Critical Appraisal Skills Programme (CASP)

CASP bibliography

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INTRODUCTION

A search was conducted to find articles specifically about CASP workshops or checklists. The search retrieved many articles about critical appraisal skills workshops in general, so it was decided to include these also. The relevant articles had to include some aspect of evaluation or analysis to be selected for the bibliography. The bibliography is listed at the end of this document, with articles categorised into one of four headings and listed in reverse chronological order. Each article has a link to full text or an abstract where available, and a key result or conclusion is highlighted.

METHODS

Search strategies

Medline (Ovid)

1. critical* apprais*
2. (skill* or training or workshop* or programme* or teach*)
3. (intervention* or method* or tool* or checklist*)
4. 2 or 3
5. (critical* apprais* adj2 (skill* or training or workshop* or programme* or teach* or (intervention* or method* or tool* or checklist*)))
6. CASP
7. (framework or programme* or criteria or tool*)
8. 1 or 7
9. 6 and 8
10. 9 not protein*
11. Program Evaluation/
12. 1 and 11
13. 5 or 10 or 12

Cochrane (Wiley)

#1 (critical* apprais*):ti,ab NEAR/2 (skill* or training or workshop* or programme* or intervention* or method* or tool* or checklist* or teach*):ti,ab

#2 critical* apprais*:ti,ab and Program Evaluation:kw

#3 CASP

#4 (#1 OR #2 OR #3)

ERIC (ProQuest)

(su.Exact("program evaluation") AND all(critical* appraisal*)) OR ((ab(skill* OR training OR workshop* OR programme* OR teach* OR intervention* OR method* OR tool* OR checklist*) OR ti(skill* OR training OR workshop* OR programme* OR teach* OR intervention* OR method* OR tool* OR checklist*)) AND all(critical* appraisal*)) OR all(CASP) OR all(critical appraisal skills programme)

RESULTS

	No. of hits	**Exclusive**
Medline (1990-Feb wk1 2012)	477	477
Embase (1990-wk5 2012)	774	357
Cochrane (1990-Jan 2012)	108	35
ERIC (1990-2011)	144	96
TOTAL		965

These 965 references were screened for mention of CASP or critical appraisal skills/workshops in general. 85 relevant references were found.

A Google search was also performed using the keywords:

CASP

*critical appraisal skills programme**

*critical appraisal skills workshop**

7 additional relevant references were identified from this search. 3 additional relevant references were identified by looking at references lists of relevant articles.

TOTAL = 95

These references were categorised into one of four headings (CASP, Checklists/tools, Journal Clubs and Training/teaching), and listed below.

CASP (9)

1. Sekiguchi, K. and J. Kawamori (2003). "How to read individual reports for Randomized Controlled Trials." Japanese Journal of Clinical Radiology 48(12): 1523-1531. In Japenese, but has English abstract.

   "The Critical Appraisal Skills Program (CASP) is a program at the NHS in United Kingdom and has helped to develop an evidence-based approach in health and social care. CASP appraisal tool for RCTs comprises 12 questions to help you make sense of them. The questions address three broad issues: 1) Is the trial valid?, 2) What are the results?, 3) Will the results help locally?" taken from abstract

   Abstract: http://sciencelinks.jp/j-east/article/200401/000020040103A0835134.php

2. Spittlehouse, C., M. Acton, et al. (2000). "Introducing critical appraisal skills training in UK social services: Another link between health and social care?" Journal of Interprofessional Care 14(4): 397-404.

   "CASP's aim is to enable decision makers and those who seek to influence them acquire skills to make sense of, and act on, the evidence. CASP has developed appraisal tools to help make sense of a variety of evidence (including randomised controlled trials, systematic reviews, qualitative research, cohort studies and economic evaluations) and through a variety of learning styles (including workshops, training sessions and paper- and computer-based open learning packages)." p403-404

   Abstract: http://informahealthcare.com/doi/abs/10.1080/13561820020003946

3. Clisby, N. and Charnock, D. (2000) DISCERN/CASP Workshops 2000. Final Project Report. Critical Appraisal Skills Programme, Institute of Health Sciences, Oxford

   Print only, not available online.

4. Bradley, P. and A. J. Burls (1999). "Critical Appraisal Skills Programme: A project in critical appraisal skills teaching to improve the quality in health care." Journal of Clinical Governance 7(2): 88-91.

   > "*The Critical Appraisal Skills Programme offers easily accessible help to all health care decision-makers, so that they can acquire skills in critical appraisal. Skills training has been shown to improve knowledge and skills of participants*" taken from abstract

   No freely available online abstract or full text.

5. Burls, A. (1999) Do half-day workshops aimed at teaching critical appraisal skills work? CASP: Institute of Health Sciences, Oxford

   Print only, not available online.

6. Ibbotson, T., J. Grimshaw, et al. (1998). "Evaluation of a programme of workshops for promoting the teaching of critical appraisal skills." Medical Education 32(5): 486-491.

   > "*The evaluation of the CASP workshop technique suggests that it does improve knowledge of clinical effectiveness, but concerns remain about the viability and reliability of this approach as it rolls out training within Scotland*" taken from abstract

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10211289

7. Burls A. (1997). An Evaluation of the Impact of Half-Day Workshop Teaching Critical Appraisal Skills. Critical Appraisal Skills Programme. Oxford: Anglia and Oxford Region; Institute of Health Sciences.

   > "*A half-day CASP workshop can produce a meaningful and statistically significant change in participants' self-assessed knowledge*" p67

   Print only, not available online.

8. Milne, R. and S. Oliver (1996). "Evidence-based consumer health information: developing teaching in critical appraisal skills." International Journal for Quality in Health Care 8(5): 439-445.

   "*The experience of the project shows that it is feasible to run CASP workshops for people who give health information to the public. Clearly, however, while such workshops are enjoyed and found useful, they cannot turn critical appraisal novices into experts. The workshops last only half a day and they deal with critical appraisal only in the wider context of evidence-based medicine and the Cochrane Collaboration. From anecdotal evidence, what we believe they can do is to help participants improve their knowledge and skills in this area*…" p444

   Full text: http://intqhc.oxfordjournals.org/content/8/5/439.full.pdf

9. Milne R, Donald A, Chambers L. (1995). Piloting short workshops on the critical appraisal of reviews. Health Trends 27(4):120-3.

   "*This paper describes a pilot programme of short workshops on the critical appraisal of review articles….The workshops were well received and were oversubscribed. Participants reported that they found them useful and that they raised their awareness of the place of evidence about effectiveness in decision-making. The challenge now is to evaluate the impact of such workshops more rigorously*" taken from abstract

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10162322

Checklists/tools (16)

1. Crowe, M. and L. Sheppard (2011). "A review of critical appraisal tools show they lack rigor: Alternative tool structure is proposed." Journal of Clinical Epidemiology 64(1): 79-89.

   "CATs are being developed while ignoring basic research techniques, the evidence available for design, and comprehensive validation and reliability testing. The basic structure for a comprehensive CAT is suggested that requires further study to verify its overall usefulness" taken from abstract

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21130354

2. Fitzgerald, A. and C. Coop (2011). "Validation and modification of the Graphical Appraisal Tool for Epidemiology (GATE) for appraising systematic reviews in evidence-based guideline development." Health Outcomes Research in Medicine 2(1): e51-e59.

   "*The GATE systematic review checklist represents a useful tool for appraising systematic reviews, and the amended version produced from this study is better suited than the original for appraising systematic reviews*." e58

   Abstract: http://www.healthoutcomesresearch.org/article/S1877-1319(10)00028-5/abstract

3. Masood, M., E. T. Thaliath, et al. (2011). "An appraisal of the quality of published qualitative dental research." Community Dentistry & Oral Epidemiology 39(3): 193-203.

   "*If quality guidelines such as the CASP framework are used in the context of a thorough understanding of qualitative research design and data analysis, they can promote good practice and the systematic assessment of qualitative research*" p201

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21070318

4. Chenail, R. J. (2011). "Learning to Appraise the Quality of Qualitative Research Articles: A Contextualized Learning Object for Constructing Knowledge." Qualitative Report 16(1): 236-248.

   "*The CASP instrument makes for a fine training tool, but it can also skew students' perceptions of what stands for quality in qualitative research....the CASP tool itself expresses this caveat, but the exercise can also leave students with an overly narrow view of what qualitative research is and is not. There is also the debate of whether or not students should be reading less than exemplary examples of qualitative research. Reading such articles can help students to learn the weaknesses as well as the strengths and hopefully, they will remember to embrace the strengths in their own work*." p59

   Full text: http://www.nova.edu/ssss/QR/WQR/appraising.pdf

5. Hannes, K., C. Lockwood, et al. (2010). "A comparative analysis of three online appraisal instruments' ability to assess validity in qualitative research." Qualitative Health Research 20(12): 1736-1743.

   "*Although the CASP tool is a popular appraisal instrument—most likely because it is a user-friendly alternative for novice researchers—it does not score particularly well in evaluating the intrinsic methodological quality of an original study when compared with other instruments*" p1741

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/20671302

6. Bak, G., M. Mierzwinski-Urban, et al. (2009). "A pragmatic critical appraisal instrument for search filters: introducing the CADTH CAI." Health Information & Libraries Journal 26(3): 211-219.

   "*The CADTH CAI provides a reliable means of determining the relative quality of search filters. Although it requires users to have some understanding of search filter methodologies, and particularly of recent developments in the nomenclature of the field and the controlled vocabularies of specific databases, this level of knowledge is not in excess of that possessed by most information specialists who work on systematic review teams*" p217

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/19712213

7. MacDermid, J. C., D. M. Walton, et al. (2009). "Critical Appraisal of Research Evidence for Its Validity and Usefulness." Hand Clinics 25(1): 29-42.

   "*Recommendations to patients or within clinical practice guidelines should consider the quality of the evidence, the balance between desirable and undesirable effects, resource use, clinical experience, and patient preferences. Recently, an international collaboration (GRADE working group) has focused on defining common methods to grade recommendations clearly and consistently and has moved toward a system that integrates these factors to make either strong, weak, or no recommendation*" taken from abstract

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/19232913

8. Heller, R. F., A. Verma, et al. (2008). "Critical appraisal for public health: a new checklist." Public Health 122(1): 92-98.

"*The use of the Population Health Evidence Cycle ('ask', 'collect', 'understand', 'use') allows a simple and reproducible set of organizing criteria. It is suggested that this tool should be used to obtain an initial appraisal, but more detailed critical appraisal tools should be used to fill in any gaps in the detailed examination of methodology, particularly where details of the internal validity of studies are concerned*" p95

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/17765937

9. Adeyemo, W. L., J. A. Akinwande, et al. (2007). "Evidence-based dental practice: part III. Critical appraisal of the literature, relevance and application of the evidence." Nigerian Quarterly Journal of Hospital Medicine 17(4): 165-169.

"*This article discusses the guidelines that have been developed to guide clinicians in assessing the validity and the relevance of published studies (randomized control trials, systematic reviews, cohort studies and case-control studies*)" taken from the abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/18320765

10. Dixon-Woods, M., A. Sutton, et al. (2007). "Appraising qualitative research for inclusion in systematic reviews: A quantitative and qualitative comparison of three methods." Journal of Health Services Research and Policy 12(1): 42-47.

"*Agreement in categorizing papers across the three methods* [unprompted judgement based on expert opinion, a UK Cabinet Office quality framework and CASP, a Critical Appraisal Skills Programme tool] *was slight...Structured approaches did not appear to yield higher agreement than that by unprompted judgement*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/17244397

11. Raslich, M. A. and G. M. Onady (2007). "Evidence-based medicine: critical appraisal of the literature (critical appraisal tools)." Pediatrics in Review 28(4): 132-138.

No abstract available.

Extract: http://intl-pedsinreview.aappublications.org/content/28/4/132.extract

12. Attia, J. and J. Page (2006). "A graphic framework for teaching critical appraisal of randomised controlled trials." Equine Veterinary Journal 38(1): 7-9.

> "*We have described a pedagogic aid: a flow diagram of an RCT, which has been developed over years of teaching residents. This diagram focuses on the steps in an RCT, and by drawing arrows, it highlights the biases possible at each step. This diagram serves as a framework on which the list of critical appraisal questions can be hung and is easy to remember."* p8

Abstract: http://europepmc.org/abstract/MED/16411579

13. Katrak, P., A. E. Bialocerkowski, et al. (2004). "A systematic review of the content of critical appraisal tools." BMC Medical Research Methodology 4: 22.

> "*A major finding of our study was the volume and variation in available critical appraisal tools. We found no gold standard critical appraisal tool for any type of study design*" p8

Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC521688/pdf/1471-2288-4-22.pdf

14. Thomas, K. G., M. R. Thomas, et al. (2004). "Assessment tools for evaluating critical appraisal skills." Medical Education 38(5): 569.

> *"….this report….demonstrates the feasibility of assessing residents' critical appraisal skills using this type of instrument* [consisting of a clinical scenario, the methods and results sections of a related manuscript, and an assessment form with instructions to appraise the validity of the information provided and interpret the results].. *Finally, this tool may be able to identify residents whose critical appraisal skills have not yet reached an acceptable level of competence and who require additional instruction*" p569

No abstract available.

15. Byers, J. F. and C. L. Beaudin (2001). "Critical appraisal tools facilitate the work of the quality professional." Journal for Healthcare Quality 23(5): 35-38, 40-33.

    "*Two critical appraisal tools (CATs) are presented here, the first for any original clinical or health services research study and the second for research synthesis*" taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/11565170

16. Treloar, C., S. Champness, et al. (2000). "Critical appraisal checklist for qualitative research studies." Indian Journal of Pediatrics 67(5): 347-351.

    "*This article presents a 10-point critical appraisal checklist for qualitative reports... The checklist represents a synthesis of the guidelines for best practice offered in the literature. The key issues are presented and discussed with little use of jargon to promote an understanding and use of qualitative methods in clinical epidemiological studies*" p347

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10885207

Journal Clubs (23)

1. Ahmadi, N., M. E. McKenzie, et al. (2012). "Teaching evidence based medicine to surgery residents-is journal club the best format? A systematic review of the literature" Journal of Surgical Education 69(1): 91-100.

    "*Seven studies met the inclusion criteria for assessment of teaching EBM and 8 studies....met criteria for assessment of journal club format. Overall, study quality was poor. Only 2 studies were randomized controlled trials. Five were before-after studies, which showed significant improvement in critical appraisal skills or statistical knowledge following an EBM course or journal club. The 2 randomized controlled trials (RCTs) compared teaching EBM or critical appraisal skills in lecture format or journal club to online learning. There was no significant difference in mean scores in 1 study whereas the other reported significantly better scores in the journal club format*" taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/22208839

2. Harris, J., K. Kearley, et al. (2011). "Are journal clubs effective in supporting evidence-based decision making? A systematic review. BEME Guide No. 16." Medical Teacher 33(1): 9-23.

   > *"….from the current review it is not clear whether journal clubs are effective in supporting evidence based decision making and studies lack the detail needed to suggest that one format of journal club is superior to another*" p4

   Full text: www.bemecollaboration.org/downloads/810/beme_review_final.pdf

3. Tam, K.-W., L.-W. Tsai, et al. (2011). "Using vote cards to encourage active participation and to improve critical appraisal skills in evidence-based medicine journal clubs." Journal of Evaluation in Clinical Practice 17(4): 827-831.

   > "*The majority of 66 respondents agreed that vote cards can improve the overall quality of EBM journal clubs, may encourage active participation and improve critical appraisal skills*" taken from abstract

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21689219

4. McLeod, R. S., H. M. MacRae, et al. (2010). "A moderated journal club is more effective than an Internet journal club in teaching critical appraisal skills: results of a multicenter randomized controlled trial." Journal of the American College of Surgeons 211(6): 769-776.

   > "*Eighty-two general surgeons who were members of the Canadian Association of General Surgeons were randomized to either a control or intervention group….Those in the intervention group* [moderated journal club] *performed significantly better than those in the control group* –Internet journal club] *(mean 58% versus mean 53.7%; p=0.0001), with the size of the difference between the 2 groups being 1.06 SD units (where 0.8 units is generally considered a large effect size)"* p773

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21036071

5. Moharari, R. S., E. Rahimi, et al. (2009). "Teaching critical appraisal and statistics in anesthesia journal club." QJM 102(2): 139-141.

> "*Residents' awareness in the application of information improved (P = 0.012), as well as research methodology (combined study design and application of information, P = 0.017). Their ability in critical appraisal did also significantly rise at the end of the course (P<0.001*)" p139

Full text: http://sitemaker.umich.edu/emjournalclub/article_database/da.data/3020234/PDF/appraisalandstatsinjournalclub139.pdf

6. Deenadayalan, Y., K. Grimmer-Somers, et al. (2008). "How to run an effective journal club: a systematic review." Journal of Evaluation in Clinical Practice 14(5): 898-911.

> "*There is no standard method for conducting journal clubs, evaluating knowledge uptake as a result of participation in journal clubs or tracking knowledge uptake through to knowledge implementation*" p905

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/19018924

7. Green, B. N. and C. D. Johnson (2007). "Use of a modified journal club and letters to editors to teach critical appraisal skills." Journal of Allied Health 36(1): 47-51.

> "*The results of this study suggest that the use of a journal club and letter-to-the-editor writing project may provide a means by which health care students can gain skills in critical appraisal. Further investigation into these methods should be undertaken*" taken from the abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/17425191

8. Stapleton, J. J. (2007). "The successful journal club." Clinics in Podiatric Medicine & Surgery 24(1): 51-55

> "*The objective in establishing a successful journal club is to build a forum for residents to formulate answers to their clinical questions through the development of essential critical appraisal skills*" taken from the abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/17127160

9. Akhund, S. and M. M. Kadir (2006). "Do community medicine residency trainees learn through journal club? An experience from a developing country" BMC Medical Education 6: 43.

"*The CMR-JC* [Community Medicine (Public Health) Resident Journal Club] *was regularly conducted. More than 95% of residents attended. (Total residents in the CMR-Programme: 32). Twenty-seven out of 29 current residents/alumni responded to the anonymous questionnaire. Acquisition of critical appraisal skills (23 respondents) and keeping up with current literature (18 respondents) were the two most important objectives achieved*" taken from abstract

Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1564014/pdf/1472-6920-6-43.pdf

10. Kanthraj, G. R. and C. R. Srinivas (2005). "Journal club: screen, select, probe & evaluate." Indian Journal of Dermatology, Venereology & Leprology 71(6): 435-440.

"*Choosing a timely topic and then applying the newly acquired knowledge in an actual work situation, participants succeeded in making the JC* [Journal Club] *a valuable learning experience….A properly organized JC helps residents in delivering quality care to their patients…"* p440

Full text: http://www.ijdvl.com/article.asp?issn=0378-6323;year=2005;volume=71;issue=6;spage=435;epage=440;aulast=Kanthraj

11. Ebbert, J. O., V. M. Montori, et al. (2001). "The journal club in postgraduate medical education: A systematic review." Medical Teacher 23(5): 455-461

"*A multicenter, randomized controlled trial of journal clubs is needed to assess whether journal clubs improve critical appraisal skills*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/12098365

12. Turner, P. and I. Mjolne (2001). "Journal provision and the prevalence of journal clubs: a survey of physiotherapy departments in England and Australia." Physiotherapy Research International 6(3): 157-169.

"*Relatively few journal clubs utilized a 'problem-based' format, which fosters the teaching of critical appraisal skills*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/11725597

13. Edwards, R., M. White, et al. (2001). "Use of a journal club and letter-writing exercise to teach critical appraisal to medical undergraduates." Medical Education 35(7): 691-694.

"*Student evaluation and outcomes, as judged by the submission and publication of letters in journals and on the Internet, were very positive. Further research is needed to evaluate the educational effectiveness of journal clubs and letter writing in teaching critical appraisal skills*" p692

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/11437973

14. Dwarakanath, L. S. and K. S. Khan (2000). "Modernizing the journal club." Hospital Medicine (London) 61(6): 425-427.

"*We propose a new approach to teaching and learning in journal clubs, focusing on literature acquisition and critical appraisal skills. This approach will enable trainees to use journal clubs for personal professional development as well as for application of new knowledge in clinical medicine to improve patients' outcomes*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10962660

15. Fu, C. H. Y., B. Hodges, et al. (1999). "Is a journal club effective for teaching critical appraisal skills? A controlled trial with residents in psychiatry." Academic Psychiatry 23(4): 205-209.

"*Following the journal club, there remained no difference in performance between the two groups* [journal club vs control group]*, although two-thirds of the journal club residents did show an improvement or no change, compared with one-third of the control residents.*" taken from abstract

Full text: http://ap.psychiatryonline.org/article.aspx?articleid=47173

16. Khan, K. S., L. S. Dwarakanath, et al. (1999). "Postgraduate journal club as a means of evidence-based obstetrics and gynaecology." Journal of Obstetrics and Gynaecology 19(3): 231-234.

"*Our study shows that it is feasible to change the traditional format of the journal club in order to encourage evidence-based medicine*" p234

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/15512285

17. Alguire, P. C. (1998). "A review of journal clubs in postgraduate medical education." Journal of General Internal Medicine 13(5): 347-353.

"*Residents exposed to critical appraisal techniques in a journal club report paying more attention to the methods and becoming more sceptical of the author's conclusions*" p351

Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1496950/pdf/jgi_102.pdf

18. Spillane, A. J. and P. J. Crowe (1998). "The role of the journal club in surgical training." Australian & New Zealand Journal of Surgery 68(4): 288-291.

"*We have found the journal club to be an excellent forum for promoting an appreciation of critical reading skills and an excellent opportunity for senior and junior surgical staff to enjoy an informal atmosphere together*" p290

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/9572341

19. Sandifer, Q. D., S. V. Lo, et al. (1996). "Evaluation of a journal club as a forum to practise critical appraisal skills." Journal of the Royal College of Physicians of London 30(6): 520-522.

"*We analysed attendance, types of paper reviewed, impact on commissioning policy and publication of letters to editors and conclude that journal clubs can be an effective learning environment and further the Clinical Effectiveness Initiative*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/8961205

20. Sidorov, J. (1995). "How are internal medicine residency journal clubs organized, and what makes them successful?" Archives of Internal Medicine 155(11): 1193-1197.

> "*If residency journal club success is defined as having high attendance or long, continuous existence, then success is associated with smaller residency programs, making attendance mandatory, promoting a journal club independent of faculty, providing formal teaching of critical appraisal skills, making food available, and emphasizing original research articles*" p1193

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/7763125

21. Tibbles, L. and R. Sanford (1994). "The research journal club: a mechanism for research utilization." Clinical Nurse Specialist 8(1): 23-26

> "*This article identifies the nursing journal club as an important mechanism for the evaluation and utilization of nursing research. It explores the CNS's* [Clinical Nurse Specialist] *role in introducing critical appraisal skills and concepts of research utilization to staff*" taken from the abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/8299061

22. Heiligman, R. M. (1991). "Resident evaluation of a family practice residency journal club." Family Medicine 23(2): 152-153.

> "*Residents selected the improvement of critical appraisal skills as the most important journal club goal*" taken from the abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/2037217

23. Seelig, C. B. (1991). "Affecting residents' literature reading attitudes, behaviors, and knowledge through a journal club intervention." Journal of General Internal Medicine 6(4): 330-334.

> "*Residents improved their performances on objective testing of critical appraisal knowledge by 60% (p = 0.02). They reported improved ability to appraise original research articles critically (p = 0.01) and reported spending more useful time reading*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/1890504

Teaching/Training (47)

1. Shu-Chen Chang, Chin-Yi Huang et al. (2013). Evaluation of a Critical Appraisal Program for Clinical Nurses. A controlled before-and-after study. J Contin Educ Nurs 44(1): 43-48.

   > *"Postintervention scores for all sections* [knowledge test, confidence in appraisal of the treatment study, confidence in appraisal of the systematic review, and confidence in appraisal of the clinical practice guidelines] *were increased compared with preintervention scores (all p values <.001)*" p45

   Full text:
   http://www.healio.com/~/media/Journals/JCEN/2013/1_January/10_3928_00220124_20121101_51/10_3928_00220124_20121101_51.pdf

2. Jones, S. C., P. A. Crookes, et al. (2011). "Teaching critical appraisal skills for nursing research." Nurse Education in Practice 11(5): 327-332.

   > "*Pre and post surveys of students found improvements in perceived knowledge of all key skills of critical appraisal* [after students had received face-to-face and online teaching modules]" taken from abstract

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21474381

3. Maden-Jenkins, M. (2011). "Healthcare librarians and the delivery of critical appraisal training: barriers to involvement." Health Information & Libraries Journal 28(1): 33-40.

   > "*The main barrier for the non-involvement of healthcare librarians in the delivery of critical appraisal training related to organisational factors….Above all, it was the fact that the training was being delivered by others in the organisation, either by other librarians, other departments or by an external trainer. Five librarians said that critical appraisal was not in their organisational training programme, while others, in an attempt to get involved, had experienced difficulties in collaborating with colleagues within their organisation*" p35-36

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21314892

4. Horsley T, Hyde C, Santesso N, Parkes J, Milne R, Stewart R. Teaching critical appraisal skills in healthcare settings. Cochrane Database Syst Rev. 2011 Nov 9;(11):CD001270. doi: 10.1002/14651858.CD001270.pub2.

   "*We included three studies involving 272 people in this review. None of the included studies evaluated process of care or patient outcomes. Statistically significant improvements in participants' knowledge were reported in domains of critical appraisal (variable approaches across studies) in two of the three studies*" taken from abstract

   Full text: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001270.pub2/abstract

5. Maden-Jenkins, M. (2010). "Healthcare librarians and the delivery of critical appraisal training: attitudes, level of involvement and support." Health Information & Libraries Journal 27(4): 304-315.

   "*Many* [healthcare librarians] *also believed that critical appraisal training ought not to be delivered in isolation but in conjunction with literature searching and therefore librarians are well placed to deliver it. Indeed, many saw literature searching as being part of the critical appraisal process and vice versa. Several librarians went further indicating that critical appraisal skills help to inform an effective search*" p307

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21050373

6. Harewood, G. C. and L. M. Hendrick (2010). "Prospective, controlled assessment of the impact of formal evidence-based medicine teaching workshop on ability to appraise the medical literature." Irish Journal of Medical Science 179(1): 91-94.

   "*A comparison of pre- and post-course grading* [the level of evidence for each type of study design was based on the Oxford Centre for Evidence Based Medicine Levels of Evidence] *demonstrates a statistically significant improvement in grading (from 39 to 74%), P = 0.002. For level 1 studies, grading improved from 42 to 75%; for level 2 studies, grading improved from 53 to 61%; for level 3 studies, grading improved significantly from 21 to 84%"* p92-93

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/19707728

7. Coughlin, S. and Molyneux, D. (2010). “Consensus paper: Resources for teaching critical appraisal." Education for Primary Care 21(2): 79-82.

   “*The article offers information on the significance of critical appraisal in ensuring the reliability and efficiency of using research evidence in evidence-based medicine in Great Britain*” taken from abstract

   Abstract: http://connection.ebscohost.com/c/articles/48656803/consensus-paper-resources-teaching-critical-appraisal

8. Hatmi, Z. N., S. Tahvildari, et al. (2010). "Teaching evidence-based medicine more effectively." Acta Medica Iranica 48(5): 332-336.

   “*EBM Conferences combined with small-group discussions enhance skills (NNI=13)* [NNI = Number Needed to Intervention, a measure of the number of medical faculty members you would need to educate to reach pre-specified outcomes]*, knowledge (NNI = 3), and attitude (NNI=21) in medical faculty members after an 11-month follow-up period*” p336

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/21287468

9. Kiss, T. L., M. O'Malley, et al. (2010). "Self-efficacy-based training for research literature appraisal: a competency for evidence-based practice." Journal for Nurses in Staff Development - JNSD 26(4): 170-177.

   “*Of the 20 items measuring post intervention self-efficacy, 19 showed significant ($p > .05$) improvement….In addition, the Wilcoxon signed rank test results…also supported the notion that participants significantly increased their research knowledge ($p = .004$) and, possibly because of enhanced knowledge, significantly increased their self-efficacy ($p = .002$)”* p173

   Abstract: http://www.ncbi.nlm.nih.gov/pubmed/20683302

10. Krainovich-Miller, B., J. Haber, et al. (2009). "Evidence-based practice challenge: teaching critical appraisal of systematic reviews and clinical practice guidelines to graduate students." Journal of Nursing Education 48(4): 186-195.

    "*This model* [the TREAD Evidence-Based Practice model] *emphasizes the use of standardized critical appraisal tools, such as the Critical Appraisal Skills Programme (CASP) or Appraisal of Guidelines for Research and Evaluation (AGREE), to facilitate user-friendly rapid appraisal of Level I evidence*" taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/19441634

11. Heye, M. L. and K. R. Stevens (2009). "Using new resources to teach evidence-based practice." Journal of Nursing Education 48(6): 334-339.

    "*Groups of students selected a priority area, categorized and critically appraised the evidence supporting the recommendation for change in health care practice, and compared the recommendation to actual practice. An oral and poster presentation of the project provided the opportunity to discuss the significance, influence, and strength of the evidence supporting the recommendation to change health care practice*" taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/19552320

12. Smith-Strom, H. and M. W. Nortvedt (2008). "Evaluation of evidence-based methods used to teach nursing students to critically appraise evidence." Journal of Nursing Education 47(8): 372-375.

    "*At the end of the course* [training in 3 steps of evidence-based practice--formulating a question, searching the evidence, and critically appraising the evidence]*, the students had a group examination in which they critically appraised a new scientific article. Most students reported that having learned steps one, two, and three involved in evidence-based practice was useful in critically appraising a scientific article. The results from the examination supported this*" taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/18751651

13. Bell, D. S., C. E. Harless, et al. (2008). "Knowledge retention after an online tutorial: a randomized educational experiment among resident physicians." Journal of General Internal Medicine 23(8): 1164-1171.

    "*After a one-time online tutorial, residents' ability to recall what they had learned diminished relatively quickly, despite large initial knowledge gains and positive learner evaluations*" p1168

    Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2517967/

14. Bernardo, L. M., J. T. Matthews, et al. (2008). "Promoting critical appraisal of the research literature: a workshop for school nurses." Journal of Continuing Education in Nursing 39(10): 461-467.

    "*Although the attendees rated the faculty and content highly, their intent to apply the findings to practice was limited*" taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/18990892

15. Yew, K. S. and A. Reid (2008). "Teaching evidence-based medicine skills: an exploratory study of residency graduates' practice habits." Family Medicine 40(1): 24-31.

    "Despite their overall satisfaction with residency training in CA/EBM, our respondents reported guilt and frustration regarding their inability to fully apply the skills learned, due largely to the time and financial pressures of clinical practice. Colleagues were their preferred information sources. Their self-reported clinical decision making for the evaluation of suspected pulmonary embolus was, at best, only possibly consistent with EBP" p29

    Full text: http://www.stfm.org/fmhub/fm2008/january/kenneth24.pdf

16. Bell, D. S., J. Higa, et al. (2007). "Learning and retention from an online tutorial among resident physicians." AMIA Annual Symposium Proceedings/AMIA Symposium: 870.

"*In linear regression modeling, critical appraisal skills and time spent on the interactive tutorial were associated with greater learning*" taken from abstract

Full text: http://telemedicina.unifesp.br/pub/AMIA/2007%20AMIA%20Proceedings/data/papers/posters/AMIA-0761-S2007.pdf

17. Doran, T., G. Maudsley, et al. (2007). "Time to think? Questionnaire survey of pre-registration house officers' experiences of critical appraisal in the Mersey Deanery." Medical Education 41(5): 487-494.

"*Most PRHOs* [pre-registration house officers'] *(69%) felt medical school prepared them to use critical appraisal skills and perceived such skills as relevant (63%). Fewer felt that their clinical work was based on best available evidence (57%)"* taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/17470078

18. Dinkevich, E., A. Markinson, et al. (2006). "Effect of a brief intervention on evidence-based medicine skills of pediatric residents." BMC Medical Education 6: 1.

"*Before the training module, the residents achieved a mean score of 17% correct overall, showing that, on the average, they had little knowledge of EBM skills. Post intervention, the mean percentage of questions answered correctly increased to 63% with significant improvement in each EBM category.... the mean difference between pre and post-test number of questions answered correctly was 4.08 out of 9.00, a statistically significant result with a 95% CI of 3.44–4.72 ($p < 0.0001$)*" p4

Full text: http://www.biomedcentral.com/content/pdf/1472-6920-6-1.pdf

19. Krueger, P. M. (2006). "Teaching critical appraisal: a pilot randomized controlled outcomes trial in undergraduate osteopathic medical education." Journal of the American Osteopathic Association 106(11): 658-662.

> "*The mean scores for the examination in critical analysis were 62% for the EBM group* [who had been randomised to receive group workshops and lectures] *and 41% for the non-EBM group* [received lectures not related to critical appraisal]*. This difference is statistically significant (t75, P<.001)*" p660

Full text: http://www.jaoa.org/content/106/11/658.full.pdf

20. Bradley, P., C. Oterholt, et al. (2005). "Comparison of directed and self-directed learning in evidence-based medicine: a randomised controlled trial." Medical Education 39(10): 1027-1035.

> "*There were no statistical differences between the study groups for any of the outcomes.....Overall, the results suggest that computer-assisted, self-directed learning offers a realistic alternative to an interactive workshop format in teaching EBM, although a single trial is insufficient to draw any firm conclusions about the intervention's relative quality*." p1032-1033

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/16178830

21. Schwartz, A. and J. Hupert (2005). "A decision making approach to assessing critical appraisal skills." Medical Teacher 27(1): 76-80.

> "*This framework* [Bayesian approach] *requires a clinical situation in which there are a limited set of plausible alternatives, and in which the clinician has some prior uncertainty about the correct decision, a response task that provides a measure of strength of preference between the alternatives and that can be repeated before and after exposure to evidence, and pieces of novel evidence of known or manipulated strength and soundness bearing on the decision. By comparing the clinician's decision and belief before and after exposure to evidence, the subjective impact of the evidence can be inferred*" p79

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/16147775

22. Taylor, R. S., B. C. Reeves, et al. (2004). "Critical appraisal skills training for health care professionals: a randomized controlled trial [ISRCTN46272378]." BMC Medical Education 4(1): 30.

> "*At follow up overall knowledge score [mean difference: 2.6 (95% CI: 0.6 to 4.6)] and ability to appraise the results of a systematic review [mean difference: 1.2 (95% CI: 0.01 to 2.4)] were higher in the critical skills training group compared to control. No statistical significant differences in overall attitude towards evidence, evidence seeking behaviour, perceived confidence, and other areas of critical appraisal skills ability (methodology or generalizability) were observed between groups*" taken from abstract

Full text: http://www.biomedcentral.com/content/pdf/1472-6920-4-30.pdf

23. Toouli J, Stanton P. (2004). Being CLEAR: evaluation of a module to teach critical appraisal to surgeons." ANZ J Surg. 2004 Jan-Feb;74(1-2):69-70.

> "*Both the value of the material covered and the quality of presentation were assessed, in each case on a simple five-point scale: excellent (1), very good (2), good (3), poor (4) and very poor (5).... Responses indicate a high level of satisfaction, with 65% of evaluations of value being at the very good or excellent level and 67% of evaluations of quality falling in these categories. Only 8% of all responses were at the poor or very poor levels*" p69-70

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/14725710

24. MacRae, H. M., G. Regehr, et al. (2004). "Assessment of critical appraisal skills." American Journal of Surgery 187(1): 120-123.

> *"….the mean score for the 22 residents who had undergone the epidemiologist led critical appraisal training was significantly higher than the 22 residents who had not (56.6% versus 49.3%, $t^{35} = 2.31$, P = 0.02*)" p121

Abstract: http://www.sciencedirect.com/science/article/pii/S0002961003004513

25. Coomarasamy, A., R. Taylor, et al. (2003). "A systematic review of postgraduate teaching in evidence-based medicine and critical appraisal." Medical Teacher 25(1): 77-81.

> "*Appraisal skills were reported as an outcome in 6/17 of the studies....The only randomized trial that reported this outcome did not find a significant improvement. Of the two controlled trials that reported this outcome, one found an improvement. One of the three before and after studies that reported on skills found an improvement*" p78

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/14741863

26. Booth, A. and A. Brice (2003). "Clear-cut?: facilitating health librarians to use information research in practice." Health Information & Libraries Journal 20 Suppl 1: 45-52.

> "It [the Pilot Project] *has demonstrated that the appraisal tool, together with the workshop format, helped participants improve their understanding of research methods and their ability to use research to aid their decision making*" p50

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/12757435

27. Creedy, D. K., J. Horsfall, et al. (2002). "Developing critical appraisal skills using a review of the evidence for postpartum debriefing." Australian Journal of Midwifery: Professional Journal of the Australian College of Midwives Incorporated 15(4): 3-9.

> "*This paper aims to assist midwives' evidence based practice skills by presenting a critical appraisal of recent randomised controlled trials of postpartum debriefing. The approach proposed by Sackett et al (2000) to critically appraise a study about a therapy or intervention is used as a framework*" p3

No abstract available.

28. Daya, S. (2002). "Improving physicians' critical appraisal skills." Evidence-based Obstetrics and Gynecology 4(4): 163-164.

> "*The educational challenge is to identify methods of imparting knowledge that are effective and efficient in equipping practitioners with the necessary skills to enable them to search and critically evaluate the evidence, so that the most appropriate plan of care can be outlined for their patients*" p164.

No abstract available

29. Haidet, P., D. Hunt, et al. (2002). "Learning by doing: teaching critical appraisal of randomized trials by performing an in-class randomized trial." Academic Medicine 77(11): 1161.

> "*This experiential teaching method allowed students to participate directly in a simulated randomized controlled trial, thereby facilitating understanding of this type of study. Students reported that the experience was enjoyable and stimulated active engagement with critical appraisal of randomized trials*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/12431940

30. Astin, J., T. Jenkins, et al. (2002). "Medical students' perspective on the teaching of medical statistics in the undergraduate medical curriculum." Statistics in Medicine 21(7): 1003-1006

> "*It was felt that medical statistics courses should focus on critical appraisal skills rather than on the ability to analyse data, which can be acquired by particular students when they need to do this*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/11921009

31. Khan, K. S., A. O. Awonuga, et al. (2001). "Assessments in evidence-based medicine workshops: Loose connection between perception of knowledge and its objective assessment." Medical Teacher 23(1): 92-94.

"*There was a poor correlation between participants' perception of confidence in assessing evidence and their objective test scores. For specific literature appraisal issues, comparison of subjective scores with corresponding objective test scores revealed that the correlation ranged from ± 0.29 to 0.60*" p93

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/11260751

32. Awonuga, A. O., L. S. Dwarakanath, et al. (2000). "Critical appraisal workshops to promote evidence-based healthcare." Journal of Obstetrics and Gynaecology 20(1): 10-14.

"After the workshop, participants paid more attention to the design of articles (81% vs. 98%, P=0.02), a significant proportion no longer thought that original research was confusing (35% vs. 52%, P=0.0001), and significantly more of them felt confident their ability to assess research evidence (26% vs. 59%, P=0.05)….the knowledge score significantly improved by about 10 points from 47.3 (SD 12.2) to 57.9 (SD 9.0) (P=0.0001)" p12

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/15512452

33. Ghali, W. A., R. Saitz, et al. (2000). "Successful teaching in evidence-based medicine." Medical Education 34(1): 18-22.

"*The intervention was associated with significant changes in students' self-assessed skills and attitudes. MEDLINE and critical appraisal skills increased significantly in the intervention group* [attended an EBM mini-course], *relative to the control group* [received more `traditional' didactic teaching] *(significance of between group differences: P=0.002 for MEDLINE and P=0.0002 for critical appraisal), as did students' tendency to use MEDLINE and original research articles to solve clinical problems (significance of between group differences: P= 0.002 and P=0.0008, respectively*)" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10607274

34. Kellum, J. A., J. P. Rieker, et al. (2000). "Teaching critical appraisal during critical care fellowship training: a foundation for evidence-based critical care medicine." Critical Care Medicine 28(8): 3067-3070.

    "*Six fellows completed both pre- and posttests. These paired results were analyzed separately, whereas results for another six fellows were conducted as an unpaired analysis. Mean scores increased both for the paired analysis (4.1+/-0.7 vs. 5.1+/-0.5; p=.015) and for the unpaired analysis (4.3+/-0.6 vs. 5.0+/-0.5; p=.012). Self-reported confidence in critical appraisal also increased (2.5+/-0.5 vs. 3.9+/-0.7; p=.004 and 2.6+/-0.5 vs. 3.9+/-0.6; p<.001, respectively)"* taken from abstract

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10966297

35. Smith, C. A., P. S. Ganschow, et al. (2000). "Teaching residents evidence-based medicine skills: a controlled trial of effectiveness and assessment of durability." Journal of General Internal Medicine 15(10): 710-715.

    "*After receiving the EBM course, the experimental group achieved significantly higher postcourse test scores (adjusted mean difference, 21%; 95% confidence interval, 13% to 28%; P<.001). Postcourse improvements were noted in three of the four EBM skill domains (formulating questions, searching, and quantitative understanding [P<.005 for all], but not in critical appraisal skills [P=.4])"* taken from abstract

    Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1495601/pdf/jgi_91026.pdf

36. Bradley, P. and G. Humphris (1999). "Assessing the ability of medical students to apply evidence in practice: the potential of the OSCE." Medical Education 33(11): 815-817.

    "*….this OSCE* [objective structured clinical examination] *station has enabled an assessment of the application of evidence in practice. The well-known effect of assessment on learning can be utilized to highlight the importance attached to critical appraisal and motivate students to view the interpretation and assimilation of evidence as a key to their professional development. This approach may address the concerns about the lack of effect of training described previously*" p817

    Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10583788

37. Greenhalgh, T. and A. Herxheimer (1999). "Towards a broader agenda for training in critical appraisal." Journal of the Royal College of Physicians of London 33(1): 36-38.

"*We outline a proposal through which the skills and attitudes needed for the critical appraisal of published articles may be applied to all other aspects of clinical practice, from planning research projects to presenting results and guidelines and peer review of articles submitted for publication*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10192068

38. Green, M. L. (1999). "Graduate medical education training in clinical epidemiology, critical appraisal, and evidence-based medicine: a critical review of curricula." Academic Medicine 74(6): 686-694.

"*The search produced 18 reports. The most common objective of the curricula described in the reports was improving critical skills; the most common format was resident-directed small-group seminar. The most common outcome-evaluation measure was a multiple-choice examination. Only seven of the reports evaluated the curricula's effectiveness, and only four met a minimum methodologic standard of a pretest-posttest controlled trial. The impacts on critical appraisal skills of the curricula in those four reports ranged from no effect to a 23% net absolute increase in test scores*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10386099

39. Bazarian, J. J., C. O. Davis, et al. (1999). "Teaching emergency medicine residents evidence-based critical appraisal skills: a controlled trial." Annals of Emergency Medicine 34(2): 148-154.

"*The mean improvement in test scores was 1.80 for the control group* [traditional, monthly, unstructured journal club] *and 1.53 for the intervention group* [monthly journal club using an EBM approach to critical appraisal]*; these values were not significantly different (P =.90). The difference in mean change in test score between the 2 groups was.27 points*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/10424914

40. Grimes, D. A., J. A. Bachicha, et al. (1998). "Teaching critical appraisal to medical students in obstetrics and gynecology." Obstetrics & Gynecology 92(5): 877-882.

"*We provide a series of student seminars that foster critical reading of the literature….Evidence-based ward rounds complement the experience. During the rotation, each student formally reviews one topic in women's health using the US Preventive Services Task Force rating system. Although we lack a quantitative assessment of this approach, student feedback has been enthusiastic*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/9794687

41. Norman GR and Shannon SI (1998). Effectiveness of instruction in critical appraisal (evidence-based medicine) skills: a critical appraisal. CMAJ. Jan 27;158(2):177-81.

"*Analysis showed that interventions implemented in undergraduate programs resulted in significant gains in knowledge, as assessed by a written test (mean gain 17.0%; standard deviation [SD] 4.0%). Conversely, studies at the residency level consistently showed a small change in knowledge (mean gain 1.3%; SD 1.7%)"* taken from abstract

Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1232690/pdf/cmaj_158_2_177.pdf

42. Richardson, B. and C. Jerosch-Herold (1998). "Appraisal of clinical effectiveness - An ACE approach to promoting evidence-based therapy." Journal of Clinical Effectiveness 3(4): 146-150.

"*The statistical analysis indicates that there is a significant difference (P=0.0001) in self-reported knowledge before and after the workshops*" taken from abstract

Abstract: http://www.emeraldinsight.com/journals.htm?articleid=1657096&show=html

43. Fikree, F. F. and D. R. Marsh (1996). "Critical appraisal by reading for medical students--a case study from Pakistan." JPMA - Journal of the Pakistan Medical Association 46(4): 80-83.

> "*The students reading attitudes and critical appraisal skills were assessed through continuous assessment and a written final examination with questionnaire. All but three students* [64/67] *passed the final examination (mean score 74%, standard deviation 12%). All (73% strongly) agreed that critical reading skills were essential, but only 30% strongly agreed that they had, indeed, mastered the skills. Ninety-seven percent (56% strongly) disagreed that year three was too early to start critical reading*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/8991359

44. Domholdt, E., J. L. Flaherty, et al. (1994). "Critical appraisal of research literature by expert and inexperienced physical therapy researchers." Physical Therapy 74(9): 853-860

> "*Experts and novices differed most in the identification of construct validity concerns and were most similar in the identification of internal validity concerns. Only one factor - content- specific expertise - was associated with differences in critiquing ability among the novices*" p860

Full text: http://www.physicaltherapyjournal.com/content/74/9/853.full.pdf+html

45. Audet, N., R. Gagnon, et al. (1993). "[How effective is the teaching of critical analysis of scientific publications? Review of studies and their methodological quality]." CMAJ Canadian Medical Association Journal 148(6): 945-952. In French, but has English abstract.

> "*The effectiveness of teaching critical appraisal of the literature remains uncertain. More rigorous methods are needed in research in this area*" taken from abstract

Abstract: http://www.cmaj.ca/content/148/6/945

46. Frasca, M. A., J. L. Dorsch, et al. (1992). "A multidisciplinary approach to information management and critical appraisal instruction: a controlled study." Bulletin of the Medical Library Association 80(1): 23-28.

> "*The results of this study show that these skills* [library instruction and critical appraisal skills] *can be effectively taught during the clinical years. Having library and clinical faculty coordinate instruction during a clinical clerkship may be more effective than preclinical instruction*" p27

Full text: http://pubmedcentralcanada.ca/pmcc/articles/PMC225611/pdf/mlab00114-0041.pdf

47. Konen, J. C. and B. S. Fromm (1990). "A family practice residency curriculum in critical appraisal of the medical literature." Family Medicine 22(4): 284-287.

> "*The curriculum prepared graduates to critically review research studies in the professional literature and translate valid conclusions into medical practice. Residents were able to identify potential areas of research interest and acquired additional skills that encouraged continuing education and professional growth*" taken from abstract

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/2384203