

Efficacy of Medical Student Surgery Journal Club



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BACKGROUND: Journal clubs exist in a variety of forms in medical schools across the United States. Many incorporate a full spectrum of medical specialties, some are specific to certain interest groups or specialties, and many widely vary in whether or not they are school mandated or student-run. While these clubs are ubiquitously scattered throughout medical education, there has been very little quantitative or qualitative analysis regarding the efficacy of these clubs in enhancing medical students' abilities to evaluate clinical literature. The purpose of this study was to evaluate the effects of attending Surgical Journal Club meetings at Eastern Virginia Medical School from both a qualitative and quantitative perspective. The authors' hypothesis was that regular attendance of these sessions would improve student performance from a multitude of perspectives and demonstrate the value of clinical literature analysis earlier in medical education.

METHODS: A fifteen question Likert survey was administered on an optional basis to thirty-six medical students attending journal club. Responses were analyzed anonymously, and there was no incentive or demerit for completing the survey. Data was compiled and the mean, median, and mode for each question calculated with "5" corresponding to "Strongly Agree" and "1" corresponding to "Strongly Disagree."

RESULTS: Twenty-seven of thirty-six attendees to our seventh journal club meeting completed the survey. Student responses were overwhelming positive, with all but one question reaching above "Agree" by analysis of the mean responses.

CONCLUSION: Journal clubs remain an integral part of medical education but their importance has been diminished in recent years due to the increasing demands of other aspects of the first two years in medical school. We described a medical student run/established journal club that increased students' interest in surgery, their

perceived knowledge-base, and comfort in critically analyzing medical journal articles. (*J Surg Ed* 76:83–88. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: club, journal, education, surgery, subspecialty, literature

COMPETENCIES: Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills

INTRODUCTION

Journal clubs exist in a variety of forms in medical schools across the United States. Many incorporate a full spectrum of medical specialties, some are specific to certain interest groups or specialties, and many widely vary in whether or not they are school mandated or student-run. While these clubs are ubiquitously scattered throughout medical education, there has been very little quantitative or qualitative analysis regarding the efficacy of these clubs in enhancing medical students' abilities to evaluate clinical literature. As students transition from learning the basic sciences into becoming clinicians throughout their 4 years in medical school, the striking difference between learning from textbooks and learning from primary literature becomes apparent. The preclinical years of medical school often leave students ill-prepared to critically analyze evidence-based medicine. In studying for USMLE Step 1, students may gain a surface level understanding of the difference between randomized controlled trials (RCTs), retrospective cohort studies, case-control studies, cross-sectional studies, and many other type of articles and study designs. However, this is often not enough to prepare students to interpret literature in the clinical setting. One of the most common misperceptions among students is that a study must be "good" if it appears in a journal that they are given to read. However, many attending physicians will quote anywhere from

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70% to 90% of articles as having severely flawed designs that lead to clinically irrelevant conclusions.¹ The goal of early exposure to clinical literature is to begin developing some of these analytical skills at an earlier stage.

While there has been sparse literature regarding this subject in the past, there have been a few studies that arrive at some interesting conclusions. Hohmann et al. showed that first year surgical residents significantly improved their ability to evaluate literature after just 10 in-person meetings.² Total assessment scores improved from 49.5% to 82.5% and the ability of surgical residents to come to the same conclusion as attending physicians regarding article acceptance improved from 0% to 60%. Ebbert et al. showed slightly more mixed results while conducting a systematic review of journal clubs in medical education.³ They showed certain RCTs of journal clubs that led to an improvement in knowledge of clinical epidemiology and biostatistics, reading habits, and the use of medical literature in practice, but no improvement of critical appraisal skills. However, 6 other studies found “possible” improvement in critical appraisal skills. This variability led them to conclude that more RCTs need to be done to fully evaluate the complete effects of journal clubs in medical education.

The purpose of this study was to evaluate the effects of attending Surgical Journal Club meetings at Eastern Virginia Medical School from both a qualitative and quantitative perspective. The authors’ hypothesis was that regular attendance of these sessions would improve student performance from a multitude of perspectives and demonstrate the value of clinical literature analysis earlier in medical education.

METHODS

The Eastern Virginia Medical School Surgery Journal Club was founded with 3 goals: (1) improve literature analysis skills, (2) expose club members to different

surgical specialties, and (3) prepare members for clinical rotations and residency programs. The club’s meetings were advertised over social media, official EVMS e-mail, and by word of mouth. First, second, and third-year medical students from a single institution attended meetings voluntarily. A monthly, 1-hour evening block in a small lecture hall was reserved for meetings. Students were provided pizza dinners for 2 of the 6 meetings, but otherwise received no additional incentives to attend. Meetings were not counted as excused absences from other clinical or school responsibilities, so students and faculty who attended did so on their own free time.

Meetings were attended by 1 surgical attending physician and between 15 and 30 medical students. An article was presented via PowerPoint format by 1 or 2 medical students to the entire group. The initial presentation lasted approximately 15 minutes and included an overview of the paper’s methods, results, clinical implications, and strengths and weaknesses. After the presentation, the attending physician provided feedback on the presentation. Finally, all participants were encouraged to join in a critique of the strengths and weaknesses of the paper, as well as pose questions regarding clinical implications to the attending physician guiding the discussion.

The only criteria for journal club papers were that the theme be related to a surgical field and that they were agreed to be of clinical significance with the attending presiding over the meeting (Table 1). The process of selecting a paper began with the 3 Surgery Journal Club executives identifying an interested attending physician in a surgical field at Eastern Virginia Medical School. A landmark article in that particular attending physician’s subspecialty field was then presented as an option. Landmark articles were defined as practice-changing. The attending physician presiding over the meeting would then agree that the article impacted his or her clinical practice or suggest another article that they felt would be both useful for medical students to know and also serve as a learning tool for analyzing strengths and weaknesses of medical research. Table 1

TABLE 1. Lists the Articles Used in the Surgical Journal Club at the Time of Manuscript Submission

Citations of journal club articles reviewed

1. Hebert PC, et al. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. *The New England Journal of Medicine*. 1999. 340(6):409-417.
 2. Shakur H, et al. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage. *The Lancet*. 2010. 376(9734):23-32.
 3. Stockman, J.a. Antibacterial Prophylaxis After Chemotherapy for Solid Tumors and Lymphomas. *Yearbook of Pediatrics*. 2007. Pp. 461–464., doi:10.1016/s0084-3954(08)70254-9.
 4. Fioranelli, M., Roccia, M. G., Pastore, C., Aracena, C. J. & Lotti, T. Completion dissection or observation for sentinel-node metastasis in melanoma. *Dermatologic Therapy* 30, (2017).
 5. Gale S, et al. The public health burden of emergency general surgery in the United States: a 10-year analysis of the Nationwide Inpatient Sample—2001 to 2010. *Journal of Trauma and Acute Care Surgery*. 2014. 77(2): 202-208.
 6. Devereaux PJ, et al. Effects of extended-release metoprolol succinate in patients undergoing non-cardiac surgery: a randomised controlled trial. *The Lancet*. 2008. 371(9627):1839-1847.
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represents a list of the literature evaluated at journal club meetings prior to writing this paper.

To determine the overall assessment of efficacy, a 15-question retrospective Likert survey was administered to determine if our club has been successful at meeting our original 3 goals: (1) improve literature analysis skills, (2) expose club members to different surgical specialties, and (3) prepare members for clinical rotations and residency programs (Fig. 1). Students were given a paper copy of the survey at the end of our fifth meeting. In order to ensure anonymity, students were asked to not write their name and to leave their responses face-down in a pile as they left. Members were told that completion of the survey was optional.

Surgical Journal Club Survey

Instructions: Please circle a single response.

1. **How many meetings of the Surgical Journal Club have you attended?**
 - a. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
2. **Have you presented at a meeting of the Surgical Journal Club?**
 - a. Yes, no
3. **The Surgical Journal Club has prepared me to succeed on my 3rd year surgery clerkship.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
4. **The Surgical Journal Club has prepared me to succeed on my other 3rd year rotations.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
5. **The Surgical Journal Club has prepared me to succeed in residency.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
6. **The Surgical Journal Club has helped me learn to detect bias in research articles.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
7. **The Surgical Journal Club has improved my skills and knowledge in biostatistics.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
8. **The Surgical Journal Club has given me insight into subspecialties of surgery I did not previously have.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
9. **My participation in the Surgical Journal Club has helped me better understand and utilize primary literature.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
10. **I currently have an interest in pursuing surgery as a career.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
11. **I had an interest in surgery as a career before joining the Surgical Journal Club**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
12. **The Surgical Journal Club has increased my desire to pursue surgery as a career.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
13. **The Surgical Journal Club has helped me solidify my basic science knowledge.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
14. **The Surgical Journal Club has helped me apply basic science to clinical situations.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
15. **The Surgical Journal Club has been a beneficial experience for me.**
 - a. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
16. **Other comments:**

Data were analyzed manually. Descriptive statistics were performed and recorded. All calculations were completed twice by 2 separate authors. Answers were assigned a score of 1 to 5. Five corresponded with “strongly agree,” 4 corresponded with “agree,” 3 corresponded with “neutral,” 2 corresponded with “disagree,” and 1 corresponded with “strongly disagree.”

RESULTS

Thirty-six medical students participated in journal club over a period of 9 months. Twenty-seven students were present and completed the survey at the conclusion of

FIGURE 1. Represents the Likert scale used to survey members of the club on a range of questions that were later statistically analyzed.

TABLE 2. Demonstrates Statistical Analysis of Student Response to Different Likert Survey Questions

Question Summary	Mean	Median	Mode
Q3: Succeed in 3rd year surgery clerkship	4.037	4	5
Q4: Succeed in other 3rd year clerkships	4.111	4	5
Q5: Succeed in residency	4.222	4	5
Q6: Detect bias in primary literature	4.481	5	5
Q7: Increase biostatistics knowledge	4.259	4	5
Q8: Insight into subspecialties	4.074	4	5
Q9: Understand and use primary literature	4.333	4	5

TABLE 3. Displays Comments From Medical Students Involved in the Journal Club Meetings

This club has been awesome, thanks!!
Hearing from active surgeons about the way they incorporate [and] analyze primary literature was extremely beneficial and taught me what I should look for in research for my future practice.
I was specifically asked about the Transfusion Requirements in Critical Care trial while on my surgery rotation. My residents and attending were extremely impressed by the rationale I gave as to why our patients with a hemoglobin of 6.4 did not necessarily need a transfusion of pRBCs.
I've received great feedback on my ability to critically evaluate literature from residents and attendings alike: I believe this is due, in large part, to my time in the Surgical Journal Club.
The club really helped me build my knowledge of landmark articles [and] was a great way to get to know attendings!
Awesome club. Great experience getting to know surgery attendings.
Got pimped on one of the articles from the Surgical Journal Club!
Thank you guys!!
As an M2, I'm still unsure how beneficial the club will be on rotations, but it really helped me get an understanding of how to utilize literature in a clinical setting. Plus, the small biostatistics talks helped me understand how the boring stats we learn in class are actually applied.

the fifth meeting for a response rate of 75%. Five of the 27 responders had previously presented an article, while 22 had not. Responders had attended an average of 3.85 meetings with a range from 1 to 6. Survey respondents agreed that the Surgery Journal Club was a positive experience in many different ways (Table 2).

The survey also asked respondents if they had additional comments. Table 3 contains all additional comments left on the surveys.

DISCUSSION

As the weighted-importance of board scores continues to increase, medical students often place little-to-no importance on developing their abilities to critically analyze evidence-based medicine. This lack of desire for students to develop these skills is compounded by the strong emphasis most US medical schools place on preparing students for USMLE Step 1 during the first 2 years of didactics. As noted by Small et al., third year medical students (after taking Step 1) are assumed to have developed proficient history taking and physical examination methods, oral and written communication, clinical

procedures, basic radiology, evidenced-based medicine, and professionalism.⁴ Of these 7 skills, most new third-year students would be hard-pressed to feel prepared in 5 of said skills; (1) how to obtain a patient's history and perform a physical examination, (2) have a basic radiology background from their anatomy classes/Step 1 studying, and (3) professionalism. The goal of our journal club was to help our colleagues connect the knowledge obtained during their first 2 years of didactics, help them learn to effectively communicate this knowledge in an oral presentation, and most importantly, to help students develop their own approach to medical journal articles and how to extract/apply this information to their future patients.

The 9-month results show a positive impact on students' comfort and is in part due to the application of the Adult Learning Theory, a theory specifically focused on a learner's development of self-directed learning techniques.⁵ The basis of this theory states that adults learn best when they are provided context with which the subject is being taught and that there are real life applications⁶; more importantly, the journal club provided users with the critical analytical tools that they will use both in residency and the rest of their careers. Because of its proven effectiveness

as a teaching method, several papers have called for an increased focus on teaching self-directed learning.^{5,7} This focus on self-directed learning empowered the club's members with a sense of personal responsibility in their learning and confidence in their current clerkships (Questions 3 and 4). A similar journal club described by Hartzell found that its participants frequently utilized skills obtained in the journal club when caring for their own patients, felt more independent as physicians, and felt more confident in their abilities to evaluate medical literature.⁶

During the first meeting, club's founders presented a review of biostatistics and how they are commonly applied in journal articles as well as a review of the article, "How to Critically Appraise an Article" by Young and Solomon.⁸ This article provides new learners with questions to ask while critically reading an article such as, "was the study design appropriate for the research question?," "do the data justify the conclusions?," etc. This provided the club's attendees with a framework that would provide a step-by-step method by which they could read and analyze a new and potentially daunting medical journal article. Despite the fact that this lecture was given 9 months prior to their surveys, club members reported increased biostatistics knowledge (Question 7) and abilities to detect biases in literature (Question 6).

After reviewing the article by Young and Solomon, club founders presented and reviewed the transfusion requirements in critical care trial⁸; the article, considered a landmark article on blood transfusion protocol, was presented as an example to help provide members with a template on how they could apply their critical reading skills in a clear and concise manner. We believed it important to provide the journal club with a basic format that could be followed for future presentations as, when left to student's discretion, there would likely be significant variation between presentations which could potentially detract from the focus points of the session. Several other journal clubs have utilized similar structured instruments which reported increased satisfaction and perceived educational attainments from its members.^{9,10} The McMaster's Criteria (Guyatt & Rennie, 2002) is one of these types of frameworks used in discussing most types of journals and an overview on how to organize presentations; however, as discussed by Hartzell, the benefit is not likely from the specific formatting but rather having a reliable and efficient system by which learners can analyze and present articles.⁶

From the first meeting, the club found that emailing club member electronic copies of the articles being reviewed increased participation. It was felt that the club's strengths were not only the variety of articles which kept members interested and engaged during meetings, but also in the variety of attending physicians that served as moderators. Members were able to see the unique process by which various attending physicians

approached literature and were able to tailor their approach accordingly. One of the more surprising aspects of starting this type of club was the high level of participation from the members both in their desire to present an article and discuss these article reviews. It was believed that choosing these types of landmark articles not only provided members with an opportunity to learn about major studies that impacted the medical profession, but also provided them with opportunities to reference said articles while on their clerkships. Not only did club members report an overall positive experience, the feedback from the attending physicians who moderated these discussions was overwhelmingly positive, all of whom thoroughly enjoyed and remarked upon the interest shown by its members and offered to moderate again in the future.

There are however several limitations to this study. This model was only evaluated at a single institution and with a relatively small number of participants. While most students reported increased basic science knowledge (86%) and how to clinically apply this knowledge (87%), the study was unable to qualitatively determine the actual impact the club had on their knowledge base. In addition, due to the short time period involved in the study, it has not yet been determined the effect the club has had from the perspective of attending physicians evaluating students on their clinical rotations.

CONCLUSIONS

Journal clubs remain an integral part of medical education but their importance has been diminished in recent years due to the increasing demands of other aspects of the first 2 years in medical school. We described a medical student run or established journal club that was based on the principles of the Adult Learning Theory that increased student's interest in surgery, their perceived knowledge-base, and comfort in critically analyzing medical journal articles. We hope that our experiences and findings spark an interest in other medical students or residents at other institutions have an interest in starting a journal club of their own.

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REFERENCES

1. Smith R. Peer review: a flawed process at the heart of science and journals. *J R Soc Med.* 2006;99:178-182.

2. Hohmann E, Tetsworth K. Teaching residents: critical appraisal of the literature using a journal club format. *Postgrad Med J*. 2016;92. <https://pmj.bmj.com/content/92/1093>.
3. Ebbert JO, Montori VM, Schultz HJ. The journal club in postgraduate medical education: a systematic review. *Med Teach*. 2001;23:455–461.
4. Small RM, Soriano RP, Chietero M, Quintana J, Parkas V, Koestler J. Easing the transition: medical students' perceptions of critical skills required for the clerkships. *Educ Health*. 2008;21:192.
5. Hartzell JD. Adult learning theory in medical education. *Am J Med*. 2007;120:e11; author reply e13.
6. Hartzell JD, Veerappan GR, Posley K, Shumway NM, Durning SJ. Resident run journal club: a model based on the adult learning theory. *Med Teach*. 2009;31:e156–e161.
7. Green ML, Ellis PJ. Impact of an evidence-based medicine curriculum based on adult learning theory. *J Gen Intern Med*. 1997;12:742–750.
8. Young JM, Solomon MJ. How to critically appraise an article. *Nat Clin Pract Gastroenterol Hepatol*. 2009;6:82–91.
9. Burstein JL, Hollander JE, Barlas D. Enhancing the value of journal club: use of a structured review instrument. *Am J Emerg Med*. 1996;14:561–563.
10. Schwartz MD, Dowell D, Aperi J, Kalet A. Improving journal club presentations or, I can present that paper in under 10 minutes. *ACP J Club*. 2007;147:A8–A9.

SUPPLEMENTARY INFORMATION

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