

Quality improvement in action

Using quality-improvement techniques to enhance patient education and counselling of diagnosis and management

Prathibha Varkey MD MPH MHPE

Associate Professor of Medicine, Division of Preventive and Occupational Medicine

Airani Sathananthan MD

Fellow, Division of Endocrinology

Amanda Scheifer MD

Fellow, Division of Endocrinology

Sumit Bhagra MD

Fellow, Division of Endocrinology

Mayo Clinic College of Medicine, Rochester, MN, USA

Akira Fujiyoshi MD

PhD Candidate in Epidemiology, Department of Health Science, Shiga University of Medical Science, Japan

Andrea Tom MD

Private Practice, San José, CA, USA

Mohammad Hassan Murad MD MPH

Assistant Professor of Medicine, Division of Preventive and Occupational Medicine, Mayo Clinic College of Medicine, Rochester, MN, USA

ABSTRACT

Background Patients recall less than half the information provided to them by their physicians.

Aims The aim of this study was to use quality-improvement (QI) techniques to enhance patient understanding of diagnosis, management and follow-up at the end of the office visit.

Method QI techniques including stakeholder analysis, process mapping and plan-do-study-act (PDSA) cycles were used in a pilot study in an outpatient endocrinology clinic specialising in bone disease. The impact of these interventions was evaluated by pre- and post-intervention patient surveys that included qualitative and quantitative data.

Results A team of endocrinology fellows and faculty with expertise in QI developed a series of tools to encourage conversation and interaction during the encounter and to serve as a reference for patients to take home through five PDSA cycles. The tools were iterations of written materials provided to patients at the end of the clinical encounter. In each cycle, the tools were modified according to

feedback from patients and providers. Ninety-three patients participated in this study. Patients were surveyed after the implementation of two of the five cycles. Compared with pre-intervention, modifications during the two cycles were associated with a non-significant increase in patients' understanding of the reasons for testing (from 64% to 80% and 75%); management plan (from 61% to 86% and 79%); and future follow-up plans (from 64% to 86% and 81%); $P > 0.05$ for all three outcomes. Improvement was not seen in patients' knowledge of their diagnoses (from 74% to 73% and 70%; $P > 0.05$).

Conclusion This pilot study shows how QI tools can be used for creating and initiating system improvements aimed at enhancing patient education and counselling.

Keywords: patient counselling, patient education, plan-do-study-act, quality improvement

How this fits in with quality in primary care

What do we know?

The lack of optimal patient education and counselling creates opportunities for medical errors, suboptimal outcomes and poor patient and provider satisfaction.

What does this paper add?

This study demonstrates that QI tools, such as the plan-do-study-act (PDSA) methodology are effective techniques for creating and initiating system improvements aimed at enhancing patient education and counselling, a key component necessary for enhancing the safety and quality of primary care.

Introduction

Physicians commonly overestimate the level of patient literacy.¹ Despite spending a significant amount of time discussing the diagnosis and management with patients, it is unclear if physicians effectively counsel patients so that they understand, recall and implement physician recommendations. The lack of adequate information flow may lead to medical errors, suboptimal outcomes, low patient satisfaction, unanticipated visits and decreased provider satisfaction.

User-friendly, up-to-date, expert-approved information provided to the patient at the end of the outpatient visit has been proposed as a solution to this problem.² However, the optimal content and content-delivery medium to enhance effective patient–physician communication are unknown. Moreover, ‘optimal’ for different individuals may differ based on their educational and cultural background, learning style or preference. When patients visit healthcare providers the interaction is typically characterised by verbal delivery of information by the provider to the patient, often containing technical words that the patient may not understand. Similarly, healthcare providers frequently overestimate patients’ literacy levels and patients themselves may be too embarrassed to ask for clarification when given medical information they do not comprehend. Blalock *et al* reported that 63.7% of patients who had received osteoporosis-prevention counselling did not remember receiving it, suggesting that counselling was suboptimal and insufficient to promote subsequent recall and behavioural change.³ This is, unfortunately, not an uncommon occurrence.

QI techniques are increasingly being recommended for efficient systems improvement in patient education and counselling.^{4–7} As opposed to traditional research, QI techniques often use input from multiple stakeholders to redesign systems for solving complex problems. In addition, these techniques facilitate the testing of multiple strategies over a short period of time. There is no published literature on QI methodologies and processes used for the development of

tools for enhanced patient–physician communication. This manuscript describes a QI pilot study conducted with the goal of enhancing patient understanding of their diagnosis and management plan at the end of the office visit. We hope that the techniques used to generate the results of this study will lay the foundation for future work in the area of QI and patient education.

Methodology

Impetus

The impetus to this study was a patient survey conducted in our institution with the aim of evaluating patients’ satisfaction with care. This survey is conducted quarterly by a market research company specialising in patient satisfaction. A random sample of patients with recent outpatient visits is contacted via phone by company representatives. Five attempts are made to contact each patient, which usually generates a high response rate. Results specific to the division of endocrinology in 2007 showed that although patients rated their providers’ knowledge highly for efficiency, expertise and overall quality of care, only 58.1% (43/74) of patients surveyed rated as excellent (the highest rating) the provision of ‘clear explanation of [your] condition and treatment and what to expect’, and only 49.3% (36/73) of patients rated as excellent ‘clear instructions of what to do following the appointment’. In an effort to enhance patient understanding of the diagnosis and management plan at the end of the office visit, we decided to explore the use of quality improvement (QI) techniques to address the issue.

Setting

This study was conducted at the Bone Clinic, a section of the Division of Endocrinology at the Mayo Clinic, Rochester. This is an outpatient clinic located in a larger tertiary care centre specialising in the evaluation and management of metabolic bone disease and

staffed by endocrinology fellows and faculty. Most of the patients present with diagnoses of osteopenia, osteoporosis, or parathyroid disease. The majority of patients are females (76%) and aged between 50 and 79 years (69%). Patients are referred to this clinic by their primary care physicians or physicians in other specialties.

QI methods

This study was approved by the institutional review board. Detailed process mapping was conducted as a first step to understanding information flow at the bone clinic.⁸ Observers took field notes and photographs, and conducted interviews of faculty physicians, residents and patients. Discrepancies between what the patient heard and what they understood were noted. It was especially noted that although patients received mailed summary letters of their diagnoses and treatment plans within two weeks of the visit, they wished for similar concise material to be provided at the end of the visit. Subsequently, stakeholders were identified to be patients, physicians, clinical assistants, nurses, and receptionists as well as other people who are less directly involved in the clinical encounter (i.e. administrators, finance and insurance specialists).

Using rapid cycle improvement methods,⁹ a series of interventional tools was developed, implemented and modified over a three-week period based on feedback from patients and providers. This method involves a 'trial-and learning' approach where a hypothesis or suggested solution for improvement is made, and testing is carried out on a small scale before any changes are made to the whole system. In this case, the hypothesis was that patients were receiving sufficient education and counselling but the volume of information was overwhelming and delivered orally or in a pre-printed format, which was not specific to the individual patient. Thus, the team proposed that a written tool specific to an individual patient should be developed and discussed during the clinical encounter, then handed to the patient so he/she can refer to this tool at home. A sequence of four steps of 'plan-do-study-act' (PDSA) was carried out in repeated small cycles, which is designed to lead to improvements.

Evaluation of interventions

Whenever significant changes were made in each cycle, a paper-and-pen survey was conducted. In these surveys, patients graded their understanding of the condition/diagnosis, reasons for tests ordered, treatment and follow-up appointments, on a five-point Likert scale (1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor) at the conclusion of their outpatient appointment. This pre- and post-evaluation tool was

developed by the QI team and corresponded to questions identified on the initial satisfaction survey that gave the impetus to this QI project. The team made changes to the evaluation tool to adapt it to the changing nature of the intervention as it went through successive PDSA cycles, and as a result decided to develop and modify a bespoke tool rather than using an existing tool. Responses were dichotomised into 'excellent' and 'less than excellent' for purposes of analysis. Questions marked with 'not applicable' were excluded from analysis. The Fisher exact test was used to determine the statistical significance of the changes in proportions considering a two-tailed *P* value of <0.05 to be significant.

Results

Description of the interventions

During the 3-week period of this QI project, the team used feedback from patients and providers to quickly modify the educational tool, and thus conducted five rapid cycles of improvement of the tool. Patients' surveys to evaluate the tool were conducted after the second and fifth PDSA cycles, the two cycles that carried most changes from previous attempts. We called these two PDSA cycles intervention 1 and 2, respectively.

The first PDSA cycle included an information sheet in which the name of the provider, diagnosis, and plan of action could be outlined by the provider (see Appendix 1). In the next iteration of this cycle (intervention 1), this form was modified to include providers' names and their contact information as well as a carbon copy for ease of dictation into the medical record. By the end of this cycle, providers recommended enhancing the forms to include a higher number of pre-filled areas since most patients had a diagnosis of osteopenia or osteoporosis and would probably require similar instructions.

In the second PDSA cycle, the form was modified to include check boxes for diagnosis and testing and treatment categories common to osteoporosis and osteopenia (see Appendix 2). The physician was expected to fill in the recommendations for calcium intake, physical activity and follow-up. Similarly, an 'educational materials' check-box section was incorporated allowing physicians to select which prepared educational materials would be most helpful for the patient. Based on feedback from patients and providers that detailed listing of patient educational materials was not being utilised effectively, the form was modified in the next iteration to simply mention the Mayo Patient Education Center as a patient resource centre. Finally, an additional form was given

to patients in the waiting room to note their primary concerns for the visit. This allowed better agenda setting and established which outcomes for the visit were anticipated by patients. This form was subsequently enhanced to include some of the common questions physicians asked patients with suspected bone disease, aiming at enhancing efficiency of the visit to allow more counselling time (see Appendix 3). Lastly, in the final iteration of this tool (intervention 2), we added more check-box items to make the process easier for providers, and a print-out of laboratory and imaging studies for patients to keep.

Pre- and post-survey results

Ninety-three patients participated in this study. Twenty-three patients were surveyed before implementation of QI measures to obtain baseline data. Seventy patients were surveyed during all the PDSA cycles described above. Seven endocrinologists and three endocrinology fellows formed the participating provider team. The length of time spent with their provider was perceived as being adequate by most patients before (22 of 23; 95.6%) and after implementation of interventions (64 of 66; 97%). The majority of patients (89%, 17 of 19) indicated that they did not wish for additional information about their condition or more handouts; however, they requested hard copies of laboratory and imaging results.

Compared with pre-intervention, the implementation of the two interventions was associated with a non-significant increase in patients' understanding of the reasons for testing, management plan and future follow-up. This improvement was not noted for patients' knowledge of their diagnoses. Results are depicted in Table 1.

Some notable excerpts from the free-text comments section of the patient survey included:

'I know what to expect after this visit.'

'[I am] confident that I can communicate the doctor's recommendations to my husband.'

Physician feedback comments included:

'[This] sets the stage for effective and objective communication.'

'If these interventions ultimately affect outcomes by improving compliance through better understanding, I am willing to incorporate them in my practice.'

Discussion

Patients recall less than half the amount of information provided to them by their physicians. Non-retention of critical information may be associated with worse patient outcomes. Patients who are able to recall information given by healthcare providers exhibit improvement in clinical measures of disease activity and control.^{10,11} In this report, we describe the use of the PDSA methodology to develop and implement an intervention aimed at creating a physician- and patient-friendly written summary document that included diagnosis, medication list and follow-up instructions that could be provided to patients at the end of the outpatient visit. The PDSA methodology proved to be efficient, feasible and acceptable for creating, implementing and studying the effects of an optimal patient education tool in a total of three weeks.

Table 1 Patient survey^a

Pre-intervention (<i>n</i> = 23)	PDSA cycle 1 (<i>n</i> = 15 ^b)	PDSA cycle 2 (<i>n</i> = 53 ^b)
1 How well do you understand your condition/diagnosis after this visit?		
17/23 (74%)	11/15 (73%); <i>P</i> = 1.00	37/53 (70%); <i>P</i> = 0.58
2 How well do you understand the reason for the tests ordered for you?		
14/22 (64%)	12/15 (80%); <i>P</i> = 0.47	38/51 (75%); <i>P</i> = 0.40
3 How well do you understand the treatment recommended?		
14/21 (61%)	12/14 (86%); <i>P</i> = 0.26	38/48 (79%); <i>P</i> = 0.36
4 How well do you understand when follow-up with a doctor is needed?		
14/22 (64%)	12/14 (86%); <i>P</i> = 0.26	42/52 (81%); <i>P</i> = 0.16

^a Number of patients answering survey questions as 'excellent'

^b Two responses marked 'not applicable' were excluded from analysis

Throughout this study, it was consistently noted that providing written information in the outpatient setting (akin to a hospital discharge summary) provided a concise summary of the diagnosis and management plan which patients could use as a reference point for clarifications and discussions with their loved ones. While many patients did not want additional handouts, they probably selected materials such as laboratory and imaging results as well as a written list of diagnosis, summary recommendations and follow-up instructions. Physicians annotated and highlighted the areas they considered most critical for the health of each patient, and provided the patients with copies of their laboratory and imaging results. We concluded that individualised documented information provided to the patient at the end of the visit enhanced patient satisfaction with the physician–patient communication. The written component (in addition to the verbal element present in most physician–patient communications) probably enhanced the understanding of the relayed information, as technical results and diagnoses may be difficult to remember because of unfamiliarity to most patients. It was also likely that a written aid enhanced recall of physician–patient discussions, especially when several issues were discussed in the course of the visit. There was, as expected, a lower patient rating of the usefulness of pre-visit collection of information as this intervention was geared primarily towards improving provider efficiency at collecting information during the visit. Interviews with the providers who implemented these interventions provided positive feedback regarding the usefulness of the same.

Other opportunities for improvement include the configuration of an interface to populate an outpatient visit summary from data available in the electronic medical chart, and posting such information on a secured link for patients to retrieve, for example, a patient portal.

Although we did not study the effect of our interventions on patient outcomes, others have evaluated the effectiveness of educational interventions on outcomes for osteoporosis/osteopenia. Jamal *et al* demonstrated that osteoporosis education in a written format along with results of bone mineral density testing improved calcium intake, as well as reduced smoking and intake of alcoholic and caffeinated beverages among study patients.¹² Audiotapes, videotapes, personal computers, and audio-guided booklets have also been used to improve evidence-based decision making in the management of osteoporosis/osteopenia, and have been shown to enhance physician–patient communication.^{13–15}

The PDSA methodology provided an opportunity for stakeholders involved in the clinical encounter (including patients, physicians, clinical assistants, nurses and receptionists) to be fully engaged in developing an adequate tool for end-of-visit patient counselling and

education whereby multiple iterations were tested and evaluated in a relatively short time. Other advantages of the PDSA methodology included making processes of improvement explicit, promoting teamwork, customising changes to local conditions, evaluating ‘side-effects’ of an intervention quickly, and reducing risks. Possible disadvantages included difficulty in applying the method to large numbers and the difficulty of allowing adequate time for learning. Other tools such as ‘lean’, or ‘six sigma’ have also been used for standardisation of practices and elimination of errors.⁹

There are several limitations to this study. This pilot was viewed from its inception as a QI project to gather information about methods to enhance patient satisfaction regarding their diagnosis, treatment and follow-up plans rather than to test a hypothesis. We used a pre/post-intervention study design without a control group, patients were not randomised, and blinding was not performed to ascertain biases in the study. In addition, our PDSA method used small sample size for each of the interventions, which did not allow for meaningful statistical comparison of pre- and post-intervention data. Finally, the use of ‘excellent’ as a goal for patient rating of satisfaction and a measure of performance is congruent with the modern concepts of QI and allows comparison with best practice rather than minimal standards.^{8,9,16} One of the challenges that faced the team from the start of this pilot project was the high number of patients who rated their knowledge as excellent at baseline.

Conclusion

QI tools, such as the PDSA methods, are feasible and acceptable techniques for creating and initiating system improvements aimed at enhancing patient education and counselling. A written or printed sheet or memory-aid, with individualised information provided to the patient at the end of the visit helped enhance patient recall and satisfaction. Future studies with a larger sample size and more rigorous designs are needed to assess the benefit of such interventions on patient outcomes, clinician efficiency and cost-effectiveness.

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ETHICAL APPROVAL

Mayo Clinic Institutional Review Board.

PEER REVIEW

Not commissioned; externally peer reviewed.

CONFLICTS OF INTEREST

None.

ADDRESS FOR CORRESPONDENCE

Prathibha Varkey, Associate Professor of Medicine, Division of Preventive and Occupational Medicine, Mayo Clinic College of Medicine, USA. Email: Varkey.prathibha@mayo.edu

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Appendix 1: Intervention 1 form

Physician

Dr xx

Appointment secretary

xxx-xxx-xxxx

Medical secretary

xxx-xxx-xxxx

Name of patient:

John Doe

Date:

3/7/2007

Diagnosis:

Osteoporosis

Testing:

Bone density and serum chemistry

Treatment:

Alendronate (Fosamax) 70 mg orally once weekly

Follow-up:

Phone follow-up in 2 months, repeat bone density in 1 year

This is not an official document. Formal recommendations will be in the official medical record.

Appendix 2: Intervention 2 form

Physician	Appointment secretary	Medical secretary
Dr xx	xxx-xxx-xxxx	xxx-xxx-xxxx
Name of patient:		Comments
Date:		
Diagnosis:		
<ul style="list-style-type: none"> • Osteopenia • Osteoporosis • Other 		
Plan of action:		
Testing:		
<ul style="list-style-type: none"> • Blood work • Urine tests • Bone density • X-rays/scans 		
Treatment:		
<i>Bisphosphonates:</i>		
<ul style="list-style-type: none"> • Fosamax/alendronate • Actonel/risedronate • Boniva/ibandronate • Aredia/pamidronate • Zometa/zoledronic acid 		
<i>Hormone therapy:</i>		
<ul style="list-style-type: none"> • Oestrogen replacement therapy/hormone replacement therapy • Evista/raloxifene 		
<i>Other:</i>		
<ul style="list-style-type: none"> • Miacalcin/calcitonin • Forteo/teriparatide 		
<i>Vitamins:</i>		
<ul style="list-style-type: none"> • Calcium supplementation: • Vitamin D supplementation: 		
<i>Lifestyle changes:</i>		
<ul style="list-style-type: none"> • Activity/exercise/limitations: • ROPE (Osteoporosis/Exercise/Rehab): 		
Follow-up:		
<p>Additional educational materials: Available at Patient Education Center (Siebens Building, Subway Level – across from Mayo Store)</p>		
<p>(NOTE: This is not an official document. Formal recommendations will be in the official medical record.)</p>		

Appendix 3: History intake form part of intervention 2

PLEASE FILL OUT IF YOU HAVE OSTEOPENIA OR OSTEOPOROSIS

Please give to your doctor at the beginning of the visit

What is the primary concern that you would like addressed at this visit?

Please circle Yes or No to questions.

- | | | | |
|----|--|-----|----|
| 1 | Have you ever fractured a bone? | Yes | No |
| 2 | Have you noticed any change in your height? | Yes | No |
| 3 | Do you need assistance with a cane/walker/wheelchair? | Yes | No |
| 4 | Do you have vision or balance problems? | Yes | No |
| 5 | Have you ever been on chronic steroids such as prednisone? | Yes | No |
| 6 | Are you on any medications for seizure disorder? | Yes | No |
| 7 | Are you on any blood thinner such as Coumadin? | Yes | No |
| 8 | Has anyone in your family had osteoporosis (e.g. your mother or grandmother)? | Yes | No |
| 9 | Do you have a history of kidney stones? | Yes | No |
| 10 | Does anyone in your family have kidney stones? | Yes | No |
| 11 | Have you ever had part of your bowels removed or problems with fatty stools? | Yes | No |
| 12 | Has your weight changed? | Yes | No |
| 13 | Do you smoke? | Yes | No |
| | If yes, how many packs a day? $\frac{1}{2}$ pack 1 pack $1\frac{1}{2}$ packs 2 packs >2 packs | | |
| | If yes, how many years have you smoked? years | | |
| 14 | How many alcoholic beverages do you consume each week? | | |
| | For how long? | | |
| 15 | Have you ever had transplant surgery? | Yes | No |
| 16 | Have you ever had an overactive thyroid or are you on thyroid hormone replacement? | Yes | No |
| 17 | Have you ever had rheumatoid arthritis? | Yes | No |
| 18 | How much milk or milk products (yoghurt/cheese) do you consume daily? | | |
| 19 | Do you take calcium supplements? | Yes | No |
| 20 | Do you take vitamin D supplements? | Yes | No |
| 21 | Do you exercise regularly? | Yes | No |
| | If yes, how many days a week and for how long? | | |

For woman only questions 22, 23, 24, and 25

- | | | | |
|----|---------------------------------------|-----|----|
| 22 | Have you gone through menopause? | Yes | No |
| | If yes, what age? years old | | |
| 23 | Have you had a hysterectomy? | Yes | No |
| | If yes, what age? years old | | |
| 24 | Did they remove your ovaries? | Yes | No |
| 25 | Were you ever on hormone replacement? | Yes | No |

For men only questions 26 and 27:

- | | | | |
|----|---|-----|----|
| 26 | Have you ever had prostate cancer or surgery? | Yes | No |
| 27 | Have you ever had your testicles removed? | Yes | No |