



Impact Evaluation of a Resident-Driven Research Training Workshop in Idaho: A Feasibility Study

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ABSTRACT

OBJECTIVES: Engagement in research activities is a critical component of clinical residency training. It is vital to build research capacity of residents to help interpret evidence-based medicine and design quality improvement projects. A mixed methods study was conducted to assess the impact of a 1-day research training workshop conducted at Eastern Idaho Regional Medical Centre, Idaho in May 2022. The workshop was targeted to improve the research knowledge of current clinical residents of Internal Medicine and Family Medicine.

METHODS: Workshop comprised of expert presentations, with assessment of difference in knowledge with a pretest and post-test. The sessions were organized around the core competencies of Institute of Medicine. Suggestions were also gathered from the audience. A pretest and post-test based on 13 questions was administered to the participants to assess change in research-related knowledge. Comments and suggestions of the participants were also recorded. Wilcoxon rank test was applied to determine statistical difference across each question and cumulative knowledge score. Conventional content analysis was applied to explore the comments and feedback.

RESULTS: The mean score of participants improved across all 12 questions. Statistically significant results were observed for the questions about types of studies qualifying as qualitative research. The cumulative score of participants increased in the post-test from 8.57 to 9.35. The participants gained new knowledge (94.3%), and felt more comfortable in application of research methods (74.3%). Encouraging feedback was obtained from the audience. They stated that they had benefited from the workshop and felt more prepared and motivated to indulge in scholarly activities.

CONCLUSION: The study shows improvement in research-related knowledge of clinical residents attending a 1-day training workshop. We recommend inclusion of such workshops in the curriculum of residents for skill building and enhanced indulgence in research activities in order to prepare them as future leaders in quality improvement, health policy, and hospital administration.

KEYWORDS: graduate medical education, residency training, teaching, curriculum, research activities, Idaho, United States

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Introduction

Accreditation Council for Graduate Medical Education (ACGME) recommends participation of postgraduate trainees of all specialties, including residents and fellows in scholarly activity.^{1,4} It is essential to ensure not only evidence-based practice,⁵ but also for capacity building of residents to be equipped with the skills required to be critical thinkers and future leaders in quality improvement, health policy, and hospital administration.^{6,7} During the recent COVID-19 pandemic it was widely recognized how research orientation and the ability to plan as well as critically appraise scientific literature empowers evidence-based decision making, advocacy, and guideline development. Furthermore, it is a critical action point in the career development of younger physicians, opening doors for further training and leadership in physician-scientist tracks, especially for those aiming to work at leading academic centers.^{8,11} It also improves resident satisfaction and dictates better patient care.⁵

Individual residency programs have implemented structured curricula to increase participation of residents and fellows in scholarly activity leading to variable satisfaction and acceptance by end-users.^{12,17} Residency training programs usually incorporate scholarly activity in the form of research projects and publications, journal clubs, grand rounds, webinars, and service on professional committees. However, there are significant barriers to successful scholarly activity implementation recognized in existing literature, including inadequate dedicated time, supervision and mentorship, and resources.¹⁸ Previous studies also found lack of resident interest as a major impediment, and varied attitudes lead to uncertain implementation of curricula.¹⁹ Research capability is a significant area of need for younger physicians. It hinders application of standards of clinical practice and takes away opportunities to provide satisfactory patient care and implement quality improvement initiatives.



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As a recently accredited Graduate Medical Education (GME) program at Eastern Idaho Regional Medical Center (EIRMC) for Internal Medicine (IM) and Family Medicine (FM) postgraduate training core faculty, hospital, and resident leadership have been working hard to establish a framework for action to enhance scholarly output. A resident-led research committee was created with representatives from all 3 years of residency and both programs of family and internal medicine as well as GME leadership and EIRMC quality improvement team. Residents are given priority in making decisions, in consultation with other senior members to ensure professionalism and appropriateness of initiatives. With strong, resident-driven momentum to establish a formal structure for research curriculum, a 3-pronged goal was identified: (i) to diversify educational opportunities available to residents through didactic sessions, workshops, or short-format conferences; (ii) to increase career potential by providing knowledge and media to design projects, write manuscripts, and publish in scientific journals; (iii) to increase resident participation in application of research toward quality improvement (QI) at hospital and system levels via QI committee participation, critical appraisal of QI interventions, and design of longitudinal programs at the institutional level.

With these goals in mind, the Research Committee at EIRMC organized a 1-day training workshop with instruction in the following areas: (i) developing a research proposal; (ii) critically appraising scientific literature; (iii) conducting literature reviews; (iv) organizing reference libraries and bibliography materials; and (v) utilizing qualitative study designs in clinical research and QI. The workshop consisted of a hybrid format of in-person and virtual presentations from nationally renowned experts. This study was designed to assess the workshop in (i) its effectiveness in improving participant knowledge of basic research concepts and existing resources and (ii) feasibility for scale-up as an annual event. These goals were created and implemented by consensus agreement of all members of the research committee, which include resident representatives, core faculty members, hospital quality improvement team, GME regional research director, and GME research coordinator. A framework targeting physician-scientist practice (described below)²⁰ was identified and core competencies salient to research curriculum studied. Subject experts were contacted for participation as expert presenters.

This workshop will be used as a pilot program for future scale-up and a baseline model for resident inclusion in curricular development. Overall goal was to inspire residents and provide opportunity to discuss impediments in the scholarly activities as well as ways to overcome them, and provide protected space and time to share ideas for new project startups as well as completion of ongoing projects. Using feedback from this workshop, the existing research curriculum will be modified to address resident needs, and introduce a regional annual event to allow residents to showcase their projects.

Methods

A 1-day training workshop was organized and conducted on May 27, 2022, at EIRMC. It was offered free of cost to the residents of FM (n = 11) and IM (n = 29). This study was reviewed by the internal HCA Healthcare Graduate Medical Education IRB and determined exempt. Informed consent was not deemed necessary as risks to participants were minimal.

Development of Session Guide

The overarching goal of the workshop was to prepare participants to carry out research activities independently. The sessions were designed to address major areas of relevance to medical residents. The framework we used is outlined by Institute of Medicine (IOM) as follows²⁰:

- Core competency 1: provide patient-centered care
- Core competency 2: teamwork and collaboration
- Core competency 3: employ evidence-based practice
- Core competency 4: apply quality improvement
- Core competency 5: utilize informatics

This is a wholistic framework targeting all aspects of physician-scientist practice, however for the purpose of this training workshop we addressed core competencies 2 to 5 to develop sessions that will help participants improve upon on skills necessary to conducting scholarly activities during residency training (Table 1). Field experts were contacted for each session and requested to contribute as facilitators for the workshop. The workshop had instructors from Brown University, Idaho State

Table 1. Session outline of the workshop.

	CORE COMPETENCIES ADDRESSED
1 Critical appraisal of scientific literature	Core competency 3
2 Literature reviews and Bibliographies	Core competency 3
3 Lessons from big data analysis	Core competency 3 and 5
4 Incorporating qualitative study design in quality improvement initiatives	Core competency 4
5 Manuscript writing and journal submissions	Core competency 3
6 Careers in clinical research for residents	Core competency 2, 3
7 Geriatric education-related research and implementation by trainees as an academic experience	Core competency 2 and 3
8 How to become independent in research	Core competency 3, 5
9 Transitioning from physician to physician-scientist	Core competency 3

University, UTHealth San Antonio, Baylor College of Medicine, UTHealth Houston, Houston Methodist Hospital, and HCA Healthcare. The workshop was a blend of in-person and virtual sessions, augmented with hands-on exercises for enhanced learning of the participants.

Measurement Tool

The effectiveness of the workshop was assessed via a mixed methods approach. For the quantitative analysis component, a self-administered online questionnaire (available as Supplemental material) was given to the participants ($n = 34$) at the beginning and end of the workshop. A small sampling frame was available depending on the currently enrolled residents in IM and FM programs. The sampling strategy therefore was nonprobability purposive sampling to include all available residents. The pretest was composed of 12 questions to assess residents' knowledge related to research and scholarly activities. The questions were formulated by facilitators of the workshop. Each question was given a score of 1 for a correct response and 0 for an incorrect response. The same 12 questions were asked of the residents at the end of the workshop along with an opportunity to provide feedback and comments about the workshop. The mean cumulative score was calculated and compared for the pretest and post-tests. For the qualitative component structured feedback forms were provided to the participants. These contained categorical response questions and well as an open-ended section for comments. A total of 78 comments were received from the participants.

Statistical Analysis

Mean and standard deviations were determined for each question along with the cumulative score of the pretest and post-tests. Wilcoxon rank test was applied to determine statistical significance between the mean score of pretest and post-tests to assess knowledge change of the participants. A P value of $<.05$ was considered significant. Frequencies and proportions were calculated for the feedback given by the audience. Comments of the participants were analyzed using conventional content analysis and organized into themes, subthemes, and codes. Word clouds were generated. The quantitative and qualitative data were analyzed using Stata.v.13 and MAXQDA, respectively.

Results

Quantitative Analysis ($n = 34$)

Table 2 depicts the results of pretest and post-tests. The mean score of participants improved across all 12 questions however, statistically significant results were only observed for the question identifying types of studies that qualify as qualitative research (pretest: mean = 0.23, post-test: mean = 0.47, P value $<.05$). The cumulative mean score of participants also increased

Table 2. Pretest and post-test results of the conference (complete questionnaire with response options available in Supplemental materials) ($n = 34$).

QUESTIONS USED IN ASSESSMENT	PRETEST MEAN (SD)	POST-TEST MEAN (SD)
1 Which of the following strategies is not typically used when conducting a PubMed literature search	0.6 (0.5)	0.7 (0.4)
2 When conducting a literature search in PubMed, which of the following is a useful search strategy	0.94 (0.23)	0.91 (0.28)
3 Why is the PICOT model useful when conducting PubMed literature searches	0.94 (0.23)	0.94 (0.23)
4 What is the best way to tell whether HCA Healthcare has access to a relevant article you find during a literature search	0.35 (0.48)	0.35 (0.48)
5 Adherence to an instructional design model can help ensure that educational activities are appropriate for the intended purpose and audience. A commonly used instructional design model is ADDIE. ADDIE stands for which of the following?	0.52 (0.50)	0.70 (0.46)
6 Please select which of the following statements regarding learning objectives is accurate	0.76 (0.43)	0.76 (0.43)
7 Cases which contain which of the following elements should be considered when selecting a case review to report	0.88 (0.32)	0.79 (0.41)
8 Which of the following types of studies is considered a qualitative study **	0.23 (0.43)	0.67 (0.47)
9 How do you define critical appraisal of scientific literature	0.32 (0.47)	0.38 (0.49)
10 Who should you contact when you have a question about research	0.91 (0.28)	0.97 (0.17)
11 If you want your project to move smoothly the number one thing you should do is	0.97 (0.17)	0.97 (0.17)
12 Who is required to do research	0.82 (0.38)	0.85 (0.35)
Cumulative score**	8.57 (1.61)	9.35 (1.92)

*Wilcoxon rank test was applied to test for significant difference between the pretest and post-test scores, as data was not normally distributed, and nonparametric tests are warranted.

** P value $<.05$ considered statistically significant.

from the pretest to the post-test from 8.57 to 9.35 ($P = .01$). Figure 1 shows a visual representation of the difference in cumulative pretest and post-test scores as well as median scores. Although there exists a visually appreciable improvement in mean as well as median scores from pretest to post-test evaluation, the 95% confidence intervals (CIs) overlap.

Table 3 shows participant feedback around the conference. Participants reported feeling as though they gained new

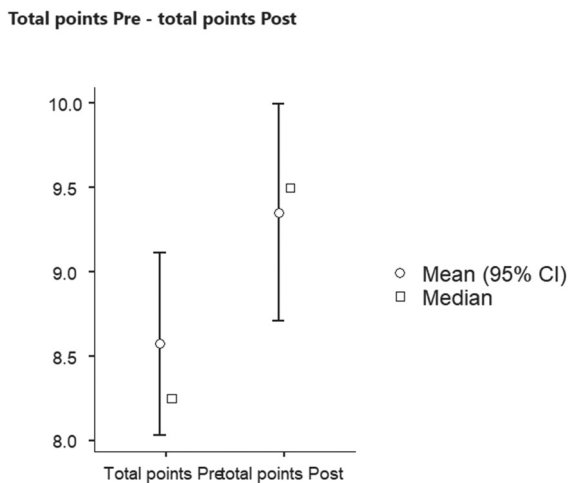


Figure 1. Visual comparison of change in cumulative mean knowledge score (95% confidence interval [CI]).

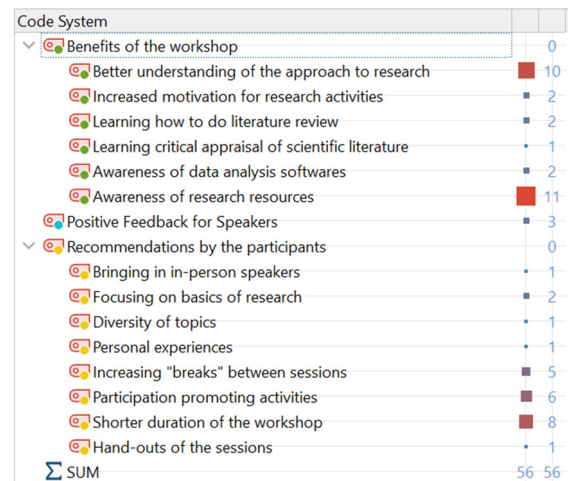


Figure 2. Themes and codes' matrix from qualitative analysis (comments = 78, themes = 3, codes = 56).

Table 3. Feedback of the participants for the conference (n = 34).

VARIABLE	n (%)
Did you feel the conference met your expectations?	
Yes	31 (88.6)
No	3 (8.6)
How would you rate the quality of the conference?	
Needs improvement	4 (11.8)
Acceptable	11 (32.4)
Good	14 (41.2)
Excellent	5 (14.7)
Did you learn new knowledge about scholarly activities and research today?	
Yes	33 (94.3)
No	1 (2.9)
Are you confident in using newly learned knowledge?	
Yes	26 (74.3)
No	8 (2.9)
Would you recommend attendance of such a conference to others?	
Yes	29 (85.3)
No	4 (11.8)
Did this conference make you feel more comfortable about doing research?	
Yes	26 (74.3)
No	8 (22.9)

knowledge related to scholarly activities from the event (94.3%), felt more comfortable about doing research (74.3%) and applying newly learned knowledge (74.3%), and would recommend such workshops to others (85.3%).

Qualitative Analysis/Workshop Evaluation by the Participants

The participants (n = 34) were asked to evaluate and comment about the workshop. Thematic content analysis of the comments (n = 78) revealed that participants appreciated the workshop and had benefitted from it. The major themes emerging from the comments were (a) the benefits of the workshop (n = 17 comments), (b) positive feedback about the speakers (n = 3 comments), and (c) recommendations for improving the workshop in future (n = 25 comments, Figure 2).

Participants narrated that the workshop was very useful in learning about the available research resources, databases, reference managers, data analysis software, and the means to access them. They added that the sessions helped them learn the steps of systematically conducting a literature review and appraising scientific literature. Participants reported developing a better understanding of the approach to research in clinical practice as demonstrated by the following participant statements: "It got me thinking about how to get research started" (Participant 23). "I got some possible ideas for how to incorporate qualitative research into QI projects" (Participant 9).

The participants also felt more motivated to indulge in research scholarly activities, for example: "I am more interested in doing research now" (Participant 10). We received positive feedback about the speakers; "Great Presenters!" (Participant 28). "The guest speakers were very helpful" (Participant 30). The in-person speakers were especially admired by the participants as they could better connect with them.

The participants gave pertinent suggestions to improve the workshop in the future. Specifically, participants suggested making the workshop more interactive by including hands-on activities: "I think we would benefit from having residents present and talk about their research and experiences." (Participant 16). Another suggestion was to have the guest speakers present their research and their driving factors for research. Additional

validity of the results is limited. The questionnaire for pretest and post-test assessment was not pilot-tested, therefore internal validity may be limited. This questionnaire was validated on face value by the members of the research committee as a screening tool to help dictate a more robust structure of the follow-up workshops. Improvement in knowledge was demonstrated by the study, however the application of knowledge was not tested. The positive impact on residents' knowledge in this study is the difference subjectively felt by the participants, which will need objective knowledge assessment for triangulation of data. A subsequent study following impact over time would also allow measurement of impact on resident attitude and practice leading to overall scholarly output. The qualitative analysis of participant responses showed that data saturation was not reached, however further data collection was limited by the number of respondents available. Nonetheless, the results are encouraging and the authors plan to improve the workshop based on suggestions of the participants. A resident-led research training workshop will be an annual event of the FM and IM residency training programs at EIRMC. For the second resident-led workshop, it will take place over 2 days and fundamental concepts of research will be taught and discussed more elaborately. The previously discussed results indicate that such a workshop will not only improve research knowledge and skills of clinical residents, but possibly also motivate residents to engage in scholarly activities.


Conclusion

This study demonstrates that resident-led workshops are feasible and can show improvement in research-related knowledge of clinical residents attending a 1-day research training workshop. It also signifies the importance of protected and dedicated research activities in increasing resident engagement and interest in scholarly activities. We recommend inclusion of such workshops in the curriculum of residents for skill building and enhanced indulgence in research activities in order to prepare them as future leaders in QI, health policy, and hospital administration. Such resident-driven initiatives may be rolled out in a formal fashion and the outlined curriculum can be added as a salient feature of all residency programs. Monitoring and evaluating the curriculum and assessing the impact will open up new avenues for QI and research with the goal to inculcate an atmosphere of scholarly activity and evidence-based practice.

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Supplemental Material

Supplemental material for this article is available online.

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