QUALITY IMPROVEMENT (QI) TO THE MAX: A STUDY ON THE EFFECTS OF A STRUCTURED QI CURRICULUM ON RESIDENT CONFIDENCE IN USING QI METHODS

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ABSTRACT
Quality improvement (QI) endeavors are now becoming an essential element in the practice of medicine, whether one’s career is in a private practice or academic setting, due to new regulations in healthcare law, the addition of a QI component to physician Maintenance of Certification (MOC), and a move toward quality-based reimbursement of health care services under the Affordable Care Act. For this reason, it is necessary that residency programs provide their trainees with a solid foundation of knowledge on QI methodology and practical experience with the design and implementation of a QI project during their training in order to better prepare them for their future careers. In this study, we sought to evaluate pediatric residents’ self-reported knowledge and confidence in QI methods by administration of a survey to each resident both before and after a structured QI curriculum was implemented within the residency program. The survey consisted of a series of questions assessing resident knowledge about QI tools such as a PDSA cycle and their comfort level, using a 4-point Likert scale, with putting various QI methods into practice. The QI curriculum implemented consisted of a series of lectures, as well as a hands-on workshop demonstrating how to develop a QI poster presentation. In comparing the pre- and post-survey results, an improvement was seen in all aspects of the survey, with a 50% or more improvement in most areas after implementation of the formal QI curriculum. We believe this supports our conclusion that providing residents with formal lectures and training on QI methods is a vital component to any residency program and an instrumental tool in ensuring the success of resident physicians in their future careers.

INTRODUCTION

The practice of medicine is a constantly changing science. As new research and clinical experience broaden our knowledge base and the use of more sophisticated technology in various aspects of the healthcare industry increases rapidly, physician ability to keep pace with these advancements and use them to provide quality care has fallen short (1). Additionally, in the near future, under the Affordable Care Act, physician reimbursement will be based on the quality of care provided to the patient. These factors, amongst others, have led to an increasing focus on quality improvement (QI) efforts in both academic and private practice settings. As of 2010, not only are practicing physicians required to participate in QI efforts periodically in order to maintain their board certification, but also the Residency Review Committee (RRC) now requires that all residents learn QI methods and participate in a QI project as part of their residency program. However, there is no mandate on how a QI curriculum should be implemented or structured. QI curriculums generally fall into one of three categories: 1) teaching alone, 2) mixed didactic and experimental learning, and 3) web-based curricula. According to an article published in 2012, which looked at all three QI curriculum strategies and compared them, no one method was superior to another in producing improvements in knowledge about QI principles, but all three strategies did produce improvement in knowledge (2). Regardless of how the curriculum is structured, it is one of the most important aspects of a residency program as QI is becoming so entrenched in physician practice. However, in a recent survey of pediatric residents, the QI curriculum was rated as one of the weakest components of residency programs in regards to preparation for practice, second only to practice management (3). Prior to 2013, the pediatric residency program at USC/Palmetto Health did not have a formal QI curriculum, but residents were required to participate in a QI project in order to graduate. This often meant that the projects were hastily put together, not well thought-out, and resulted in little actual improvement. It also meant that while the residents participated in a project, they often learned little in regards to QI principles. In this study, we sought to evaluate pediatric residents’ self-reported knowledge and confidence in QI methods by administration of a survey to each resident both before and after a structured QI curriculum was implemented within the residency program. Our goal was to show improvement of the resident self-efficacy score in each category by at least 50%.
METHODS
The pediatric residency program at USC/Palmetto Health consists of 36 total residents (12 in each year). Residents are required to complete a QI project prior to the beginning of their 3rd year and present a poster on that QI project at the annual South Carolina AAP meeting held in July. The current 3rd year class was given a survey prior to beginning their QI projects consisting of 12 questions and using a 4-point Likert scale to assess resident knowledge about QI principles as well as their comfort level with putting various QI methods into practice (see Figure 1). The QI curriculum was then implemented; it consisted of a series of lectures discussing QI principles such as a PDSA cycle, as well as a hands-on workshop demonstrating how to develop a QI poster presentation. After the completion of their project, as well as the poster presentation, the residents were given the same survey. Using the 4-point Likert scale, an average score for each question was determined with the possible range being between 0 and 4. This average was designated as the resident self-efficacy score for that specific survey question. In the pre- and post-surveys, the resident self-efficacy scores were calculated for each question and then compared.

OUTCOMES
Eleven residents completed the pre-survey and twelve completed the post-survey. The pre-intervention resident self-efficacy scores ranged from 0.73 – 1.36. The post-intervention scores ranged from 1.58 – 2.17. There was a greater than 50% improvement noted in 9 of 12 categories, and all categories demonstrated improvement over the pre-survey results (see Table 1). The categories in which there was less than 50% improvement were: 1) applying the best professional knowledge, 2) using measurement to improve your skills, and 3) identifying best practices and comparing these to local practice/skills. In these categories, the percent of improvement was 28.7%, 45%, and 45% respectively. The survey category that showed the greatest improvement (a 139.7% increase) was in implementing a structured plan to test a change. Overall, in all survey categories, there was an average improvement of 75.3% in the reported resident self-efficacy score after implementation of the QI curriculum.

DISCUSSION
The implementation of a structured QI curriculum consisting of a mixture of didactic sessions and experimental learning within our residency program produced a significant increase in resident knowledge of QI principles and methods as well as confidence in implementing a QI project. Strengths of the study include the fact that it uses current residents as its study population and it is easily reproducible. A weakness would be that the survey tool utilized in this study only assessed resident self-reported knowledge about QI methods and did not actually have a means of testing within the survey if the residents had successfully grasped the content taught as part of the implemented QI curriculum.

The study did show that there is room for improvement, specifically in the areas of the survey in which the lowest margin of improvement occurred (applying the best professional knowledge, using measurement to improve one’s skills, and identifying best practices and comparing those to local practice/skills). Using information gathered as a part of this QI project, we have incorporated several new additions to the residency QI curriculum that have already been implemented with this year’s intern class. First, we have added an additional didactic lecture titled “An introduction to QI” which will be presented to each intern class during the first month of their intern year. This lecture will serve as a means to introduce new residents to the importance of quality improvement endeavors in the healthcare field and provide them with a foundation to begin thinking about how they practice everyday medicine (on the inpatient general wards, PICU, outpatient clinic, etc) from a quality improvement perspective. Additionally, we have improved our survey to be more specific in determining resident knowledge base about QI methods/principles (see Figure 2). This survey will be given to the first year residents prior to their first introductory lecture and then again in the beginning of their 3rd year of residency once they have completed the formal QI curriculum. Based on the results of this improved survey, we will be able to make more specific improvements to the curriculum.

In conclusion, we believe this study has shown that utilization of a structured QI curriculum to teach QI principles and methods to residents will not only improve their knowledge about QI endeavors and their ability to carry out their own QI projects, but will enable them to be more successful in their future medical careers given the increased focus on quality in the healthcare field as a whole today. A future direction of this project will include examining the usefulness of the residency program’s formal QI curriculum from the perspective of residents who have graduated recently and have since entered private practice.
REFERENCES


Figure 1:

Quality Improvement (QI)
Pre-Test Self Assessment

Resident Name:________________________________________________________________________________________

1. Have you had any previous experience in quality improvement? □ Yes □ No

2. In general, how comfortable are you in your ability to design and implement a QI project?
□ Not comfortable □ Somewhat comfortable □ Pretty comfortable □ Very comfortable

3. Do you know what a PDSA cycle is? □ Yes □ No

4. How comfortable are you in your current skills with the following aspects of quality improvement?

   a. Writing a clear problem statement
   b. Applying the best professional knowledge
   c. Using measurement to improve your skills
   d. Studying the process
   e. Making changes in a system
   f. Identifying whether a change leads to an improvement in your skills
   g. Using small cycles of change
   h. Identifying best practices and comparing these to local practice/skills
   i. Implementing a structured plan to test a change
   j. Using the PDSA model as a systematic Framework for trial and learning
   k. Identifying how data is linked to specific processes
   l. Building your next improvement upon prior success or failure

   Not at all □ Slightly □ Moderately □ Extremely □
Figure 2:

USC Pediatric Residency Program
Quality Improvement Pre-Program Self Assessment

Resident Name (First and Last):

1. In general, on a scale of 0 to 10, how comfortable are you in your ability to design and implement a QI project? (Circle one number) (0 is not at all comfortable and 10 is very comfortable)

2. A PDSA cycle is a structured trial of a process change used in quality improvement projects. The term “PDSA” stands for the following:

   P =

   D =

   S =

   A =

3. Use the following scenario to answer questions A-C:

   As a nurse manager of a medicine unit in an academic hospital, you’re aware that your unit has a high rate of patient readmissions. In fact, 36 percent of the patients discharged from your unit are readmitted to the hospital within 30 days. After reviewing the literature, you become aware that this rate is quite high compared to national standards. Working with other members of your unit, you develop a plan to call patients on the phone within 48 hours of discharge, with the aim of cutting readmission rates to 18 percent.

   A. What would you identify as the outcome measure for the project? (Choose only one)
      - Average length of stay
      - The cost of labor associated with the calls
      - Rate of job satisfaction of those on the unit making the calls
      - Percent of patients that are readmitted to the hospital

   B. Which of the following is an example of a process measure that you may collect as part of this improvement effort?
      - The rate of patients being readmitted within 30 days
      - The reasons for readmission to the hospital
      - The percent of patients receiving a call within 48 hours of discharge
      - The cost of the labor associated with the calls

   C. Why might you consider collecting balancing measures?
      - To show that you met your aim
      - To make sure you are able to publish your study
      - To demonstrate to your hospital board that you were justified in using resources for this project
      - To make sure you did not unintentionally damage other aspects of the unit’s work
Quality Improvement Scenarios

Instructions: Please read each of the following scenarios and then answer the questions that follow. We recognize that there may be many areas to improve. Be brief and complete. We request that you attempt each question, even if you are unsure.

Scenario #1
You are a pediatric endocrinologist in a three-person practice and have just finished a busy morning clinic session. Your last patient was a 17 year-old male with type 1 diabetes with whom you have been working very hard to improve glycemic control. You are frustrated because he continues to be in poor control based on his most recent hemoglobin A1C of 10%. You have been successful in getting him to obtain and record some of his finger sticks. However, he is not interested in exercise and his diet is suspect as to whether it is reasonable or not. He says he is taking his insulin as prescribed (at appropriate doses for his body weight). You are particularly concerned because he also has an elevated cholesterol and is beginning to note some nocturnal tingling in his feet.

As you sit down to ponder his case, you open a letter from one of the insurance plans that covers many of your patients. Enclosed is a summary of their review of a random number of diabetics in your practice; this was done as part of their annual review for National Committee on Quality Assurance certification of their plan. The data shows that on several measures (hemoglobin A1c, annual retinal exams, podiatry evaluations and urine for microalbumin testing) more than 65% of your patients do not meet the target goals. This further adds to your level of frustration and ruins your appetite for lunch.

Questions for Scenario #1
Please answer each of the following questions as if you were developing a program to investigate and improve the problem presented above.

1) If you were developing a program to investigate and improve one of the problems listed above, what would be your AIM statement?

2) What would be your outcome measure?

3) Identify one change that might be worth testing to accomplish your AIM statement above.
Table 1: