One-on-one Quality Improvement Education in a Family Medicine Residency Program

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Abstract

Background: Quality Improvement (QI) education is required by all Accreditation Council for Graduate Medical Education (ACGME)-accredited Family Medicine (FM) programs. Competing educational demands and the general lack of appreciation of quality improvement (QI) among residents necessitate the adoption of innovative ways to teach QI.

Objective: This article describes an innovative individualized approach to QI education that was implemented in our family medicine residency program and outcome of its evaluation at the end of its first year of implementation.

Methods: This used a quasi-experimental approach with a one group pretest-posttest design. This project was undertaken from July 2022 to June 2023. Each second year FM resident, at the start of their QI month, met with a QI expert for a one hour in-person session. The encounter began with the resident answering a10-item baseline survey on their knowledge and understanding of QI. This was followed by at least four weekly sessions of at least one hour duration. Topics on principles of QI were covered and residents were guided to complete a QI charter on a topic of their interest. They also completed a self-paced online module on QI. At the end of the QI month, each resident completed a post survey to assess knowledge gained. A final survey to assess the residents' perception of the program was conducted at the end of the year.

Results: All 12 second year family medicine residents completed the program. Mean QI knowledge improved from 6.25 (±2.2) to 9.0 (±0.95) on a 10-point scale. All 12 residents completed the online modules. Ten residents (response rate of 83%) completed the post-program survey. All the respondents strongly agreed/agreed that the one-on-one meetings helped them concentrate and better understand QI, and has helped them formulate QI questions. They found the program informative and felt comfortable designing their own QI projects.

Conclusions: One-on-one personalized learning experiences could help improve QI education in FM residents especially when differing rotation schedules make large group didactics challenging.

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Original Manuscript

Original paper

One-on-one Quality Improvement Education in a Family Medicine Residency Program

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Keywords
Quality improvement, patient safety, family medicine, residency program

Abstract

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Results

All 12 second year family medicine residents completed the program. Mean QI knowledge improved from 6.25 (±2.2) to 9.0 (±0.95) on a 10-point scale. All 12 residents completed the online modules. Ten residents (response rate of 83%) completed the post-program survey. All the respondents strongly agreed/agreed that the one-on-one meetings helped them concentrate and better understand QI, and has helped them formulate QI questions. They found the program informative and felt

comfortable designing their own QI projects.

Conclusion

One-on-one personalized learning experiences could help improve QI education in FM residents especially when differing rotation schedules make large group didactics challenging.

Introduction

Quality improvement and patient safety have become topical areas in medical education especially since the release of the IOM (now National Academy of Medicine, NAM) report on “To err is human” in 1999[1] Education in quality improvement (QI) is required by the Accreditation Council for Graduate Medical Education (ACGME) as part of residency training. Professional responsibility to serve the interests of their patients requires physicians and indeed all health professionals to meet socially determined quality expectations of the patients, to cooperate in activities designed to improve performance of the healthcare organizations in which they work in order to meet those expectations, and to cooperate in societal efforts aimed at improving the health care system to better serve the interests of their patients.[2] Therefore it is of utmost importance to equip residents with the requisite knowledge and skill to continuously improve patient care, reduce medical errors and meet the quality expectations of their patients in their future practice. However, there is no established curriculum suggesting a recommended mode of providing the required education. Various programs may approach this differently.[3-5] Our program had used large group didactic approach to teaching residents about quality improvement.[6] Residents would then be guided to develop their individual QI projects during their allotted month QI learning and activities. It was noticed that the large group didactic approach had not been very effective in providing them with the requisite knowledge to identify quality gaps and develop a QI charter to address them. Contributory factors to this included the challenge to capture all the residents at the same time given their differing rotation schedules. The competing demands on residents in a busy program sometimes made it difficult to find appropriate time for large group didactics and to adequately engage the residents in a subject not yet particularly seen as a priority by many residents and even some faculty. This necessitated the adoption of an innovative approach to teaching QI, a mandatory part of the residency training.

Although many studies have been published on QI and patient safety education, they reveal very little novel insights and approaches to teaching.[7] The aim of this paper was to describe a one-on-one

individualized approach to QI education that we adopted in our family medicine residency program and its evaluation.

Methods

This was approved as part of our QI initiative by the Research Compliance Office of UTHealth which determined that it did not meet the regulatory definition of human subjects research and was exempt from review by the Committee for the Protection of Human Subjects (CPHS) and no informed consent was required. Participation was mandatory for all second year family medicine residents. The project was in a family medicine residency program and took place from July 2022 to June 2023.

Study design

This was a quasi-experimental study with a one group pretest-posttest design.

Study population

All twelve second year family medicine residents in our program were included and it was part of our culture of safety initiative reported elsewhere.[6] Each month one second year family medicine resident was assigned protected time to partake in mandatory QI program during which they were supposed to learn about QI, identify a quality gap, design a project aimed at improving an identified quality gap.

Educational sessions

The resident assigned for QI for the month met with a QI expert in person on the first scheduled day for an introductory discussion. At this meeting, expectations for the month were discussed. The resident was then taken through an individualized discussion on QI depending on his or her previous experience with QI and patient safety. This included topics on quality of care, frameworks and dimensions of quality, and principles of quality improvement. There were also discussions on differences between human subjects research and QI and how to write a QI charter. The initial encounter lasted about 90 minutes long. Equipped with this knowledge, the resident would identify a

quality gap or an opportunity for improvement in their clinical setting.

The resident was also directed to complete a self-paced online module on QI by the American Academy of Family Physicians (AAFP) which lasted for about 45 minutes. They were required to produce evidence of completion. This was completed on the residents' own time.

After the initial encounter, the resident continued to meet with the QI team member for at least one-hour weekly sessions, where more discussions were held on various aspects of QI and issues on the QI process were clarified. Guided by a faculty mentor and the QI team, each resident developed a QI charter based on a quality gap they had identified. This was then submitted to the institutional compliance office for approval.

Program evaluation

The one-on-one instructional modality was evaluated in three ways:

Knowledge assessment: At the beginning of the initial educational session, each resident was administered a 10-item pretest questionnaire to assess their baseline knowledge on QI. This assessment was based on the content of the QI topics discussed and emphasized what quality improvement in healthcare entails and the differences between QI and human subjects research using case scenarios. (See Supplementary material). Each item was scored one point if correct and zero if incorrect.. A posttest assessment was administered at the end of their QI month. We compared the pretest and posttest knowledge scores of each resident. The mean knowledge scores for the pretest and posttest were compared using Student T-test.

Performance assessment: We also assessed the number of residents who successfully completed a QI charter as well as the number who completed the required online QI module.

End of year survey: All residents were sent an anonymous online survey to assess their perceptions and degree of satisfaction with the instructional approach at the end of the academic year. Responding to the survey was voluntary.

Figure 1 is a schematic representation of the QI program.

Results

All 12 second year family medicine residents completed the program. Mean QI knowledge score improved from 6.25/10 (±2.2) to 9.0/10 (±0.95) ($p<0.05$). Of the 12 residents, eight scored higher on the post-test than the pretest while four maintained same scores on both pre- and-post-test assessment, two of whom had had perfect scores. Figure 2 is a bar chart showing the pre- and post-test knowledge scores of individual residents. Post-test knowledge scores were higher on all questions than the pre-test scores. All residents completed their QI charters and the online modules. All residents developed charters for QI projects. Table 1 is the list of completed QI charters that the residents developed. At the end of the year, 10 out of the 12 residents completed the post-program survey, a response rate of 83%. All respondents strongly agreed/agreed that the one-on-one meetings helped them concentrate and understand QI, and were helpful in how to formulate QI questions. Many felt the program was informative and helped them distinguish QI from research. They also felt comfortable developing their own QI projects. All the respondents strongly agreed that the program enhanced their knowledge on the subject matter. Figure 3 illustrates some of the impressions of the residents about the QI program at the end of the year.

Discussion

We reported our one-on-one QI teaching modality in our family medicine residency program and the outcome of its evaluation. Residents' knowledge on QI showed significant improvement over the baseline assessment from 6.25 (62.5%) to 9.0 (90%). Every resident was able to identify a quality gap and develop an intervention for redress. All the respondents to the end-of-year survey found the approach helpful and expressed satisfaction with the teaching modality.

Improvement in knowledge as observed in our program is a common finding in many QI endeavors.[3,8,9] Both objective and subjective assessment of knowledge have been applied in various studies.[10,11] In this study we used an objective true/false questions to reflect the content of the course. While residents' performance on each of the knowledge assessment questions improved, most

improvement were seen in their understanding that QI was an intrinsic part of normal health care operations and one's participation was a responsibility as a component of care.[12] On the other hand, their understanding that QI is intended to bring about immediate improvement in particular settings, improved the least. This latter observation could be a result of the general training in scientific methods which aim at developing or contributing to generalizable knowledge to be applied later, that the residents are most used to. Although the residents demonstrated improved knowledge at the end of the session, it is unclear whether this achievement is sustainable and would translate into improved patient outcomes in the long term. A study on medical errors education by Paxton et al, showed much better improved short term knowledge but this declined over one to 12 months.[13] The understanding of QI as an intrinsic part of their future work in health care and its acceptance as a responsibility for optimized care delivery for their patients may encourage its application in their future work.

Systematic reviews of studies on teaching quality improvement and patient safety found that most curricula had combinations of didactic lectures, small-group discussion, experiential learning and web-based modules.[3,4,14] We combined individualized didactic lectures, experiential learning and web-based modules but on a one-on-one basis.

One of the challenges in implementing a one-on-one QI instructional model may be adequate manpower. Programs may need to identify a resource person (or persons) with expertise in QI to be in charge of the training. Since ACGME requires family medicine residents to be trained in QI, it will ultimately be necessary to train some faculty or resource person to lead the effort. QI training for faculty who are involved in residency programs can be achieved through faculty development activities within the department or at the institutional level. While residents are usually assigned to work with a faculty mentor/sponsor, this can also be added as scholarly activities for the academic faculty mentor. Residents may be assigned on a one-on-one basis or in small groups, based the size of the program, availability of faculty mentors and resources at the particular residency program.

Our one-on-one approach to QI instruction incorporated some adult learning principles outlined by Boonyasai et al.[15] The learners actively participated and content was adapted to their individual experiences. It also allowed the learners to identify quality gaps and pursue QI projects of their interest and put into practice what they learned. The approach enabled them to receive prompt feedback on the design and implementation of their projects.

Limitations

The project had some obvious limitations. This report covers only one year of family medicine residents (PGY2) and it is unclear if the gains could be sustained over a long period. We used a set of 10 questions developed from the program content to assess their knowledge on characteristics of QI and how it differs from human subject research. This was not a validated knowledge assessment tool. Gains in knowledge as we observed, may not necessarily translate into improved patient outcomes. Our study did not assess attitudinal changes which would normally take time to manifest. However, the experiential learning component coupled with the knowledge improvement would hopefully help enhance their skills at QI.

Our novel approach to QI teaching appeared effective in improving resident knowledge on QI. It helped the residents apply their knowledge gained during the one-on-one sessions to identify quality gaps and to design interventions with the goal to improve quality of care.

Conflicts of Interests

The authors report there are no competing interests in this study to declare

Ethics approval and consent to participate

This was approved as part of a quality improvement (QI) initiative (QI Project No. 2020-763) by the UTHealth Research Compliance Office which determined that it did not meet the regulatory definition of human subjects and was exempt from review by the Committee for the Protection of Human Subjects (CPHS) and did not require informed consent.

Data availability

Data for this study is available from the corresponding author on reasonable request. To protect participants' privacy, data cannot be shared openly.

Funding

This study did not receive any funding

References

1. Institute of Medicine Committee on Quality of Health Care in A. In: Kohn LT, Corrigan JM, Donaldson MS, eds. *To Err is Human: Building a Safer Health System.* Washington (DC): National Academies Press (US). Copyright 2000 by the National Academy of Sciences. All rights reserved.; 2000.
2. Baily MA, Bottrell M, Jennings B, Lynn J. *A Hastings Center Special Report: The Ethics of Using QI Methods to Improve Health Care Quality and Safety.* Hastings Center;2006.
3. Wong BM, Etchells EE, Kuper A, Levinson W, Shojania KG. Teaching quality improvement and patient safety to trainees: a systematic review. *Acad Med.* 2010;85(9):1425-1439.
4. Hall Barber K, Schultz K, Scott A, Pollock E, Kotecha J, Martin D. Teaching Quality Improvement in Graduate Medical Education: An Experiential and Team-Based Approach to the Acquisition of Quality Improvement Competencies. *Acad Med.* 2015;90(10):1363-1367.
5. Ogrinc G, Headrick LA, Mutha S, Coleman MT, O'Donnell J, Miles PV. A framework for teaching medical students and residents about practice-based learning and improvement, synthesized from a literature review. *Acad Med.* 2003;78(7):748-756.
6. Goldstein S, des Bordes JKA, Neher S, Rianon N. Improving patient safety through mandatory quality improvement (QI) education in a family medicine residency programme. *BMJ Open Qual.* 2024;13(1).
7. Wong BM. Reporting on Patient Safety and Quality Improvement Education: Designing Projects for Optimal Dissemination. *J Grad Med Educ.* 2015;7(4):513-516.
8. Oyler J, Vinci L, Arora V, Johnson J. Teaching internal medicine residents quality improvement techniques using the ABIM's practice improvement modules. *J Gen Intern Med.* 2008;23(7):927-930.
9. Tudiver F, Click IA, Ward P, Basden JA. Evaluation of a quality improvement curriculum for family medicine residents. *Fam Med.* 2013;45(1):19-25.

10. Nidumolu A, Freedman D, Bosma M. From Theory to Practice: Development and Evaluation of a Quality Improvement Curriculum for Psychiatry Residents. *J Med Educ Curric Dev.* 2024;11:23821205241228200.

11. Pohl SD, Van Hala S, Ose D, Tingey B, Leiser JP. A Longitudinal Curriculum for Quality Improvement, Leadership Experience, and Scholarship in a Family Medicine Residency Program. *Fam Med.* 2020;52(8):570-575.

12. Lynn J, Baily MA, Bottrell M, et al. The ethics of using quality improvement methods in health care. *Ann Intern Med.* 2007;146(9):666-673.

13. Paxton JH, Rubinfeld IS. Medical errors education: A prospective study of a new educational tool. *Am J Med Qual.* 2010;25(2):135-142.

14. Kirkman MA, Sevdalis N, Arora S, Baker P, Vincent C, Ahmed M. The outcomes of recent patient safety education interventions for trainee physicians and medical students: a systematic review. *BMJ Open.* 2015;5(5):e007705.

15. Boonyasai RT, Windish DM, Chakraborti C, Feldman LS, Rubin HR, Bass EB. Effectiveness of teaching quality improvement to clinicians: a systematic review. *Jama.* 2007;298(9):1023-1037.

Tables

Table 1. Quality Improvement (QI) project charter titles

1. Reducing rates of Burnout among Family Medicine Residents through Creation of “Families”
2. Improving physician efficiency and diabetic patient care using artificial intelligence to consolidate relevant clinical data
3. Improving Continuity of Care after Hospital Discharge Through Implementation of a Discharge Checklist and Patient Information Sheet
4. Cracking the Code: A Standardized Method for Meaningful Code Status Discussions
5. Improving colonoscopy education in eligible patients by family medicine residents
6. Improving Joint Pain Management with Exercise Education
7. Financial Literacy and Wellness among Medical Residents
8. Improving Resident Knowledge on Hospital Discharge Dispositions
9. Improving completion rates of MCHAT in Acres Home Clinic
10. Streamlining diabetic foot exam education
11. Geri Flex”: Implementing a Safe and Effective Exercise Program for the Elderly to Decrease the Risk of Fracture

Figures

Figure 1. Program schematic

Figure 2. Knowledge scores on pre- and post-test assessment

Figure 3. Residents' impression of the program at the end of the year

Figures 1

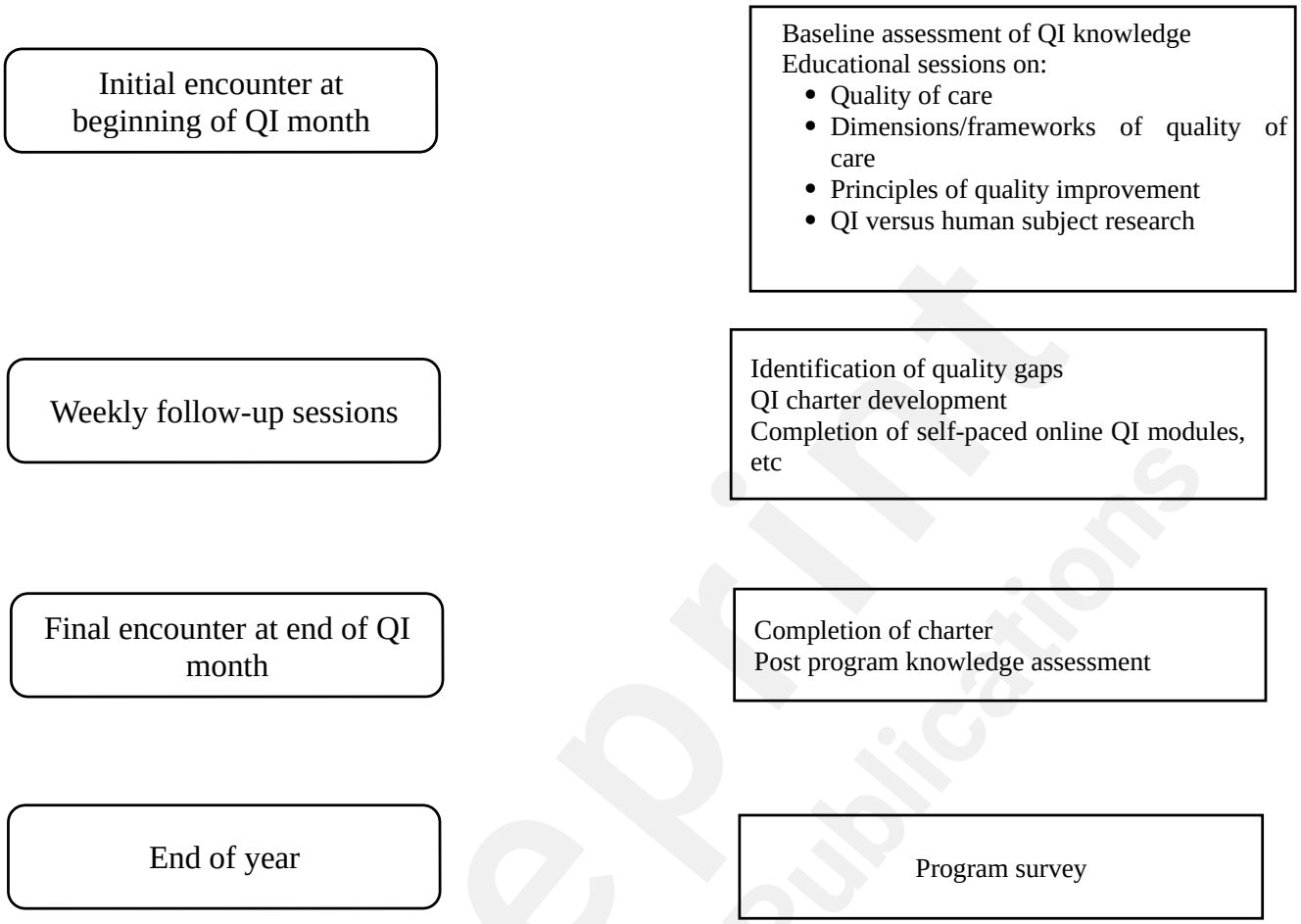


Figure 2.

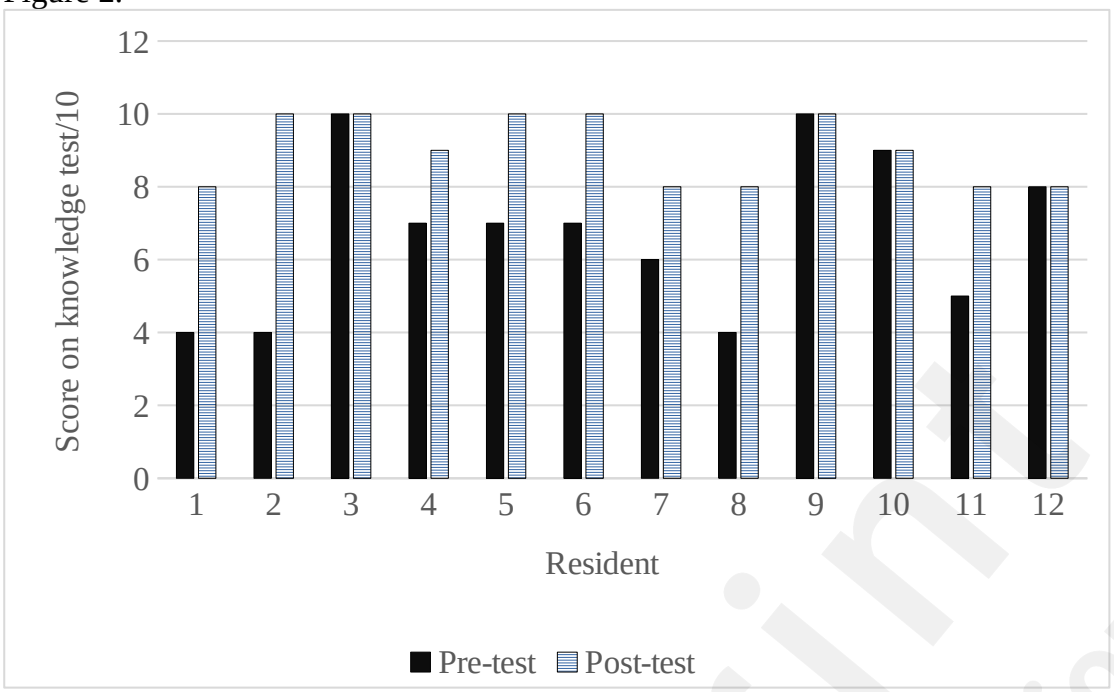
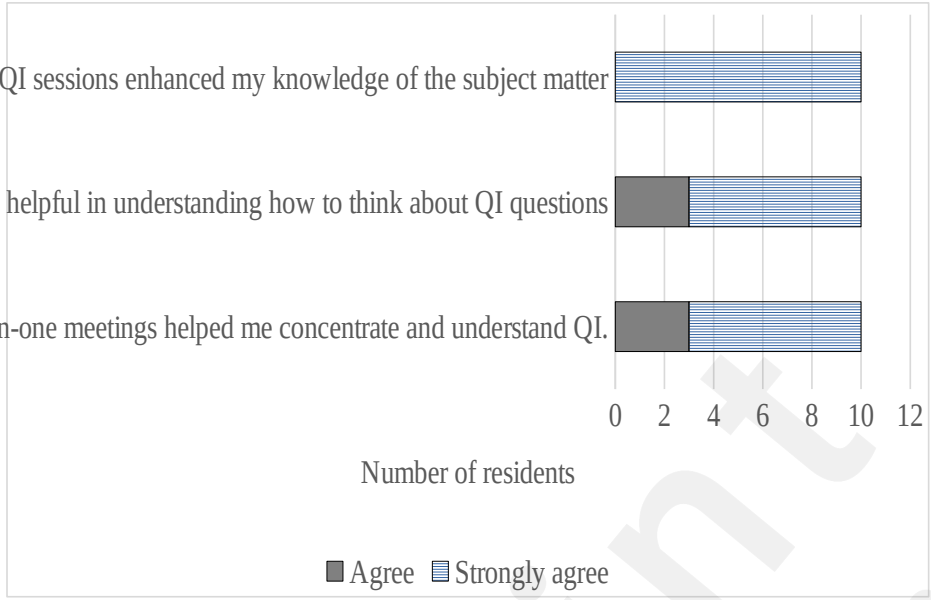


Figure 3.



Supplementary Files