

An assessment of knowledge and education about sepsis among medical students: a multi-university survey

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Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection; it affects 55 000 Australians and results in around 8700 deaths annually.¹

Studies have shown that junior doctors have reduced awareness of the importance of sepsis as a time-critical illness.² Whether this deficiency is a consequence of insufficient training on sepsis in medical schools is unknown. This study evaluated the knowledge of sepsis among medical students in two Australian universities.

Two medical schools in Queensland were approached for the study and ethics approval was obtained (HREC 2019.14.292, 2019002038). Participants were medical students, both undergraduate and graduate entry; students from all years were eligible to participate.

The online survey was distributed using the SurveyMonkey tool (www.surveymonkey.com). It included a pool of 16 questions pertaining to student demographic characteristics, sepsis education format, sepsis definitions, epidemiology, recognition of symptoms, treatment and appropriate time frames, common pathogens and long term outcomes in both the adult and paediatric populations (Online Appendix). Answers were corroborated by a panel based on current literature and published epidemiological data. Weekly reminders were posted on student forums. The survey was open for a period of 8 weeks.

Students' responses are reported descriptively using percentages for categorical data and mean and standard deviation for continuous variables. Associations between categorical variables were assessed by a formal Pearson χ^2 test. Univariable and multivariable linear regression models were fitted to evaluate the association between knowledge score and pre-defined covariates (type of teaching, year, students' prior awareness of sepsis, graduate or undergraduate course and university).

We invited 1744 students to participate and 549 students (31.5%) responded to the survey (university A, 49.6%; university B, 22.1%). Most students had completed a prior degree (62.5%).

Over half of the respondents had heard of sepsis before medical school, with a higher proportion among graduate compared with undergraduate students (64.3 % *v* 38%;

P < 0.001) and 100% had heard of sepsis by their final medical year.

Most respondents (349/549, 63.6%) reported receiving formal education on sepsis (86% from university A *v* 44% from university B; *P* < 0.001), predominantly through didactic lectures (60.3%). Other modes included case-based (30.1%) and self-directed learning (9.5%).

Scores ranged from 0 to 8 with a mean score of 3.5. Graduate medical students had a higher mean score (3.6/8.0) compared with undergraduate students (3.3/8.0), and final year students scored higher than first year ones (48.2% [3.9/8.0] *v* 39.1% [3.1/8.0]; *P* = 0.017). The current correct definitions of sepsis and septic shock were identified by 27% and 30% of the students respectively. The following proportions of students reported correct answers for the various sections — epidemiology 43%, symptomatology 89%, timing of antibiotics 46%, bacterial pathogens in paediatric sepsis 40%, late signs of sepsis 62%, and long term sequelae 50%.

On multivariate analysis, year 4 and 5 students had significantly higher percentage differences in scores (8.9 [95% CI, 2.8–15.0; *P* = 0.004] *v* 9.4 [95% CI, 1.7–17.1; *P* = 0.017] respectively) compared with year 1 students. Sepsis definition was correctly identified by a higher proportion of students from university B (*P* = 0.016).

Thus, while students had an overall awareness of sepsis, less than one-third knew the precise definitions of sepsis and septic shock. Less than half of students were aware of the importance of timely interventions and the national burden of sepsis.

One of the recommendations of the World Health Organization was to educate health care workers about the importance of sepsis as a time-critical medical emergency.³ Junior doctors are frequently the first doctor to be called to review septic patients. Our findings are in line with the literature reporting poor ability to recognise sepsis among interns.⁴

This is the first study to explore medical students' knowledge about sepsis, an important public health problem. However, this study was conducted on a relatively small subset of the population of medical students. There

may have been some opt-in bias in the questions and responses, limiting generalisability. We did not evaluate the current curriculum content on sepsis delivered by the medical schools and, hence, were unable to determine whether the low scores related to knowledge deficiency or lack of an updated medical school curriculum incorporating the most recent definitions on sepsis.

In conclusion, our study from two Australian universities reports the majority of medical students are underprepared in relation to the recognition and management of septic patients. Study replication at other universities is warranted to investigate the potential for knowledge deficits nationally. Our data suggest the need for a standardised curriculum with dedicated sepsis education.

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Competing interests

Balasubramanian Venkatesh is the Chair of the Queensland Statewide Sepsis Steering Committee.

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