



A Survey Showing the Need to Incorporate the Teaching of Critical Appraisal Skills in the Undergraduate Medical Curriculum

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Authors' contributions

This work was carried out in collaboration between both authors. Author SJ designed the study, wrote the protocol and wrote the first draft of the manuscript. Author HLA managed the literature searches and analyses of the study performed. Both authors read and approved the final manuscript.

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ABSTRACT

Aim: Evidence based medicine (EBM) not only increases knowledge but forms the foundations upon which decision making processes are used in medicine. This requires well-conducted research and the ability for doctors to critically appraise literature. The aim of this survey was to gain an insight into the understanding of critical appraisal amongst medical student and trainees, with particular emphasis on the teaching aspect of these skills in the undergraduate curriculum.

Methods: Online questionnaires were distributed within the West Midlands Deanery to final year medical students (from the three medical schools) foundation doctors, core surgical trainees and specialist registrars. The questions asked related to levels of confidence in critical appraisal of scientific papers, undergraduate exposure to the process of critical review and opinions on whether these skills should form a more significant component of the undergraduate curriculum.

Results: 266 questionnaire responses were received from a range of grades. 127 final year medical students, 62 foundation doctors, 34 core trainees and 43 registrars. Respondents were asked to

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grade their confidence in critically appraising scientific papers from a choice of no confidence, little confidence, quite confident and very confident. There was a noticeable correlation between level of confidence and grade of respondent. 93% felt critical appraisal teaching was inadequate, with particular emphasis on research methods and paper analysis, with 96% of respondents suggesting this should form a mandatory part of the curriculum.

Conclusion: This survey clearly demonstrates the need to ensure that critical appraisal skills are incorporated into the undergraduate curriculum so that newly qualified doctors begin their careers equipped with the essential skills required to practice evidence-based medicine.

Keywords: Evidence based medicine; critical appraisal; training; medical curriculum.

1. INTRODUCTION

Evidence-based medicine (EBM) involves combining the best available scientific evidence, clinical judgment and the patient's values to make clinical decisions. Sackett et al. [1] described how the practice of EBM requires the sound application of 5 core principles:

1. Recognition of the patient problem(s) in order to construct a clinical question;
2. The ability to search the medical literature efficiently to extrapolate the current best available evidence;
3. Critical appraisal of this evidence;
4. The integration of this evidence with patients to determine the best possible clinical care; and
5. Evaluating clinical practice against evidence-based standards.

EBM has been promoted as a method to reduce variations in clinical practice, maximize the efficient use of healthcare resources and increase knowledge in addition to improving the quality of patient care [2].

Critical appraisal of the medical literature is one of the fundamental skillsets required for the successful practice of EBM and should form part of the armamentarium of all clinicians. The knowledge and skills needed for critical appraisal of the literature are often taught through standalone courses away from clinical practice.

The importance of EBM inclusion into the undergraduate curriculum is a necessity and will underpin the efficacy of critical appraisal skills which medical students will be able to carry forth and use in their everyday practice.

We sought to report the understanding and level of confidence in the use of critical appraisal skills amongst medical students and trainees, with

particular emphasis on the teaching of these skills in the undergraduate curriculum.

2. METHODS

Administrators at three medical schools (Birmingham, Keele and Warwick) and the West Midlands Deanery were contacted and kindly forwarded an anonymised questionnaire (Fig. 1) to final year medical students, junior doctors (foundation year doctors (FY) and core trainees (CT)) and senior trainees (specialist registrars (SpR/StR)). There were no reminders and a response to the survey was not incentivized. Only fully completed surveys were included in the analysis. The results from questions 1-3 were analysed using simple descriptive statistics, whilst the answers to questions 4-6 were analysed on a yes/no basis.

3. RESULTS

A total of 266 responses were received from a range of grades; 127 final year medical students, 62 foundation year 1 (FY1) doctors, 34 senior house officers (FY2/CT1/CT2) and 43 specialist registrars (SpR). The results are summarised in Tables 1-3 and Figs. 2-7.

93% of respondents felt they had not received adequate teaching on how to critically appraise a paper (248/266), Fig. 5. Whilst 96% stated that critical appraisal skills should be taught as part of the undergraduate curriculum.

95% of all respondents (including 100% of SpRs) felt that regular participation at a journal club would be beneficial in developing critical appraisal skills, Fig. 7.

4. DISCUSSION

Over the last few decades, medicine has seen an explosion in the number of journals with almost

uncontrollable volumes of information derived from scientific research. Simultaneously, clinicians face the challenge of integrating this rapidly expanding knowledgebase into healthcare systems with limited financial resources. Evidence-based medicine refers to the conscientious, explicit and judicious use of the current best evidence in making decisions about the care of individual patients and provides different techniques to answer clinical questions. It enables clinicians to transfer the results of studies into clinical practice and requires 5 key competencies:

1. Recognition of a patient problem and construction of a structured clinical question
2. The ability to efficiently and effectively search the medical literature to retrieve the

best available evidence to answer the clinical question

3. Critical appraisal of the evidence; and
4. Integration of the evidence with individual patient decision making to determine the best possible care for the patient.
5. Regular audit against evidence-based standards.

Thus, clinicians need to develop skills in problem formulation, literature searching and critical appraisal as well as practical experience in applying information from the literature to patient care questions and conducting robust audits of clinical practice. If today's medical students and young doctors are to evolve into effective evidence-based practitioners, focused educational interventions targeting each of these 5 key skills are required.

A survey showing the need to incorporate the teaching of critical appraisal skills in the undergraduate medical curriculum

1. How confident do you feel at reading scientific papers?	No confidence <input type="checkbox"/>	Little confidence <input type="checkbox"/>
	Quite confident <input type="checkbox"/>	Very confident <input type="checkbox"/>
2. How confident are you at understanding/interpreting the Methods and Results sections of a scientific paper?	No confidence <input type="checkbox"/>	Little confidence <input type="checkbox"/>
	Quite confident <input type="checkbox"/>	Very confident <input type="checkbox"/>
3. How confident are you at critically appraising a scientific paper?	No confidence <input type="checkbox"/>	Little confidence <input type="checkbox"/>
	Quite confident <input type="checkbox"/>	Very confident <input type="checkbox"/>
4. Do you feel that you have had adequate teaching/training in how to critically appraise a paper?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
5. Should critical appraisal skills be taught as part of the undergraduate curriculum?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
6. Would regular participation at a journal club allow you to develop your critical appraisal skills?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Fig. 1. The anonymised questionnaire that was distributed in this study

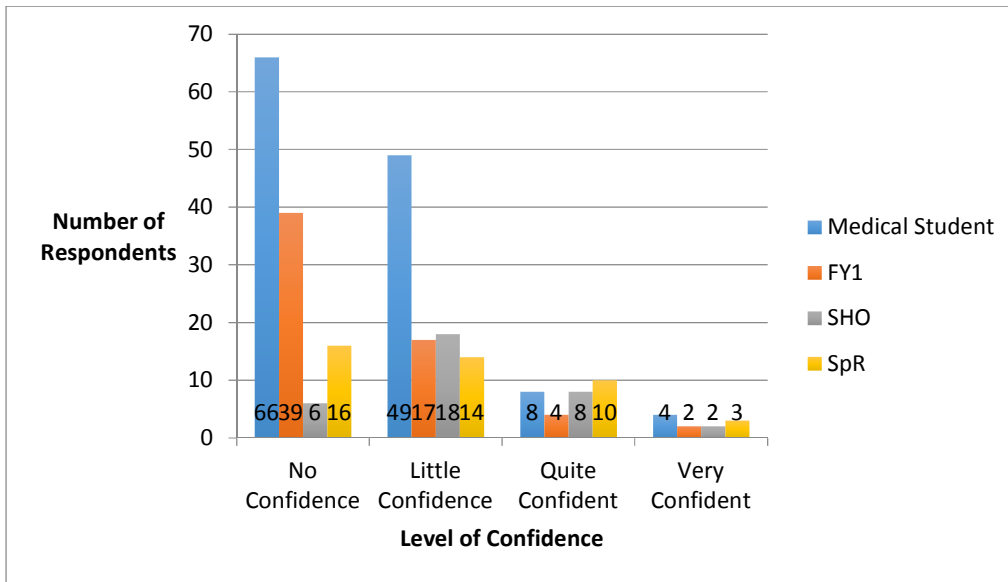


Fig. 2. The level of confidence in the ability to read a scientific paper

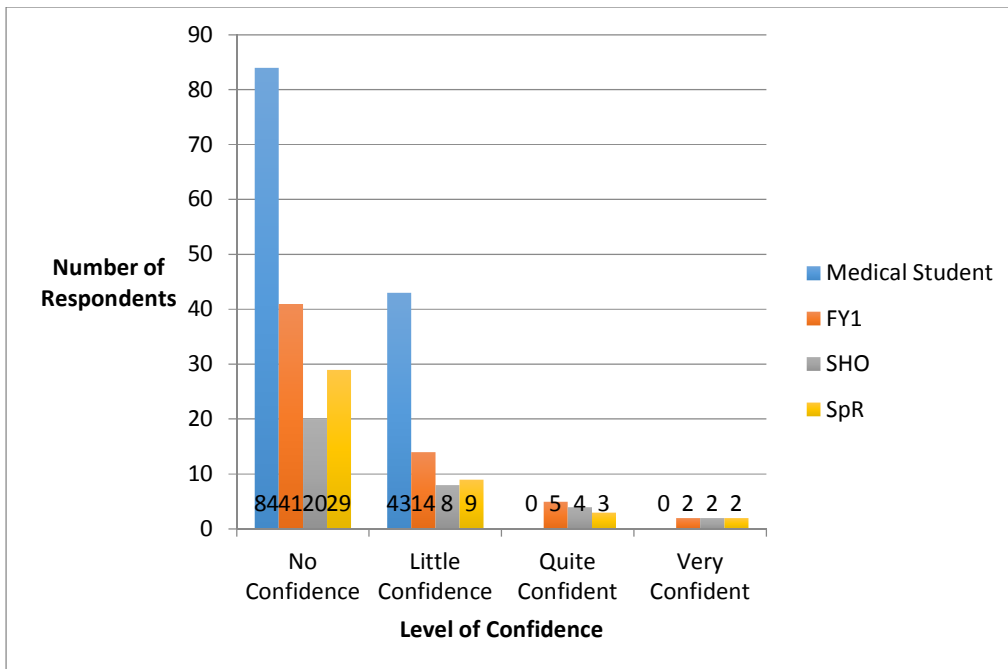


Fig. 3. The level of confidence in understanding/interpreting the methods and results section of a scientific paper

Critical appraisal is defined as the process of assessing and interpreting evidence by systematically considering its validity, results and relevance to an individual's work [3]. In addition to being one of the 5 basic skills of EBM, the ability to critically appraise a paper forms a significant part of many postgraduate

examinations. In 1996, a survey of 21 UK medical schools showed that just 14 taught aspects of EBM with only 9 specifically covering critical appraisal skills. [4] The explosion of standalone courses teaching critical appraisal skills may be a reflection of the lack of effective teaching of these skills

at both undergraduate and postgraduate level.

The results of our survey add further weight to the worrying belief that critical appraisal skills are poorly taught at undergraduate level and that this has a knock-on effect, manifest in the profound

lack of confidence amongst senior trainees at critically appraising the medical literature. Over half of all finalists and almost two-thirds of foundation year one doctors reported having no confidence in reading the medical literature. Perhaps more concerning is that almost 40% of senior trainees felt the same.

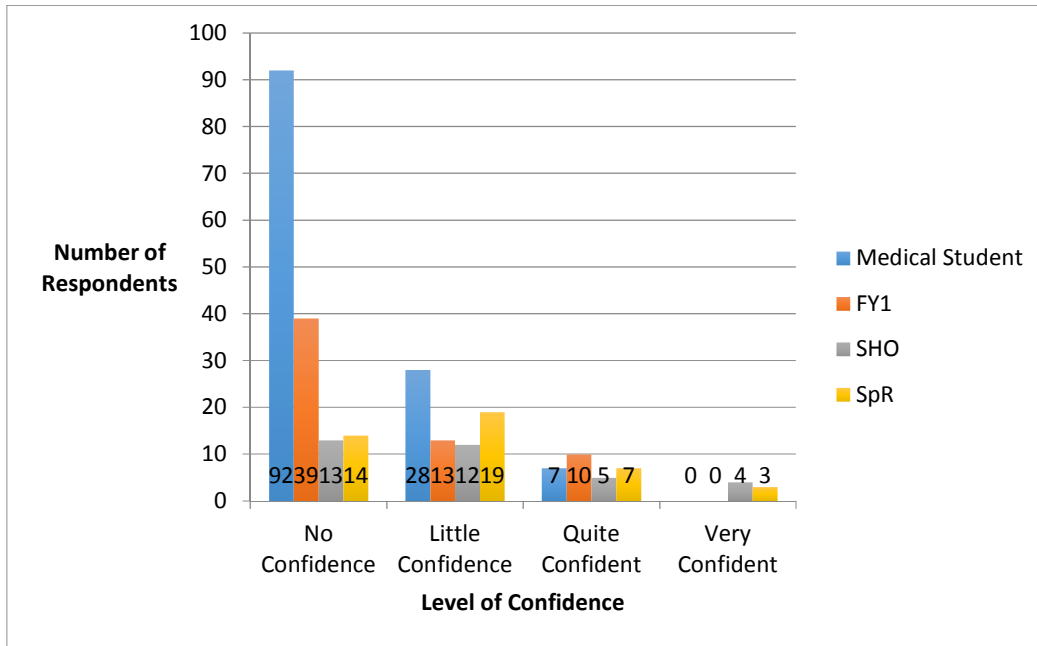


Fig. 4. The level of confidence in critically appraising a scientific paper

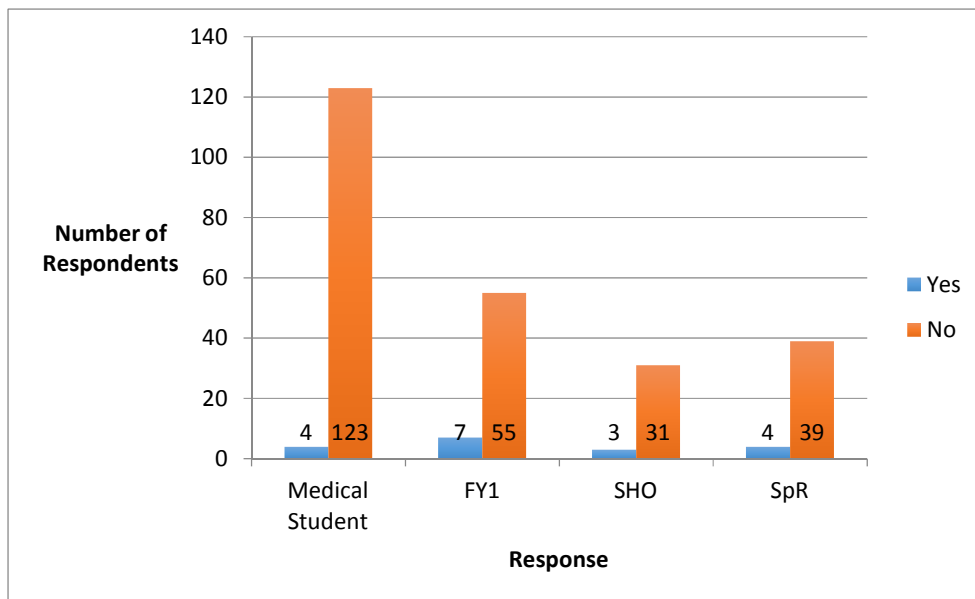


Fig. 5. Is there adequate teaching/training in how to critically appraise a scientific paper?

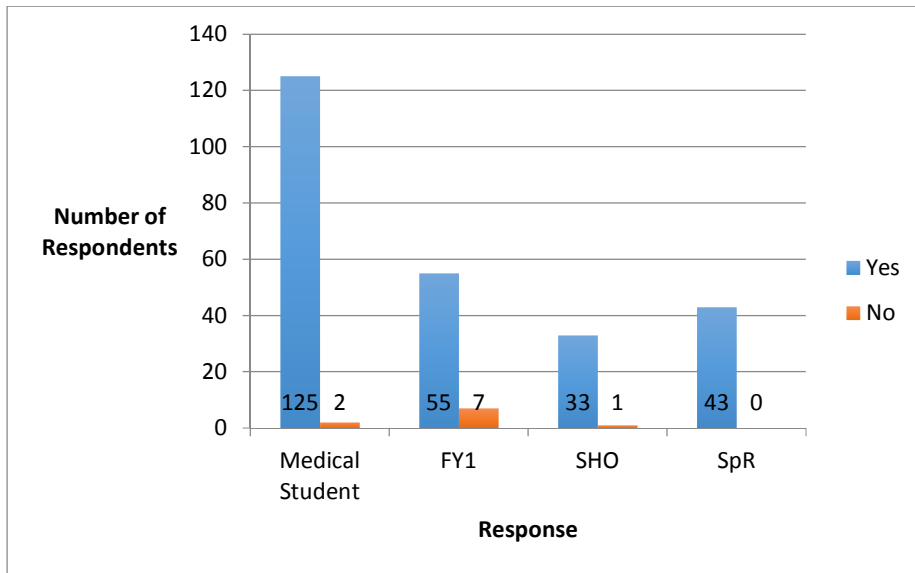


Fig. 6. Should critical appraisal skills be taught as part of the undergraduate curriculum

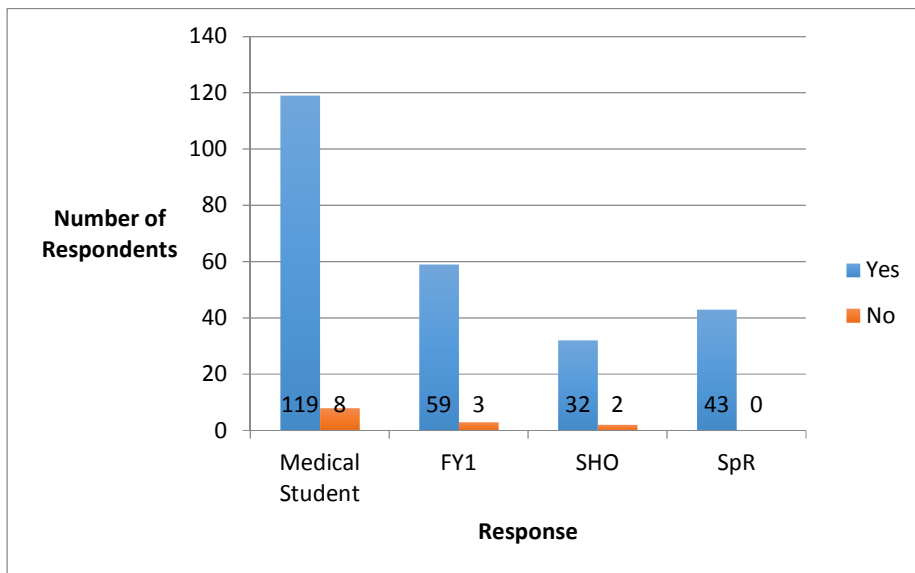


Fig. 7. Would regular participation at a journal club allow one to develop critical appraisal skills?

Table 1. Level of confidence of respondents at reading scientific papers

Question 1: How confident do you feel at reading scientific papers? (%)				
Level of confidence	None	Little	Quite	Very
Med. student	66 (52)	49 (38.5)	8 (6.3)	4 (3.1)
FY1	39 (63)	17 (27.3)	4 (6.5)	2 (3.2)
FY2/CT1/CT2	6 (17.6)	18 (52.9)	8 (23.5)	2 (5.9)
SpR	16 (37.2)	14 (32.6)	10 (23.3)	3 (7)

Table 2. Level of confidence of respondents at understanding/interpreting the Methods/Results section of a scientific paper

Question 2: How confident are you at understanding/interpreting the Methods and Results section of a scientific paper?				
(%)				
Level of confidence	None	Little	Quite	Very
Med. student	84 (66.1)	43 (33.8)	0	0
FY1	41 (66.1)	14 (22.6)	5 (8.1)	2 (3.2)
FY2/CT1/CT2	20 (58.8)	8 (23.5)	4 (11.8)	2 (5.9)
SpR	29 (67.4)	9 (20.9)	3 (7)	2 (4.7)

Table 3. Level of confidence of respondents at critically appraising a scientific paper

Question 3: How confident are you at critically appraising a scientific paper?				
(%)				
Level of confidence	None	Little	Quite	Very
Med. student	92 (72.4)	28 (22)	7 (5.5)	0
FY1	39 (62.9)	13 (21)	10 (16.1)	0
FY2/CT1/CT2	13 (38.2)	12 (35.3)	5 (14.7)	4 (11.8)
SpR	14 (32.5)	19 (44.2)	7 (16.3)	3 (7)

The methods section of a research paper is often regarded as key to its overall plausibility but yet two-thirds of final year medical students, FY1s and specialist registrars had no confidence in understanding and interpreting this and the results section. Only 5% of senior trainees reported feeling very confident at understanding both the methods and results section of a paper.

Over 90% of respondents felt they had received inadequate teaching in critical appraisal and that the specific teaching of this core EBM skill should form part of the undergraduate curriculum.

Journal clubs are one way of teaching critical appraisal skills and indeed 95% of our respondents felt that regular participation at a journal club would be a valuable way to develop their skills. These clubs are largely confined to the hospital setting and are attended by postgraduates but perhaps their widespread introduction at undergraduate level would form a solid basis upon which to teach EBM skills. Additionally, journal clubs can help nurture enquiring minds and provide the stimulus to develop tomorrow's clinical academics. Indeed, the eruption of trainee-led research collaborative groups highlights the increasing ambition of trainees to become involved in research, audit and thus EBM [6-8].

Newcastle Medical School demonstrated how a journal club with subsequent letter writing was a very effective approach to teaching critical appraisal skills. [3] In the initial three and a half years of their innovative programme, almost 60

letters had been published online. Furthermore, the feedback they received from students was overwhelmingly positive.

In North America, an increasing number of medical schools and residency programmes have formally introduced curricula for teaching the principles and practice of EBM. [4] Interestingly, 95% of US internal medicine residency programmes have journal clubs and almost 40% of US and Canadian internal medicine residencies have time dedicated for EBM [5,9].

5. CONCLUSION

In conclusion, whilst we accept that our survey is limited in its small sample size, it does nonetheless clearly suggest that there is both a need and a demand for critical appraisal skills to be taught as part of the undergraduate curriculum.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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