CONTRIBUTION OF LEVEL 1 TRAUMA CENTRE

ON PROBABILITY OF SURVIVAL (AI)

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Background

While South Africa has a number of hospitals with specialised trauma capabilities, only two hospitals are accredited level-1 trauma centres as defined by the Trauma Society of South Africa (TSSA). No study has yet been conducted in which the impact of a trauma centre on the probability of survival for trauma injuries is measured in the South African context.

Methods

A forward stepwise multivariate linear regression and the Trauma and Injury Severity Score (TRISS) methodology were used to isolate the impact of level-1 trauma centres and evaluate their care. In order to verify the statistical significance for each hospital a Z statistic was calculated. The Z statistic is an outcome comparison between the two subsets namely the number of survivors versus the predicted number of survivors.

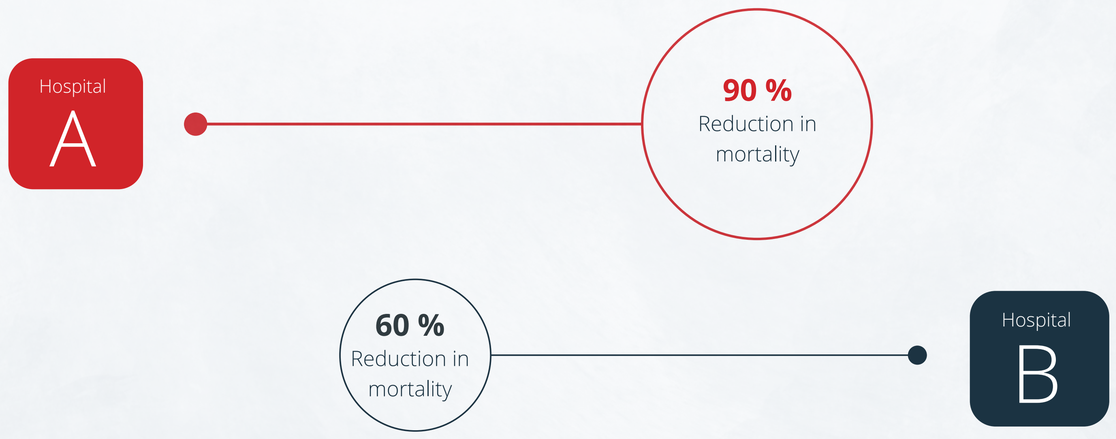
Ethical Considerations

AI exercise is carried out on a completely de identified anonymized data base Medibank.
Internal Ethics committee permission granted.

Outcomes

Relevant variables broadly included the injury to arrival time, various injury severity indicators (ISS, Glasgow Coma Scale (GCS), New Injury Severity Score (NISS)), TRISS probability of survival and the presence of level-1 trauma care. Relevant to our analysis, the presence of a level-1 trauma unit at a hospital was found to have a statistically significant impact on the probability of survival, all else equal.

For Hospital A on its own, mortality rates were reduced by 0.91 % which is approximately a 90 % reduction in mortality rates. For Hospital B on its own, mortality rates were reduced by 0.61 % which is approximately a 60 % reduction in mortality rates.



This indicates that ceteris paribus an individual with trauma-related injuries will have a significantly higher probability of survival at one of the accredited level-1 trauma centres as opposed to the other 38 emergency departments in the sample. For Hospital A the probability of survival using the TRISS methodology is approximately 64.3 % (i.e. 28.6 % more than the MTOS average) while for Hospital B the corresponding probability of survival is approximately 80.65 % (i.e. 61.3 % more than the MTOS average). The primary reason for this contradiction is the difference in the time taken from injury to arrival at the hospital as Hospital A receives far more patients from long distances than Hospital B.

Both the stepwise regression exercise and the statistical significance test of actual and expected mortality rates using the TRISS methodology indicated that the presence of a level-1 trauma centre materially increases the probability of survival of a high priority patient with a trauma injury. While the exact impact of Hospital A and B are not clear, evidence suggests that it exceeds the widely accepted 50 % standard established by the Major Trauma Outcomes Study (MTOS). These findings provide valuable insight to the broader South African trauma community and embed South Africa in the international discourse on trauma care.

AI is being used in healthcare to improve wellness, detection, administration and diagnosis - among many other things