**Introduction**

Trauma, defined as the clinical entity composed of both physical injury and the body's associated response, is a global health problem both in regards of mortality and morbidity. 2017 accounted for 8% of total global deaths and for 13% of all Disease Adjusted Life Years (DALY) lost [@GBD2017DALY]. (The total number of injuries of all kinds is estimated to be at least 520 million per year. [4]) According to calculations done by Mock et al. [5] 90% of all deaths due to trauma were in low and middle income countries which also had a fatality rate 60-80% higher then that of high income countries and an improvement in trauma care globally to the level of that in high income countries could save about 1.7 lives annually, or about one third of the global deaths due to trauma. [5]. It is also known that trauma care requires early intervention, often surgical, as by “The golden hour” concept and that most deaths occur early after the accident [6]. It is therefore important to be able to characterize the severity of the condition rapidly and thus be able to prioritize resources on the patients most affected, especially regarding trauma patients in low resource settings.

For patients with severe infections the Sequential Organ Failure Assessment score (SOFA score) has been developed to grade the level of organ dysfunction as a result of the infection. Alongside the SOFA score the quick Sequential Organ Failure Assessment score (qSOFA score) has been developed as a screening tool able to be performed bedside to identify patients with high-risk of organ dysfunction. The qSOFA score contains three parameters: systolic blood pressure(SBP) below 100 mm Hg, a respiratory rate above 22/min and an altered consciousness, measured with a Glasgow Coma Scale(GCS) score below 15. One point is awarded for each parameter yielding a total score of 0-3. [7][8] The qSOFA score has also been shown to be able to predict mortality when used both in prehospital care[2] and used as a repeated evaluation during hospitalization.[1] Another tool to asses the severity of a patients condition due to trauma is the Triage Revised Trauma Score (T-RTS) composed of the same parameters as qSOFA, GCS, SBP and RR but with a score of 0-4 for each parameter adding up to a total of 0-12.[10] However there are some articles raising concerns about the sensitivity of the T-RTS depending on the type of injury. [3][11]

It should be noted that the majority of the research done on this topic has been performed in high income countries and it is thus not clear if the results are also applicable in low resource settings, which stand to benefit the most of a scoring system to be able to prioritize the limited resources at hand.

**Aim**

The aim of this article is to evaluate the predictive accuracy of qSOFA on trauma patients in rural India, and if needed adjust the relative importance of its ingoing parameters. A retrospective analysis of the data in the TITOC cohort was performed and the primary outcome of the study was admission to the ICU during hospitalization.

**Method**

**Source of data**

For this paper a retrospective analysis of the observational Towards Improved Trauma Care Outcomes in India (TITCO) cohort was performed [12]. The data for TITCO was collected during July 2013 to December 2015 and contains patients admitted to four public university hospitals. The hospitals included were; Jai Prakash Narayan Apex Trauma Center (JPNATC), connected to the All India Institute of Medical Sciences in New Delhi, a large center solely dedicated to trauma care; King Edward Memorial hospital (KEM) in Mumbai, a tertiary level hospital but without dedicated trauma wards; Lokmanya Tilak Municipal General Hospital (LTMGH) in Mumbai, a tertiary lever public university hospital with a smaller dedicated trauma ward; and Seth Sukhlal Karnani Memorial Hospital (SSKM) in Kolkata, connected to The Institute of Post-Graduate Medical Education and Research, a tertiary level public university hospital without a ward dedicated solely to trauma.

**Participants**

The TITCO cohort include patients with a history of trauma who either got admitted to one of the participating hospitals or who died between arrival and admission. Patients with isolated injuries to limbs and that therefore were treated by orthopedics and not within the general trauma care were excluded from the database as well as patients who were dead on arrival.

**Outcome**

The primary outcome of interest was admission to the ICU during hospitalization.

**Predictors**

For each patient included in the study the qSOFA score was calculated using data recorded on arrival to the hospital. The calculation of the qSOFA score includes a respiratory rate above 22, GCS below 15 and a systolic blood pressure below 100 where one point is awarded for meeting each of the specified criterias and thus yields a score of 0 to 3.

**Sample size**

We included all eligible patients in the TITCO cohort.

**Missing data**

In this article we used complete-case analysis and only used data points where GCS, NBP and RR where reported.

**Statistical analysis methods**

We used R for all statistical analysis [RStudio]. We describe the sample characteristics using counts and percentages for qualitative variables and medians and interquartile ranges (IQR) for quantitative variables. The study sample was randomly split into training, validation, and test samples with 60%, 20%, and 20% of the observations in each sample respectively. We used the training sample to update qSOFA by reestimating the coefficients of the original predictors using logistic regression. We used the validation sample to identify optimal cutoffs - those who maximised the Youden index - for the original and updated qSOFA. We used the test sample to assess and compare the performance of the two models. Bootstrapping was used to estimate 95% confidence intervals associated with point estimates.

**Ethical considerations**

This study was performed on the open and anonymized TITOC observational cohort dataset. Ethics committees at all participating centers approved the gathering of data and all participants were given a waiver of consent for participation. (Lokmanya Tilak Municipal General Hospital, IEC/11/13; King Edward Memorial Hospital, IEC(I)/OUT/222/14; Seth Sukhlal Karnani Memorial Hospital, IEC/279; All‐India Institute of Medical Sciences, IEC/NP‐279/2013 RP‐01/2013).

Since the data was collected before the conception of this study and that the TITOC cohort was purely observational and all patients received the best care available regardless of participation or not inclusion can be said to be a free choice for the participants. No participant can be said to have been harmed by the study because of its purely observational nature and the dataset is of the size needed to be able to draw conclusions. The participants were often of low socioeconomical status and the study of this arguably vulnerable population is justified in that the gain of knowledge in turn benefit the same population going forward.

It can also be said that the resources needed to perform this study is small since no new data need to be gathered and thus the benefit of improved trauma care and health for trauma patients in low resource settings is sufficient to merit this project.

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**TIDSPLAN (GANTT-DIAGRAM) FÖR EXAMENSARBETET**