BET 2: POOR EVIDENCE ON WHETHER TEACHING COGNITIVE DEBIASING, OR COGNITIVE FORCING STRATEGIES, LEAD TO A REDUCTION IN ERRORS ATTRIBUTABLE TO COGNITION IN EMERGENCY MEDICINE STUDENTS OR DOCTORS

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ABSTRACT

A short review was carried out to see if teaching cognitive forcing strategies reduces cognitive error in the practice of emergency medicine. Two relevant papers were found using the described search strategy. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these papers are tabulated. There is currently little evidence that teaching cognitive forcing strategies reduces cognitive error in the practice of emergency medicine.

THREE PART QUESTION

In (emergency medicine physicians or students) does (teaching cognitive debiasing, cognitive forcing strategies or metacognition) lead to (a reduction in error attributable to cognition)?

CLINICAL RELEVANCE

Very few environments rival the complexity, unpredictability, acuity, time pressures and decision density of the ED.[1 2] Unsurprisingly, it has been described as a natural laboratory for human error.[3] Despite the skills of the emergency physician in making decisions, an unacceptable number of decisions made in the process of medical diagnoses are wrong with error or diagnostic failure rate estimated to occur in 10%–15% of decisions in the ED.[4] Expert opinions within emergency medicine have highlighted the role of cognitive debiasing strategies[5] and cognitive forcing strategies[6] to decrease the error attributable to cognition.

Table 2 Relevant papers for BET 2

Author, date & country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Sherbino *et al*, 2011, Canada[9]	Fifty-six final-year medical students on emergency medicine at a single university. Each attended a 90 min seminar on cognitive forcing. Students were then tested on four scenarios similar (near group) or dissimilar (far group) to educational cases they had reviewed, two of which had a subtle second diagnosis to detect and two did not. Forty-seven students were tested immediately; 9 students were tested after 2 weeks	Level 4 Non-randomised experimental study	Proportion of students identifying a subtle second diagnosis (absence of search satisfaction)	64% and 55% of students looked for a second diagnosis in the near and far transfer groups, respectively, after immediate testing (p=0.129)	Small sample No randomisation, unequal group sizes and very few students in the delayed testing group. Novice clinicians. No control group. Poor reference standards. Artificial study setting with challenge of transfer to clinical setting.
			Proportion of students correctly identifying a less likely explanation for findings (absence of availability bias)	30% and 17% of students identified the correct uncommon diagnosis in the near and far transfer groups, respectively, after immediate testing (p=0.24)	
			Absence of search satisfaction bias and availability bias on delayed testing after 2 weeks	Only 22% and 11% of students looked for a second diagnosis in the near and far groups, respectively, (p<0.05 vs immediate testing). 0% and 11% identified the correct uncommon diagnosis in each group (p<0.05 vs immediate testing)	
			Prevalence of false positive diagnoses in cases where there was no second diagnosis	53% (near group) and 32% (far group)	
Sherbino *et al*, 2014, Canada[8]	One hundred and ninety-one final-year medical students on emergency medicine. One hundred and forty-five attended a 90 min seminar on cognitive forcing (intervention group) and 46 did not (controls). Tested on six scenarios after 3 weeks.	Non-randomised controlled trial	Proportion of students identifying a subtle second diagnosis (absence of search satisfaction)	52% and 48% of students looked for a second diagnosis in the intervention and control groups, respectively (p=0.13)	Smaller control group. No randomisation. Novice clinicians. Potential contamination between groups. Single 90 min teaching intervention with remote testing interval (3 weeks). Artificial study setting with challenge of transfer to clinical setting.
			Proportion of students correctly identifying the less common explanation for the findings (absence of availability bias)	45% in both the intervention and control groups identified the correct uncommon diagnosis (p=0.98)	
			Proportion of students wrongly identifying a second diagnosis (false positives)	64.5% in the intervention group vs 76.7% in the control group (p=0.12)	

The need to take all available steps to prevent error and harm from occurring has been highlighted as a moral and professional obligation in order to honour the ethical principles of beneficence, non-maleficence, fairness and justice.[7]

SEARCH STRATEGY

PubMed (inc. Medline), search strategy A=106

Embase 1974–2016 via Ovid interface, search strategy A=289

Cochrane Library, search strategy B=220

Search terms

(1) Emergency, (2) Error, (3) Cognitive and (4) Metacognition

Search strategy using search terms above

A. (1) (All text) AND (2) (All text) AND (3) (All text) OR (4) (All text)
B. (1) (Abstract, Keywords, Titles) AND (2) (Abstract, Keywords, Titles) AND (3) (Abstract, Keywords, Titles) OR (4) (Abstract, Keywords, Titles)

SEARCH OUTCOME

Six hundred and fifteen papers were returned, of which 2 were relevant.[8 9] These are displayed in table 2.

COMMENT(S)

There is currently little evidence that teaching cognitive forcing strategies reduces cognitive error in the practice of emergency medicine. The evidence that is available is subject to important limitations. That evidence suggests that the delivery of a single 90 min teaching intervention to medical students has no effect on search satisfaction bias, availability bias or the prevalence of false positive diagnoses on testing after 3 weeks.

No evidence is currently available on the impact of teaching cognitive debiasing, metacognition or cognitive forcing strategies on error attributable to cognition in postgraduate learners of any grade practising in emergency medicine.

FUTURE RESEARCH

There is a clear need for further research into cognitive debiasing and cognitive forcing strategies and their role in the reduction of cognitive errors made within the ED. There has been insufficient progress in systematically evaluating and implementing proposed strategies.[7] It is an ethical imperative to act on the expanding body of expert opinion; continued refinement of this area should be considered integral to medical education and be seen not only as a research priority but also a moral and professional duty.[7]

Clinical bottom line

Despite multiple expert opinions on the role of teaching and implementing training on cognitive debiasing, metacognition or cognitive forcing strategies to reduce error attributable to cognition in the ED, no study evidence can be drawn to support this statement at present.

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BET 2: Poor evidence on whether teaching cognitive debiasing, or cognitive forcing strategies, lead to a reduction in errors attributable to cognition in emergency medicine students or doctors

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