity. The meta-analysis of the area under the receiver operating characteristic curve of six studies comparing the qSOFA and SIRS favored the qSOFA (RR, 0.03; 95% CI, 0.01-0.05; P = .002; I² = 48%) as a predictor of inhospital mortality.

CONCLUSIONS: The SIRS was significantly superior to the qSOFA for sepsis diagnosis, and the qSOFA was slightly better than the SIRS in predicting hospital mortality. The association of both criteria could provide a better model to initiate or escalate therapy in patients with sepsis.

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KEY WORDS: prediction of mortality; qSOFA; sepsis diagnosis; SIRS criteria

ABBREVIATIONS: AUROC = area under the receiver operating characteristic curve; LOS = length of stay; NOS = Newcastle-Ottawa scale; qSOFA = quick Sepsis-related Organ Failure Assessment; SIRS = systemic inflammatory response syndrome

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In February 2016, the new criteria for sepsis, called Sepsis-3 Third International Consensus Definitions for Sepsis and Septic Shock, were published,\textsuperscript{1} aiming to replace the previous criteria (Sepsis-1\textsuperscript{2} and Sepsis-2\textsuperscript{3}). The Sepsis-3 consensus definitions were developed by a task force appointed by the European Society of Intensive Care Medicine and the Society of Critical Care Medicine and were endorsed by more than 30 scientific societies. Nonetheless, they were severely criticized.\textsuperscript{4,5}

One of the major criticisms was the development and proposal of a new tool, the quick Sepsis-related Organ Failure Assessment (qSOFA), which was derived from large databases of North American patients. Additionally, there were concerns that the qSOFA may defer diagnosis and case recognition until infection-related organ dysfunction is clearly established.

The qSOFA uses three routinely available clinical parameters (systolic blood pressure, mental status, and respiratory rate) without the need for laboratory tests. Accordingly, a qSOFA $\geq 2$ identifies patients with suspected infection who have a higher risk of poor outcomes, namely, a prolonged ICU stay and death.\textsuperscript{6} The qSOFA was specifically designed to be used outside the ICU to enable clinicians to improve resource allocation by the identification of patients in need of further investigation, to initiate or escalate therapy if appropriate, and to consider further monitoring or transfer to an ICU.\textsuperscript{1} In the original study, its predictive ability of hospital mortality was higher than that of the SIRS criteria.\textsuperscript{1}

However, before wide implementation, there is a need to validate the qSOFA in different settings, as its ability to predict poor outcomes, mortality, and longer ICU stay could occur at the expense of a lower sensitivity for the diagnosis of the early stages of severe infections, with the consequent delay of diagnosis and a potential delay in the prescription of antibiotics.\textsuperscript{4,5,7,8}

Several studies were recently published to validate the qSOFA, namely by comparing it with the SIRS criteria, assessing its performance in the identification of patients with poor outcomes as well as for the diagnosis of sepsis.\textsuperscript{6,9,10} In the present study, we performed a systematic review of the literature and a meta-analysis to describe the performance of the qSOFA and compare it with the SIRS for the diagnosis of sepsis and its ability to predict hospital mortality.

**Methods**

**Data Sources and Study Selection**

We conducted a systematic review and meta-analysis of prospective observational studies following the recommendations of the Meta-analysis of Observational Studies in Epidemiology (MOOSE) group\textsuperscript{11} and according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.\textsuperscript{12} We searched MEDLINE, CINAHL, and the Web of Science databases during the period of February 23, 2016 to June 30, 2017 to identify full-text English-language studies published after the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)\textsuperscript{3} that described clinical criteria for sepsis. The most recent search was performed on July 10, 2017. Reference lists of retrieved articles and relevant review articles, as well as personal files were searched manually. Search terms included: “qsofa” OR “sofa” OR “sirs” OR “sequential organ failure assessment” OR “systemic inflammatory response syndrome” OR “sepsis/diagnosis.” We considered the following criteria for study inclusion: (1) full-length reports published in peer-reviewed journals, (2) prospective observational cohorts or clinical trials of adult ( $> 16$ years) patients, (3) data describing sepsis assessment using the qSOFA and SIRS criteria, and (4) the relationship between sepsis screening criteria and at least one of the following reported outcomes: sensitivity or specificity for the diagnosis of sepsis, hospital and ICU length of stay (LOS), death in the hospital, or any outcomes after hospital discharge. Articles were excluded (1) if they described data about only a specific population (patients with neutropenia, liver failure) and (2) if they were case studies or case series.

Three investigators (R. S., P. P., J. A. G.) performed the study selection process, including the initial search for the identification of references and the selection of potentially relevant titles for review of abstracts, including those chosen for review of the full-length reports. All selections were decided by consensus. This report was prospectively registered with the PROSPERO database of systematic reviews (CRD42017067645).

**Data Extraction and Study Quality Assessment**

Data extraction from the selected articles was independently performed by two authors (R. S., J. A. G.). The following data were recorded (when available): study characteristics (type of study, selection of patients, number of patients enrolled, criteria to diagnosis of infection, diagnosis of sepsis), patient characteristics (age, sex, setting in which patient was seen), and outcomes (organ dysfunction, mortality, ICU and hospital LOS).

To assess the methodological quality of the studies, we used the Newcastle-Ottawa Scale (NOS).\textsuperscript{13} The scale evaluates three aspects of study methods: the selection of study groups (range, 0-4), the comparability of groups (range, 0-2), and the quality of outcome ascertainment (range, 0-3). The total score ranges from 0 to 9, and an acceptable methodological design is reflected by a score of $> 5$. 
Analytical Approach

We evaluated patient characteristics, diagnosis of sepsis (sensitivity and specificity), and outcomes (predicted mortality, organ failure, ICU and hospital LOS) for patients according to the SIRS and qSOFA criteria. For continuous outcomes, we described the standard mean difference and 95% CI based on reported means or medians, respectively. We compared the performance of the SIRS and qSOFA for predicting mortality and sensitivity for the diagnosis of sepsis. The strength of the relationship between sepsis and mortality was expressed as the area under the receiver operating characteristic curve (AUROC) with 95% CIs. We selected the AUROC as a measure of effect for the outcome (death) to meta-analysis, since it is less prone to artificial inflation due to heterogeneity than the risk difference and, in addition, it was described in most studies. To perform the meta-analysis of sensitivity we had to estimate the CI. We calculated the SE of samples = √[(P × (1 − P))/N] (P = proportion of positive cases, N = total cases) and then we calculated the CI multiplying the value obtained by the normal distribution value for 95% CI found in statistical tables (SE × 1.96).¹⁴ We used the χ² test to describe the proportion of the total variation in the study estimates that is due to heterogeneity in the meta-analysis. We performed all analyses using Review Manager (RevMan), version 5.3 (Cochrane Collaboration).¹⁵

Results

Search Results and Description of Studies

The initial search identified 4,017 citations, and five additional studies were retrieved from the references of previously identified articles. Articles in duplicate were removed, and after careful evaluation of the abstracts, 35 articles were retrieved and reviewed in detail. Disagreements (n = 5) between the two evaluators were solved by further discussion and the attainment of a consensus. Finally, 10 studies met the inclusion criteria and were selected. Figure 1 depicts the flow diagram of the study search and selection process according to the PRISMA methodology.

Characteristics of the 10 studies selected are described in Table 1. Two studies evaluated patients at ICU admission, and the other eight studies evaluated patients

![Flow diagram of study inclusion](image-url)
<table>
<thead>
<tr>
<th>Study/Year</th>
<th>Patients evaluated, No.</th>
<th>Type of Patient Setting</th>
<th>Infection Criteria</th>
<th>Sensitivity for Diagnosis of Sepsis (%)</th>
<th>Specificity for Diagnosis of Sepsis (%)</th>
<th>Sensitivity for Mortality (%)</th>
<th>Specificity for Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April et al (<a href="#">2017</a>)</td>
<td>214</td>
<td>ED</td>
<td>Suspected infection, admitted to ICU</td>
<td>NA (SIRS ≥ 2)</td>
<td>NA (qSOFa ≥ 2)</td>
<td>97.4</td>
<td>89.7</td>
</tr>
<tr>
<td>Churpek et al (<a href="#">2017</a>)</td>
<td>30,677</td>
<td>ED and ward</td>
<td>Cultures collected and administration of antimicrobial agents</td>
<td>88.3 (SIRS ≥ 2)</td>
<td>38.2 (qSOFa ≥ 2)</td>
<td>93.8</td>
<td>68.7</td>
</tr>
<tr>
<td>Desott et al (<a href="#">2017</a>)</td>
<td>152</td>
<td>ED and prehospital</td>
<td>ICD-9</td>
<td>39.5 (SIRS ≥ 2)</td>
<td>16.3 (qSOFa ≥ 2)</td>
<td>93.4</td>
<td>97.3</td>
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<tr>
<td>Donnelly et al (<a href="#">2017</a>)</td>
<td>2,593</td>
<td>ED and ward</td>
<td>At least 2 criteria of SIRS, SOFA, or qSOFA</td>
<td>54 (SIRS ≥ 2)</td>
<td>12 (qSOFa ≥ 2)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Finkelstein et al (<a href="#">2017</a>)</td>
<td>152</td>
<td>ED and ward</td>
<td>Suspected infection and administration of antimicrobial agents</td>
<td>NA (SIRS ≥ 2)</td>
<td>NA (qSOFa ≥ 2)</td>
<td>93.4</td>
<td>90.0</td>
</tr>
<tr>
<td>Freund et al (<a href="#">2017</a>)</td>
<td>879</td>
<td>ED</td>
<td>Suspected infection, admitted to ICU</td>
<td>74.3 (SIRS ≥ 2)</td>
<td>24.8 (qSOFa ≥ 2)</td>
<td>93.4</td>
<td>70.3</td>
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<tr>
<td>Park et al (<a href="#">2017</a>)</td>
<td>1,009</td>
<td>ED</td>
<td>Suspected infection, cultures collected, and administration of antimicrobial agents</td>
<td>NA (SIRS ≥ 2)</td>
<td>NA (qSOFa ≥ 2)</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Rath et al (<a href="#">2017</a>)</td>
<td>184,875</td>
<td>ICU admission</td>
<td>Suspected infection, admitted to ICU</td>
<td>86.7 (SIRS ≥ 2)</td>
<td>54.4 (qSOFa ≥ 2)</td>
<td>19.9</td>
<td>22.8</td>
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<tr>
<td>Siddiqui et al (<a href="#">2017</a>)</td>
<td>58</td>
<td>ICU admission</td>
<td>Diagnostic of sepsis</td>
<td>62.1 (SIRS ≥ 2)</td>
<td>42.8 (qSOFa ≥ 2)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Williams et al (<a href="#">2017</a>)</td>
<td>8,871</td>
<td>ED</td>
<td>Suspected infection</td>
<td>47.1 (SIRS ≥ 2)</td>
<td>10.2 (qSOFa ≥ 2)</td>
<td>77.4</td>
<td>50.2</td>
</tr>
</tbody>
</table>

ICD-9 = International Classification of Diseases, ninth revision; NA = not available; qSOFA = quick Sepsis-related Organ Failure Assessment; SIRS = systemic inflammatory response syndrome; SOFA = Sequential Organ Failure Assessment.
in the ED (9,10,19-24) (Table 1). In the studies of Dorsett et al (9) and Williams et al (10), patients were younger (mean ± SD, 54 ± 20 years and median, 49 years; 95% CI, 30-69 years, respectively) in comparison with the other studies (mean ± SD, 63.98 ± 5.98 years).

Among the four studies that described the source of infection, the most common sites of infection were the respiratory tract (17,19,22) and the urinary tract. (23) The studies assumed different criteria to define infection in selected patients. Four studies considered clinically presumed or suspected infection, (10,17,19,20) one considered the suspicion of infection resulting in the administration of antimicrobial agents, (22) two considered the clinical suspicion that resulted in obtaining specimens for cultures and administration of antimicrobial agents, (21,23) one considered the diagnosis of sepsis at ICU admission, (18) one considered the presence of at least two criteria of the SIRS, SOFA, or qSOFA, (24) and, finally, one study considered International Classification of Diseases, ninth revision coding for infection (9) (Table 1).

Quality Assessment of Studies

All studies were observational. Only two studies were prospective, (10,19) and the remaining eight were retrospective. (9,17,18,20-24) Most studies were designed to evaluate the discriminatory ability of the qSOFA compared with SIRS criteria in predicting inhospital mortality. (9,10,17,19-24) Seven studies described the sensitivity of the qSOFA and SIRS criteria for the diagnosis of sepsis, (10,17-21,23,24) and one also evaluated the specificity. (9) The selected studies were well designed, and the NOS quality assessment demonstrates a low risk of bias in most of them (25) (Table 2). The funnel plot of included studies in the meta-analysis suggested a low publication bias (Figs 2, 3).

Main Clinical Outcomes

Inhospital mortality and sensitivity for the diagnosis of sepsis by the qSOFA and SIRS criteria were the most frequently reported outcomes (Table 1). Pooling all the studies, a total of 229,480 patients were evaluated. However, a single study was responsible for enrolling 184,875 patients (80.6%). (17) The meta-analysis of the AUROC of seven studies comparing the qSOFA and SIRS score was in favor of qSOFA (risk ratio [RR], 0.03; 95% CI, 0.02-0.05; P = .002; F = 48%) as a predictor of inhospital mortality (10,17,19-23) (Fig 4). As expected, the meta-analysis of the sensitivity of the diagnosis of sepsis comparing the qSOFA and SIRS criteria was in favor of the SIRS criteria (RR, 1.32; 95% CI, 0.40-2.24; P < .0001; F = 100%) (Fig 5). Only one study described the specificity for the diagnosis of infection comparing the SIRS (84.4%; 95% CI, 76.2-90.6) with the qSOFA (97.3%; 95% CI, 92.1-99.4) (9) and demonstrated a better specificity with the qSOFA.

Ventilator-free days using the qSOFA (AUROC, 0.64; 95% CI, 0.56-0.71) were not different from those using the SIRS criteria (AUROC, 0.57; 95% CI, 0.48-0.65; P = .19). (22)

Long-term mortality was described in two studies. Donnelly et al (24) described a higher 1-year mortality for patients who met the qSOFA criteria than for those who met the SIRS criteria (RR, 29.4; 95% CI, 22.3-38.7 vs 14.7; 95% CI, 12.5-17.2). In contrast, Williams et al (10) described a significantly higher mortality for those who met the qSOFA criteria at 30 days (difference, 3.6%; 95% CI, 0.8%-6.4%) but not at 1 year (difference, −2.6%; 95% CI, −6.8% to 1.5%).

Discussion

Our meta-analysis identified 10 clinical studies (two prospective and eight retrospective), including > 200,000 patients seen in the ED or up until the first 24 hours of ICU admission. We evaluated qSOFA vs SIRS performance in the diagnosis of sepsis and inhospital mortality prediction. We found that although the qSOFA is slightly better for the prediction of mortality, the SIRS is more sensitive for the diagnosis of sepsis, and in the single study that evaluated specificity of sepsis, the qSOFA performed better.

Since the publication of the new Sepsis-3 criteria, there has been a vast debate about the methods used to set up the new criteria and their potential negative impact in clinical practice. As a gold standard for the diagnosis of sepsis is not available, we still rely on the intersection of three groups of clinical and laboratory data, namely, general systemic manifestations (eg, fever, tachycardia, leukocytosis, elevated C-reactive protein or procalcitonin level), manifestations of organ dysfunction/failure, and, finally, microbiological documentation.

The new sepsis definition is clearly centered on organ dysfunction, and for that purpose the Sepsis-3 task force designed a new tool, the qSOFA (respiratory rate > 22/min, systolic blood pressure < 100 mm Hg, altered mentation). However, in the original Sepsis-3 study, the prediction of inhospital mortality in the validation cohort (non-ICU encounters, N = 66,522)
<table>
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<tr>
<th>Study/Year</th>
<th>Representativeness of the Exposed Cohort&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Selection of the Nonexposed Cohort&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Ascertainment of Exposure&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Demonstration That Outcome of Interest Was Not Present at Start of Study&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Comparability of Cohorts on the Basis of the Design or Analysis&lt;sup&gt;e&lt;/sup&gt;</th>
<th>Assessment of Outcome&lt;sup&gt;f&lt;/sup&gt;</th>
<th>Was Follow-Up Long Enough for Outcomes to Occur&lt;sup&gt;g&lt;/sup&gt;</th>
<th>Adequacy of Follow-up of Cohorts&lt;sup&gt;h&lt;/sup&gt;</th>
<th>No. of stars [NOS]&lt;sup&gt;i&lt;/sup&gt;</th>
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<td>Aprili et al&lt;sup&gt;j&lt;/sup&gt;/2017</td>
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<td>Churpek et al&lt;sup&gt;j&lt;/sup&gt;/2017</td>
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<td>Dorsett et al&lt;sup&gt;j&lt;/sup&gt;/2017</td>
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<sup>a</sup>To be considered representative, a cohort should include medical and surgical patients consecutively admitted to the ICU and not a specific population.

<sup>b</sup>Selection of a nonexposed cohort should be drawn from the same community as the exposed cohort.

<sup>c</sup>Data should be extracted from a secure record or structured interview.

<sup>d</sup>It should be demonstrated that the outcome of interest was not present at the start of the study and pre-existing cognitive or psychological function were assessed.

<sup>e</sup>Either exposed or nonexposed individuals must be matched in the design or confounders must be adjusted for in the analysis, or both. A maximum of two stars was allotted in this category if confounders were adjusted for more than one outcome.

<sup>f</sup>Patients should be followed until hospital discharge or death.
early identification of non-ICU patients, we would have guessed that almost all patients with septic shock would also satisfy the qSOFA criteria (≥ 2 points). However, that was not the case; in a recent study, the authors clearly showed that only 63.5% of the 200 Sepsis-3 septic shock patients presented with a qSOFA score ≥ 2. This means that almost one in every three patients with Sepsis-3 septic shock did not meet the qSOFA criteria.

In our meta-analysis, the sensitivity of the diagnosis of sepsis was consistently in favor of the SIRS criteria (Fig 5). The previous sepsis definitions of Sepsis-1 and Sepsis-2 were proposed by expert consensus and essentially focused on the identification of the presence of general systemic manifestations followed by a severity stratification, severe sepsis (organ dysfunction, hypotension or hypoperfusion, or both) and septic shock (hypotension despite adequate fluid resuscitation). Also, with all the criticisms of it being too sensitive and poorly specific, the SIRS by itself was able to identify seven of eight patients with sepsis and organ dysfunction and 91% of patients with septic shock. In another study of 108 patients admitted to the ED with severe sepsis, a qSOFA score ≥ 2 was able to identify only 15.4% of patients compared with 65.4% for a SIRS score ≥ 2.

The lower sensitivity of the qSOFA in the diagnosis of sepsis raises concerns regarding potential delays in sepsis identification and treatment. It is well known that septic patients could deteriorate markedly in the first hours after hospital admission, and organ failure can be initially absent. Indeed, the best performance of the qSOFA was observed in the studies that included patients seen at ICU admission (Table 1). In one study assessing patients with community-acquired sepsis (N = 897), at the time of hospital admission, only 8.6% presented with Sepsis-2 septic shock, but this figure rises almost six times to 51% at the time of ICU admission. In addition, more than one-third of patients with septic shock at ICU admission did not present with any cardiovascular dysfunction at the time of hospital admission. In another study designed to assess the risk factors associated with the development of septic shock between 4 and 48 hours of ED arrival, it was found that among the Sepsis-2 septic shock patients (N = 161), only 31% were diagnosed within 4 hours of ED arrival.

These data reinforce the importance of a good and sensitive screening tool for septic patients, ideally before the appearance of organ dysfunction/failure. In the
The present study, the SIRS criteria performed significantly better than the qSOFA for the diagnosis of sepsis (Fig 3). This difference is a potential marker of the clinical impact of SIRS, since it seems to be able to correctly identify one-third more patients with sepsis than does the qSOFA, probably at the expense of lesser specificity.

Nevertheless, the qSOFA was superior to the SIRS for inhospital mortality prediction and perhaps, as demonstrated in a single study, has better specificity for the diagnosis of sepsis. Thus, it seems that the qSOFA is identifying a sicker population, and maybe a two-step approach with a highly sensitive screening tool for the diagnosis (SIRS) and a better predictor of outcome for resource allocation (qSOFA) could be tested.

The high sensitivity of the SIRS also has drawbacks, as the potential overdiagnosis of sepsis could lead to inappropriate use and overuse of antibiotics with the consequent potential increase in multiresistance, toxicity, and costs.

The present study has some limitations. First, studies assessed different samples sizes and considered different criteria for the diagnosis of infection, which may have been responsible for the observed heterogeneity in this meta-analysis, as reflected by the I² statistic. Second, none of the included studies used the alternative definitions to prospectively identify the cases, which could have contributed to a lower sensitivity of the SIRS and qSOFA. Third, most studies were primarily designed to describe the predicted mortality of the SIRS and qSOFA criteria and not their diagnostic accuracy, so data about predictive values could not be calculated. The CI of sensitivity in the diagnosis of sepsis had to be estimated to obtain the forest plot, making its interpretation tricky. Fourth, the assessment of publication bias through the funnel plot analysis was impaired due to different samples sizes and the small number of studies included; as a result, the power of the test is too low to distinguish chance from real asymmetry. Fifth, we did not conduct a gray literature search, which might contribute to an overestimation of size effect in small trials. Finally, since data on LOS, costs, or long-term outcomes were not available in the current literature, this relevant aspect of sepsis outcomes could not be evaluated.

![Figure 4](image-url) - Forest plot of mortality. Effects measure = risk ratio; analysis model = random effects; statistical method = I² heterogeneity. The "diamond" at the bottom represents the 95% CI. IV = initialization vector; qSOFA = quick Sepsis-related Organ Failure Assessment; SIRS = systemic inflammatory response syndrome; Std = standard.

![Figure 5](image-url) - Forest plot of sensitivity for diagnosis of sepsis. Effects measure = risk ratio; analysis model = random effects; statistical method = I² heterogeneity. The "diamond" at the bottom represents the 95% CI. See Figure 4 legend for expansion of abbreviations.
The present study does have several strengths. As far as we are aware, this is the first meta-analysis comparing the qSOFA vs the SIRS. Our meta-analyses used data from good-quality studies with a large sample size. In addition, the main results are concordant with the importance of early identification as well as the achievement of better results if treatment is started promptly, even in patients with less severe sepsis. This can provide substrate for future reviews of current guidelines.

Conclusions

The SIRS was more sensitive and significantly superior to the qSOFA for sepsis diagnosis, and the qSOFA was better than the SIRS for prediction of inhospital mortality. Considering the present results, future studies should focus on the prospective evaluation of more homogeneous methodologies comparing both criteria as a part of the decision-making process for clinicians caring for septic patients.

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