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Critical appraisal of journal article in research workshop for postgraduates: Quasi experimental study

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ABSTRACT

The thesis serves as a prerequisite for every graduate program and a standard component of the graduate curriculum, designed to assess students' mastery of specific coursework. This is a prospective study conducted during a three-day basic research workshop to evaluate the impact of various aspects of critical assessment instruction on students' understanding. This article also reviews the available literature on critical evaluation for graduate students in the health sciences and provides guidance to help initiate the thesis process. To publish in a journal, one needs up-to-date information on various journals, citation indexes, and their impact factors. This article provides a current overview of bibliographic indexing agencies. Additionally, the critical evaluation of journal articles is explained in detail. The results of this study indicate that indexing information and the direct presentation of results have a significant impact on students' understanding of critical evaluation. The inclusion and emphasis on journal indexing and information regarding the direct presentation of results in courses and workshops on research methodology for graduate students will represent a step forward in curriculum development.

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ABSTRAK

Tesis sebagai prasyarat untuk setiap program pascasarjana dan bagian standar dari kurikulum pascasarjana yang mengevaluasi penguasaan mahasiswa dalam mata kuliah tertentu. Ini adalah studi prospektif yang dilakukan selama 3 hari lokakarya penelitian dasar untuk mengevaluasi dampak berbagai aspek kuliah penilaian kritis terhadap pemahaman mahasiswa. Artikel ini juga mengulas literatur yang tersedia tentang penilaian kritis mahasiswa pascasarjana ilmu kesehatan dan memberikan informasi yang akan membantu dalam memulai proses tesis. Untuk menerbitkan di jurnal, seseorang memerlukan informasi terkini mengenai berbagai jurnal standar dan indeks kutipan serta faktor dampaknya. Artikel ini memberikan gambaran umum terkini tentang lembaga bibliografi pengindeksan. Selain itu, penilaian kritis terhadap artikel jurnal dijelaskan secara rinci. Hasil studi ini menunjukkan bahwa ada dampak signifikan dari informasi pengindeksan dan penyajian hasil secara langsung terhadap pemahaman mahasiswa dalam penilaian kritis. Pencantuman dan penekanan pada pengindeksan jurnal dan informasi tentang representasi hasil secara langsung, dalam kursus dan lokakarya tentang metodologi penelitian untuk mahasiswa pascasarjana, akan menjadi satu langkah maju dalam pengembangan kurikulum.

Kata Kunci: *artikel jurnal; penilaian kritis; penulisan tesis*

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INTRODUCTION

A thesis is a prerequisite for any postgraduate degree and a standard part of the postgraduate curriculum to evaluate the mastery of a student in a particular subject. Thesis as a research topic and postgraduates at the initial stage find it difficult to proceed with their thesis. It is the first step for students of health sciences towards evidence-based medicine practice. Skills acquired during learning research methodology and the thesis process remain lifelong guiding principles for evidence-based practices (Almutairi et al., 2024; Manjali & Gupta, 2020; Tod et al., 2022). In universities offering health sciences, there are various streams, e.g., Medical, Ayurveda, Homeopathy, Nursing, and Physiotherapy. Postgraduates in these streams need to undergo basic research workshops early in their curriculum, and critical appraisal of journal articles is an essential part of each workshop.

Critical appraisal is difficult and, at times, boring, which creates a barrier to continuing research and learning activities (Tomotaki et al., 2024; Wood et al., 2022). While preparing for such a workshop, this researcher observed a discrepancy in the literature regarding the teaching of critical appraisal to students of health sciences. While regulatory bodies of health education worldwide have made it mandatory that publications for academicians be in indexed journals and that teaching and research be conducted in workshops for post-graduates, there is little emphasis on journal indexing. Hence, the study needs to examine the impact of incorporating indexing into students' critical appraisal teaching.

Table 1. Studies related to the improvement of critical appraisal skills

Studies related to the improvement of Critical appraisal skills
Studies describing critical skill improvement in health personnel
(Mumtaz & Sabir, 2022): Journal clubs
(Sasannia et al., 2022): Multi-media and Critical appraisal skill online workshops
(Allon et al., 2023): Gamified journal club
(Mlika et al., 2022): Traditional workshop method with a serious game
(Lin et al., 2023): Simulation scenarios and vote cards
(Özden & Cakir, 2024): Online peer teaching of the Critical Appraisal
(Mohamed et al., 2024): Video journal club
Studies describing the results of different tools for critical appraisal assessment
(Soliman et al., 2022)
(Smeraglio et al., 2022)
(Aizer et al., 2023)
(Chao et al., 2023)
(Danopoulos et al., 2025)

Source: Research Documentation, 2026

In the available literature on critical appraisal, the role of indexing is not emphasized, which is vital during the initial phase of the research process for a thesis (See: **Table 1**). Results on pectoral presentation provide further insights into the study, which will be very helpful for

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postgraduates. Graphical presentation in a research paper. This encouraged the addition of a graphical presentation in the lecture (Manjali & Gupta, 2020). These two modifications were made during a research workshop for postgraduates to spark students' interest in research and support curriculum development. In the literature, the impact of these modifications has not been assessed, and there is insufficient evidence to support it. Hence, this preliminary quasi-experimental study was contemplated. This study evaluates the impact of different aspects of critical appraisal lectures in research workshops on students' understanding. The objective of this study: 1) To study the role of modifications in critical appraisal of journal article lectures in curriculum development; 2) To estimate the impact of information of indexing on health science post-graduates in a research workshop; and 3) To assess the impact of pectoral presentation of results in critical appraisal to students.

LITERATURE REVIEW

Critical appraisal is the systematic examination of the research evidence reported in scientific articles to assess their validity, reliability, and applicability before using their findings to inform decision-making. It should be considered the first step in grading the quality of evidence (Manjali & Gupta, 2020). A study introduced a journal club to preclinical dental students. It evaluated it using a 15-item questionnaire and found that journal clubs are useful for improving active learning, critical appraisal, analytical, and decision-making skills (Mumtaz & Sabir, 2022). A prospective Randomized Control Trial (RCT) involving 256 sixth-year undergraduate medical students concluded that teaching critical appraisal skills through multimedia and online workshops effectively improves students' knowledge and confidence in appraising articles (Sasannia et al., 2022).

Furthermore, a 2022 study developed a tool with two appendices to guide researchers in answering 21 questions to assess the quality of published clinical pharmacokinetic studies (Soliman et al., 2022). A qualitative study found that key barriers to learning critical appraisal include time constraints and the perception that critical appraisal is difficult or boring. By integrating critical appraisal into emergency department culture and connecting critical appraisal skills with the development of residents' professional identity as excellent physicians, researchers, and teachers, residents will develop greater intrinsic motivation to learn and practice critical appraisal (Wood et al., 2022). Critical appraisal tool for graduate medical education trainees for medical research manuscripts (Smeraglio et al., 2022).

A gamified journal club was associated with improvements in engagement and minimal change in critical appraisal skills (Allon et al., 2023). A 2022 study compared traditional workshop methods with a serious game intervention for teaching critical appraisal of literature to pathology students. They did not find a significant difference between the two groups' scores. However, the students in the intervention group showed improved motivation and encouraged the use of both methods in critical appraisal teaching (Mlika et al., 2022). The study used simulation scenarios and vote cards in an EBM course. It concluded that vote cards facilitated medical students' understanding of critical appraisal concepts, identified areas they found challenging, and encouraged their active participation. Such interactive sessions should be increasingly included in medical education (Lin et al., 2023).

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Furthermore, the study measured the critical appraisal skills of postgraduate medical students using a questionnaire developed through item generation from a literature review and an expert committee, and found it to be quite reliable (Mlika et al., 2023). A study used select items from the Clinical Research Appraisal Inventory (CRAI), an instrument measuring clinical research self-efficacy, with rheumatology trainees and concluded that it is a useful tool (Aizer et al., 2023). A 2023 study reported a critical appraisal tool for composite measures such as frailty and mental illness, comprising 19 questions across seven domains (Chao et al., 2023). The study evaluated a workshop focused on critical appraisal for advanced practice nurses. It concluded that, despite strong interest in evidence-based practice and critical appraisal, ongoing learning in the critical appraisal of research articles was difficult in practice. Continuous learning and practicing critical appraisal require organizational support and readiness for evidence-based practice (Tomotaki et al., 2024).

Furthermore, the study used a standard peer-teaching module on critical appraisal for medical students. It concluded that online peer teaching of the Critical Appraisal module successfully increased participants' knowledge and self-confidence (Özden & Cakir, 2024). A quasi-experimental study involving 40 participants examined the effect of video journal clubs and concluded that they are influential in developing competencies in critical appraisal (Mohamed et al., 2024). The article raises concern that the lack of formal instruction in critical appraisal for junior doctors will harm their future development of research skills. However, they do not mention indexing journals in critical appraisal training (Almutairi et al., 2024). Though not related to teaching critical appraisal to health post-graduates, they stated that the critical appraisal tool they developed was designed to test the quality of evidence communication (Danopoulos et al., 2025).

METHODS

This study uses a preliminary quasi-experimental design in which only post-test scores were considered. Participants were first-year postgraduates from India who had registered for a 3-day basic research workshop. 30 participants attended the workshop lecture on critical appraisal and all provided consent to participate in this study. The lecture on critical appraisal was divided into the subtopics: Indexing of the journal article, Introduction, Methods, Results, and Discussion. All participants were given a post-test after the lecture. In the post-test, participants had to mention the serial number assigned in the workshop and the stream of health sciences, and they had to give a score for the usefulness they thought each subtopic of the lecture had, out of 10, with parametric variables described as means. The collected data were analyzed using IBM SPSS Statistics version 30.

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RESULTS AND DISCUSSION

Table 2. Different Streams of Participants

	Frequency	Percent
Ayurved	4	13.3
Nursing	8	26.7
Physiotherapy	18	60.0
Total	30	100.0

Source: Research Documentation, 2026

Table 2 shows that of the 30 participants, 18 were Physiotherapists, 4 were Ayurved, and 8 were from the Nursing stream.

Table 3. Comparison of Scores Given by Participants to Subtopics

	N	Minimum	Maximum	Mean	Std. Deviation
Indexing of a journal article	30	8	10	9.47	.900
Introduction	30	7	7	7.00	.000
Methods	30	4	7	5.70	1.291
Results	30	5	7	5.93	.907
Pectoral presentation	30	8	10	9.40	.770
Discussion	30	7	9	7.73	.691

Source: Research Documentation, 2026

Table 3 shows the participants' post-test scores by subtopic. Indexing of journal articles and Pectoral presentations has scores of 9.47 and 9.40, respectively, out of 10, which are the highest among the other subtopics.

Table 4. Stream-wise post-test scores

Stream of Participant		Indexing of journal article	Introduction	Methods	Results	Pectoral presntaton	Discussion
Ayurved	Mean	9.50	7.00	6.75	6.75	8.75	8.25
	N	4	4	4	4	4	4
	Std. Deviation	1.000	.000	.500	.500	.500	.500
Nursing	Mean	9.25	7.00	6.50	6.62	9.00	8.38
	N	8	8	8	8	8	8
	Std. Deviation	1.035	.000	.535	.518	.926	.518
Physiotherapy	Mean	9.56	7.00	5.11	5.44	9.72	7.33
	N	18	18	18	18	18	18
	Std. Deviation	.856	.000	1.323	.784	.575	.485
Total	Mean	9.47	7.00	5.70	5.93	9.40	7.73
	N	30	30	30	30	30	30
	Std. Deviation	.900	.000	1.291	.907	.770	.691

Source: Research Documentation, 2026

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Table 4 shows stream-wise post-test scores. Scores were not compared across streams of health sciences, as this was deemed unnecessary.

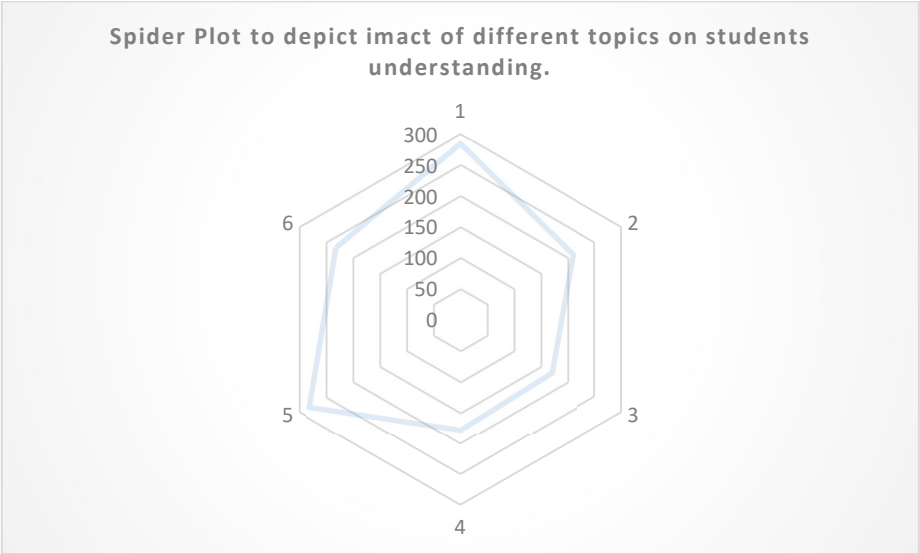

Figure 1. Impact of Different topics on students' understanding
1. Indexing, 2. Introduction, 3. Methods, 4. Results, 5. Pectoral presentation, 6. Discussion.
Source: Research Documentation, 2026

The post-test results show higher scores for indexing the journal and Pectoral presentation subtopics in **Figure 1**. The following provides brief information on the critical appraisal of the journal article, useful for postgraduate health science students, along with general details.

When interpreting the findings from a synthesis of the evidence, reviewers need to consider the credibility of the underlying research, a process typically labelled as a critical appraisal. Critical appraisal is the process of systematically examining the research evidence to assess its validity, results, and relevance before using it to inform a decision.

After writing a good-quality manuscript, there is a search for a high-quality, peer-reviewed, indexed journal. An initial assessment of the journal in which it was published is especially valuable: a peer-reviewed, indexed journal with a strong impact factor adds robustness to the paper. An indexing or citation index is an ordered list of cited articles (labeled as references). Each cited article is accompanied by a list of citing articles (sources), allowing users to establish the chronology of citations. Indexing of a journal reflects its quality, reputation, reach, and, consequently, its impact on journal articles.

Indexing is a database of scientific journals with a good track record of upholding ethical standards and publication quality. Indexed journals are considered to be higher in terms of quality when compared with non-indexed journals. They have better visibility, thus helping quality papers be submitted to the journal. The journal's authority and reputation also improved (Singhal et al., 2023). All these factors further increase the journal's impact factor. There are several abstracting and indexing services available today. Some are affiliated with institutions (e.g., PubMed, maintained by the United States National Library of Medicine [NLM], USA, at the National Institutes of Health). In contrast, others are provided by publishers (e.g., Scopus by Elsevier).

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Currently, there are four major online bibliographic sites: MEDLINE, PubMed Central, Institute for Scientific Information (ISI), and Scopus. Inclusion in MEDLINE confers a mark of quality on the published material; PubMed Central provides greater access to open-access content; ISI provides an official impact factor; and inclusion in Scopus provides a better picture of journal metrics and an H-Index indicating productivity and citation impact (Agrawal, 2020).

For many years, Index Medicus (IM), developed by the United States National Library of Medicine (NLM), was regarded as one of the most reliable and widely used indexes of medical journal articles. IM served as the printed index of medical literature and was published from 1879 until 2004. In 1960, NLM began computerizing this system through a program called MEDLARS, which later evolved into MEDLINE. Consequently, IM served as the print counterpart to the MEDLINE database until its discontinuation in 2004. Today, MEDLINE includes records from approximately 5,600 scientific journals (Kalyani et al., 2025; Singhal et al., 2023).

PubMed is a free search platform that allows users to explore and retrieve scientific literature from NLM resources, including MEDLINE, PubMed Central (PMC), and the Bookshelf (Zhao et al., 2022). MEDLINE is the primary component of PubMed and contains citations from selected journals indexed with Medical Subject Headings (MeSH), along with curated metadata such as funding details, genetic information, chemical data, and other relevant information. Another major component of PubMed is PubMed Central (PMC), which provides a full-text digital archive of journal articles reviewed and approved by NLM (Singhal et al., 2023).

Citation indexing services include Science Citation Index (SCI) and Science Citation Index Expanded (SCIE) (Liu et al., 2024). Other platforms function mainly as search engines or online bibliographic databases. Major bibliographic databases include MEDLINE (one of the most prestigious and searchable through PubMed), ISI (Institute for Scientific Information founded by Eugene Garfield), Scopus, and the emerging Indian Citation Index. SCI, originally published by the Institute for Scientific Information, was the first citation index developed. It has also been used to evaluate scientific productivity by linking researchers' performance with citation counts. Currently, SCI is owned by Clarivate Analytics as part of the Web of Science database (Gurnani & Kaur, 2021). The broader version of SCI is SCIE, which indexes more than 8,000 prominent journals across 174 scientific disciplines. These journals are recognized as leading publications in science and technology due to SCIE's rigorous selection process. Another distinction is that SCI is still available in CD/DVD format, although both SCI and SCIE are accessible online (Singhal et al., 2023).

Elsevier publishes both Embase and Scopus, but they differ in their primary focus (De Leon et al., 2025). Embase emphasizes detailed indexing of biomedical full-text content, offering deeper insights through structured indexing systems. In contrast, Scopus primarily focuses on abstracts and citation data, allowing users to efficiently track and navigate the published scientific literature (Singhal et al., 2023).

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The Directory of Open Access Journals (DOAJ) is an index that lists a wide range of open-access journals from around the world (Nishikawa-Pacer, 2022). It operates as an independent, nonprofit organization managed by Infrastructure Services for Open Access (IS4OA), which is registered in the United Kingdom and also has a branch in Denmark. DOAJ provides free and immediate access to the full content of open-access journals without requiring registration. At the same time, it maintains high academic standards by ensuring that the included journals follow peer-review processes or strict editorial quality control (Singhal et al., 2023).

The use of tables and figures, including graphical representations, is encouraged to improve clarity. However, duplicating these data in the text should be avoided. Here are some commonly used data presentation designs (Rainero et al., 2021; Spineli & Pandis, 2020):

1. A pie chart depicts the groups of data as proportions of the whole dataset.
2. The bar/column graph depicts the variation of a variable between several groups as bars (horizontal) or columns (vertical).
3. Histogram: Column graph with no gaps, labeled by using the midpoint, start, or end of the interval.
4. Box and whisker plot for the comparison of values between two or more groups. The box represents the 25th and 75th percentiles of the cohort. A horizontal line represents the median value of the cohort. Whiskers show the maximum and minimum values.
5. ROC curve: A graphical plot that illustrates the diagnostic ability of a binary classifier system as its discrimination threshold is varied. It is created by plotting true-positive rates against the false-positive rates and is commonly used in the studies of diagnostic accuracy.
6. Line graph: Depicts the relationship between an independent variable (x-axis) and a dependent variable (y-axis), which are usually continuous.
7. KM curve: A line graph that represents time-to-event data (overall survival) with the X-axis plotting time and the Y-axis plotting the event.
8. Scatter plot: Depicts the relationship between two variables and their change in a consistent way.
9. Waterfall plot: A special type of bar graph (two-dimensional) used to represent the response rate in individual patients (arranged from best to worst).
10. Spider plot: Depicts multivariate data as equiangular spokes (radii) with each spoke representing one of the variables and the length of the spoke being proportional to the magnitude of the data point relative to the magnitude of the variable across all data points.
11. A graphical display to summarize the results of meta-analysis. The measured effect of each study is depicted as a solid square. The square's size is proportional to the study's weight. The horizontal line through each square represents the 95% confidence interval (CI) for the point estimate in that study. Diamond represents the weighted pooled effect. The dashed line passing through the diamond is the overall point estimate. The edges of the diamond represent the 95% CI around this estimate. A solid vertical line represents the unity (line of no effect).

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Discussion

A thesis is a mandatory exercise to be completed for the award of the postgraduate degree. However, later in the careers of health professionals, the research methodology learned during the initial period helps them search for evidence in practice. A critical appraisal of journal articles conveys the essence of the research methodology, and the research methodology workshop forms an important part of the postgraduate curriculum. However, the literature suggests difficulties in teaching and maintaining continued interest among busy health sciences students and professionals (Tomotaki et al., 2024; Wood et al., 2022). Critical appraisal of a journal article is an important step for post-graduates in preparation for thesis work. Many postgraduates feel wounded by the overload of clinical work, and reading journal articles with critical appraisal skills will spark interest and hasten the thesis process. Inclusion and emphasis on journal indexing and information on the presentation of results in the courses and workshops on research methodology for postgraduate students will be a step forward in curriculum development.

The literature review shows that many studies on critical appraisal have used various interventions to increase students' interest in the topic. Few studies used interventions at the undergraduate level. Undergraduate EBM training is challenging because most students find the content irrelevant to their courses (Basheer et al., 2021). This shows a wide discrepancy in students' understanding of research and the critical appraisal of articles. Overview of critical appraisal, including a pictorial presentation of results. However, details regarding indexing agencies are not mentioned in most articles (Manjali & Gupta, 2020). The results of this study support the prior assumption that adding indexing information and presenting results in a pectoral manner in critical appraisal lectures to postgraduate students will affect their understanding of critical appraisal of research articles. Though there are studies describing various strategies to improve critical appraisal skills, interventions done in this study are adding a different dimension in teaching critical appraisal to health sciences post-graduates (Allon et al., 2023; Lin et al., 2023; Mlika et al., 2022; Mohamed et al., 2024; Mumtaz & Sabir, 2022; Özden & Cakir, 2024; Sasannia et al., 2022).

Studies report various tools for assessing critical appraisal skills. Findings from this study can be further explored in the development of a tool to aid critical appraisal (Aizer et al., 2023; Chao et al., 2023; Danopoulos et al., 2025; Smeraglio et al., 2022; Soliman et al., 2022). There are a few drawbacks to this study. This study is preliminary and does not intend to reach conclusions, as it is a quasi-experimental study that considers only post-test scores. Sample size limited to 30 participants, representative of Health University, which caters to thousands of health sciences post-graduates. Given the weaker study design and the possibility of bias, chance, and confounding factors in the results cannot be ruled out. Only the post-test score used in this study is a subjective outcome, which is a limitation.

CONCLUSION

This study finds space for adding indexing information and a practical presentation of results in critical appraisal lectures in research workshops, with a significant impact on students and an increase in their engagement and interest in critical appraisal skills. Critical appraisal of journal articles is a must for postgraduates. It will help with their thesis work and

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poster/paper presentations at conferences, which are mandatory requirements for completing their courses. It also guides the future in clinical practice. The literature review shows that many strategies are used to improve students' critical appraisal skills in the health professions. Most institutions offering postgraduate courses conduct orientation programs for new Postgraduates. Also, one needs to complete research methodology courses to gain basic knowledge for research activity. However, in these courses and workshops on critical appraisal skills, the indexing of journal information is not covered in detail. This information should be incorporated into these activities, which will be one step in the curriculum development process. Different pectoral designs are used to depict the study's results. Various charts and bar diagrams briefly summarize the results. However, these pectoral representations are not stressed during training sessions for students' critical appraisal. A section on pectoral representation should be included in such courses, as it would be very helpful to students.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article. The author emphasizes that the article's data and content are free of plagiarism.

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