DEVELOPMENT OF A DECISION SUPPORT SYSTEM FOR EARLY DETECTION OF SEPSIS

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Background: Sepsis is one of the leading causes of mortality outside of the ICU setting. (Bone et al, 1992). Despite this, it remains one of the most difficult patient conditions to classify and diagnose quickly. This results in many clinicians, with limited sepsis experience, not recognising the signs in time (Robson et al, 2007).

Aim: To develop a decision support system that may predict sepsis prior to the onset of obvious symptoms.

Methods: A literature review showed that numerous studies have attempted to address this issue with various classification tools and methods. Many of these were specific, difficult to acquire, or required invasive data points as inputs.

Based on this, an artificial neural network (ANN) was developed using a total of 34 inputs over an 8 hour period to classify a patient's likelihood of sepsis. The inputs used are easily and routinely obtained by any nurse and do not require further specialist training.

The completed ANN was then programmed into a mobile application (SepsisNet), allowing clinicians to input patient data and obtain a sepsis risk percentage score. The app. functionality was evaluated using a questionnaire based on that used by Lewis (1995).

Results: Overall, the test case for the ANN had an accuracy of 85.2%, with 14.8% being incorrectly classified.

Fifteen (15) / twenty (20) completed questionnaires were returned. All praised the objective of the app., and four (4) said they would use a similar app. in their daily practice.

Difficulties experienced were the need for an 8 hour window, and the need to input all data points at once. Four (4) also said that using a mobile device slowed their workflow too much.

Discussion: Results from this project prove that an ANN can be developed to recognise sepsis using basic inputs.

Further works are planned, including investigating other data points' efficacy, whether the ANN can be optimised using genetic algorithms, and the scope for automating and integrating this data collection with an EHR via HL7 messaging.

References:

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