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Use of patient flow analysis to improve patient access and clinical efficiency by decreasing patient wait time in a tertiary community hospital Ob/Gyn ambulatory women's clinic: a quality improvement (QI) projectst century

Abstract

Introduction: "Quality improvement (QI) is an approach to enhancing service systems and processes through the routine use of health and program data to meet patient and program needs".[1] Pregnancy and prenatal care follow-ups require frequent care visits. Problems that decrease the efficiency in caring for high volumes of patients can occur at any time. Furthermore, studies show that excessive wait time can be a source of patient and employee dissatisfaction,[2–4] and are associated with lower patient satisfaction ($p<0.05$).

Objective: The purpose of this QI project was to improve patient visit efficiency.[5] Our goal was to decrease the lead time (entrance to exit) for the initial maternity visit that included ancillary services (e.g. Women, Infants and Children (WIC), Pregnancy Care Management) to 30 minutes or less by December 1, 2016 from the current baseline of 2 hours 49 minutes. This decrease in lead time is a critical component of our efforts to improve patient and staff satisfaction, increase our capacity for patient care, provide multiple same-day services, enhance time management, and increase "word of mouth" patient referral.[6] Furthermore, an additional goal of this study was to evaluate and improve the delay time (i.e. days until next available appointment) in scheduling clinic appointments.

Study design: Observational study, Quality Improvement Project.

Setting: Women's Clinic at Lincoln Medical and Mental Health Center (LMMHC).

Methods: The Quality Improvement (QI) Project was initiated in 2013 to shorten the time between presenting to the women's health clinic and being seen by the provider. The in-clinic waiting time was defined as the time (in minutes) from the patient's appointment time to the time that the patient was being seen by the healthcare provider. A Daily Management System (DMS) is designed to incorporate staff leadership, daily accountability, and visual controls as a means to quickly identify and improve issues in the workplace. For many years, a (DMS) was used to manage patient flow through the women's clinic at Lincoln Medical and Mental Health Center. However, in contrast to a DMS, a Visual Management Board (VMB) allows for visual communication of data or goals to the staff (28) and as a part of continuing "Transformation," a VMB replaced the traditional DMS in the women's clinic at Lincoln Medical and Mental Health Center. From March 2013 to February 2015, the VMB was utilized as a Patient flow analysis (PFA) to track patient access in the women's clinic.

Results: By using VMB, the staff was able to identify inefficiencies in the patient visits, suggest areas in need of improvement, institute changes and test the effectiveness of clinic interventions.[5] These changes include, but are not limited to, added outpatient sessions, increased office efficiency, (such as, increased appointments, improved consistency in staff parings, enhanced computer access and also employed usage of a Patient Satisfaction Survey (Press Ganey). We were able to identify delays in patient throughput, improve patient wait time, minimize superfluous tasks performed by staff members, increase efficiency throughout the clinic, and ultimately provide more timely care to the women treated by our OB/GYN services. Mean wait time in the obstetrical clinic was decreased from 34 minutes to 33 minutes and in the gynecological clinic wait time decreased from 49 minutes to 28 minutes. At baseline, the mean visit time for OB clinic patient visits was 169 minutes and the mean visit time for gynecological clinic patient visits was 169 minutes. Based on these data, we identified specific areas of inefficiency and developed interventions to decrease the mean time of the patient visit. After interventions, follow-up data found the mean visit time for the obstetrical clinic was reduced by 1 minute to 168 minutes, and the mean visit time for the gynecological clinic was reduced by21 minutes to 148 minutes. The delay time before new obstetrical visits could be scheduled decreased from 11 to 7 days after changes were implemented. The time the patient spent in the clinic only decreased form 2 hours 49 minutes to 2 hours 48 minutes. From January 2014 to August 2014, the volume of initial gynecologic visits increased by 38%, 739 to 1020 appointments), return gynecologic visits increased by 29%,(795 to 1026 appointments, initial obstetrical visits increased by 15%, 152 to 174, repeat obstetrical visits decreased by 2.4%, 1198 to 1169, and using a 10 point Likert-scale revealed that mean patient satisfaction scores increased from 67% to 84%.

Conclusion: Patient flow analysis (PFA) via VMBis a simple, cost-effective method assesses function of ambulatory health care sites to measure patient flow, identify any inefficiency in the administrative and clinical processes and efficiently collect patient and provider flow data. We were able to document that, by adding outpatient sessions with increased office efficiency, we were able to identify delays in patient throughput, decrease the wait time for the next available appointment and for the provider after entering the clinical ambulatory site. After identification of inefficiencies, we were able to implement targeted interventions that were associated improved patient satisfaction.[5]

Keywords: daily management system, disconfirmation paradigm, hospital consumer assessment of healthcare providers and systems, outpatients, patient satisfaction performance improvement models, patient flow analysis, patient satisfaction, patient satisfaction survey (press ganey), physician satisfaction, quality improvement project, revisiting intention, revisiting, the hcahps survey, throughput times, visual management board, waiting time, women, infants and children, women's clinic

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Abbreviations: VMB, visual management board; PFA, patient flow analysis; CAHPS, consumer assessment of health plans study; COE, centers of excellence in women's health; AAAHC, accreditation association for ambulatory health care; IOM, institute of medicine's; HCAHPS, hospital consumer assessment of healthcare providers and systems; QI, quality improvement

Background

Providing the best health care to women in an ambulatory setting requires meeting their unique needs as well as structuring visits to ensure the patients' health and safeness of treatment. Unfortunately, as illustrated in the Institute of Medicine's (IOM) *Crossing the Quality Chiasm: a new health system for the 21st century*,"The healthcare system is poorly organized to meet the challenges of today's patients and the delivery of care is overly complex and uncoordinated, requiring steps and patient 'handoffs' that slow down care and decrease, rather than improve safety".[7] Compounding the issue is the sheer number of patients served at a tertiary community hospital in a heavily populated city, where the rates of comorbidities can be high. These patients typically require more intricate care, which contributes to lengthier visits, and increases the difficulty of efficiently managing a high patient census with good quality of care.

Anderson et al.[8] investigated patient descriptors of medical care and found that the "core" qualities were communication, access, interpersonal skills, care coordination and follow up. Poor performance in these areas tended to correlate with negative perceptions of the encounter as an experience and f the quality of care provided.[8] In 2001, the Institute of Medicine's (IOM) Committee on the Quality of Healthcare in America examined the access quality and described "*timely*: reducing waits and sometimes harmful delays for both those who receive and those who give care"[7] as one of the "six aims for improvement" because the timeliness of care received is clinically important and related to patient reported outcomes of care.[7] Since patient visits can be delayed at any point during the patient's appointment from registration, to being placed in a room, or waiting for the doctor; an examination of the entire visit is necessary to improve the efficiency and the quality of care.

Studies show that excessive wait time can be a primary source of patient dissatisfaction and employee dissatisfaction.[2–4] Anderson et al.[9] found that longer wait times were associated with lower patient satisfaction ($p<0.05$),[9] and excessive wait times could even decrease patients' outlook on the capabilities of the physician.[10] While Goodman et al.[11] reported that implementing change to enhance patient satisfaction requires immense support from institutional leaders and employee investment of extra time and effort. However, adoption of change vested by all stakeholders, it may help build camaraderie and a more synergistic practice across all levels.[11]

Naomi Kuznets[12] and the Accreditation Association for Ambulatory Health Care (AAAHC) Institute for Quality Improvement used benchmarking and the 10 Elements that function as actions steps in building a complete quality improvement (QI) study to initiate and sustain performance improvement. In doing so, wait times in the designated clinic decreased from 50 minutes to 28 minutes.[12] It is worthy to note that when wait times decreased, patient satisfaction increased.[2–4,9,10,13] However, Anderson et al.[9] concluded that the time spent with the physician is a stronger predictor of patient satisfaction than the amount of time spent in the waiting room.[9] Patient flow analysis (PFA) can be an effective method for making salient any inefficiency in the patient visit and efficiently collect patient flow data.[5] In addition, performing PFA in a clinic setting does not require hiring external consultants to identify areas of inefficiency, which conserves resources and allows for more efficient use of time.[5,14] Kallen et al.[3] formulated a multifaceted plan to decrease wait times in an Ambulatory Treatment Center (ATC) of the MD Anderson Cancer Center and observed a 26.8% decrease in overall wait times following implementation (15% decrease in wait time for patients with pre-schedule appointments and a 29% decrease for those with scheduled appointments).[3] Therefore, improved throughput can provide more time for resident exposure to patients, improved education, and more financial security.[14] Kallen's ATC estimated that they could serve an additional 3.6 patients per day, which would result in an annual gain of over $1 million.[14]

"Quality improvement (QI) is an approach to improve service systems and processes through the routine use of health and program data to meet patient and program needs".[1] Our goal is to design a QI project that will improve patient access and clinical efficiency in our tertiary community hospital OB/GYN women's clinic. Our goal is to improve patient access by reducing patient no-show rates and incorporating a Resident's Template, improve cycle time for all women's health services, and network with the community Diagnostic and Treatment Centers (DT&Cs) and providers. A Visual Management Board (VMB) was used as a Patient flow analysis (PFA) to identify and reduce wait times. Various interventions were implemented after use of the VMB to identify sources of bottlenecks in patient throughput to improve patient flow and ultimately reduce wait times. Patient scheduling is a low-cost area on which to focus change in a clinic and analysis of the data can help match existing resources to meet excessive demands at appropriate times.[15]

The HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) Survey, also known as the CAHPS Hospital Survey or Hospital CAHPS, is a standardized survey instrument and data collection methodology that has been in use since 2006 to measure patients' perspectives of hospital care.[16]

Objectives

The purpose of this QI project was to improve patient visit efficiency.[5] We aimed to decrease the lead time (entrance to exit) of a patient's initial maternity visit with ancillary services (e.g. WIC, Pregnancy Care Management) to 30 minutes or less from a baseline of 2 hours 49 minutes by December 2016. The decrease in lead time is critical to improve patient and staff satisfaction, increase the capacity for patient care, provide multiple same-day services, enhance time management, and promote timely services of better quality by patient word of mouth.[6]

Additional goals included:

- Improve access by reducing no show rate and incorporating Resident's Template.
- Improve Cycle Time for all Women's Health Services.
- Network with our Diagnostic and Treatment Centers (DT&Cs) and Community.

Our six guiding Principles were: Keep Patients First, Keep Everyone Safe, Work Together; Pursue Excellence, Manage Your Resources and Keep Learning (Figure 1).[17]

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Figure 1 Our six guiding principles.[26]

Methods

The Health Director identified a potential backlog for patients seeking Women, Infants and Children (WIC) services. The wait time associated with the WIC process, especially as it relates to maternal health patients was evaluated. Upon review, the QI team quickly identified a problem with navigating the maternal health system that prevented patients from even being able to access WIC services, such as lack of free appointment spots to cover all the walk-in paitents.[6]

March 2014

To facilitate the patients flow to the doctors, we implemented a system in which the physicians switched between the different patient rooms, instead of a Patient flow analysis (PFA) (or other staff member) where a patient came to the physician who remained in the same room. In this mode, we found that the physicians become more familiar with the facility and sometimes are more mobile than patients, which may help to reduce time spent in the office. Additionally, patients are made more comfortable and not forced to continuously switch rooms, which may positively affect their satisfaction with the services provided.

March 2014

We increased templates for physicians from 56 outpatient sessions/week (OB=20/week and GYN=36/week) to a total of 61 slots on the physicians' template, which equated to 78 more patients per week. The slots were distributed among various levels of training as seen fit (i.e. 3 slots/4 patients were added to Postgraduate Year 1 (PGY1) physicians and 6 slots/8 patients were added to PGY 4 physicians).

October 2014

We installed a second computer in each examination room for Patient Care Assistants (PCA) to facilitate the simultaneous extraction and recording of patient information. In effect, this should reduce the number of repetitive questions asked to the patient so as to reduce the time of the visit and possibly increase patient satisfaction.

August 2014

We began using Soarian Clinical's database (similar to Global Positioning System [GPS] navigation system). This is a system that provides a more accurate portrayal of the patient's visit and time spent during each facet of the visit. The system can be queried for the time the patient arrived, registered, entered the examination and was discharged from the clinic. This digitally captured information simplifies the analysis of accurate contemporaneous data.

In addition to the above changes, we have also requested three additional ultrasound machines and four additional scales with dual function (height-weight) to facilitate sonographic examination and patient flow through their visits.

Also, as a part of the "Transformation," we implemented a board that indicates the pairings of staff members throughout the day to minimize confusion and overlapping of staff. There are also "daily briefs" at the beginning of each day to remind staff of pertinent information regarding patient care and safety, as well as to reiterate department goals. In addition, starting in February 2015 we began issuing Patient's Same Day Satisfaction Surveys and Press Ganey: Healthcare Performance Improvement and Patient's Satisfaction Surveys designed to evaluate patient satisfaction from December 2014 to February 2015 by asking patients about timeliness, courtesy, communication and competence of personnel in the clinic.[18,19]

Furthermore, we used a Visual Management Board (VMB) to track patient access and throughput in the women's clinic from March 2013 to February 2015.

Results

By using VMB, the staff was able to identify inefficiencies in the patient visits, suggest areas in need of improvement, institute changes and test the effectiveness of clinic interventions.[5] These changes include, but are not limited to, added outpatient sessions, increased number of available appointments, improved consistency in staff parings, enhanced computer access and also began the routine use of a Patient Satisfaction Survey (Press Ganey). Mean wait time in the obstetrical clinic was decreased from 34 minutes to 33 minutes and in the gynecological clinic wait time decreased from 49 minutes to 28 minutes (Table 1) (Figure 2).

Table 1 Wait time in gynecology clinic

Month	Average In-clinic Wait Time (min)
January 2014	49
February 2014	51
March 2014	47
April 2014	76
May 2014	72
June 2014	69
July 2014	47
August 2014	47
September 2014	57
October 2014	16
November 2014	54
December 2014	40
January 2015	30
February 2015	32
March 2015	28

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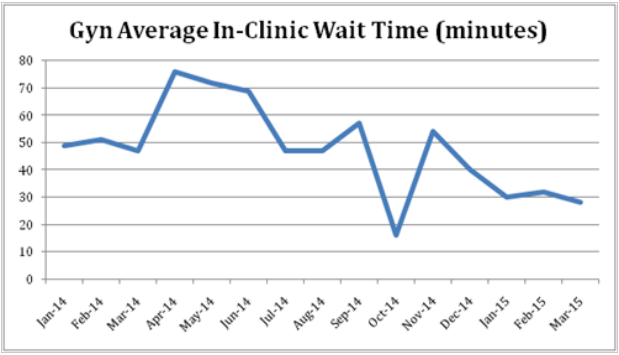

Figure 2 Average in-clinic wait time (in minutes) for gynecology clinic.

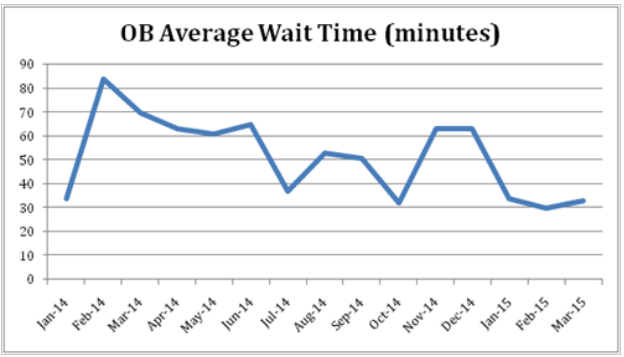

Figure 3 Average in-clinic wait time (in minutes) for obstetrics clinic

At baseline, the mean visit time for OB clinic patient visits was 169 minutes and the mean visit time for gynecological clinic patient visits was 169 minutes. Based on these data, we identified specific areas of inefficiency via the PFA, and subsequently developed interventions to decrease the mean time of the patient visit. After interventions, follow-up data found the mean visit time was reduced to 168 minutes for the obstetrical clinic, a time decrease of 1 minute. Mean visit time for the gynecological clinic was reduced to 148 minutes, a time decrease of 21 minutes.

Wait times for new obstetrical visits decreased from 11 to 7 days. The patient time spent in the clinic dropped from 2 hours 49 minutes to 2 hours 48 minutes. From January 2014 to August 2014, initial gynecologic visits increased by 38% (from 739 to 1020 appointments), return gynecologic visits increased by 29% (from 795 to 1026 appointments), initial obstetrical visits increased by 15% (from 152 to 174 appointments), repeat obstetrical visits decreased by 2.4% (from 1198 to 1169 appointments), and the mean patient satisfaction scores increased from 67% to 84% (on a 10-point scale) (Table 2) (Figure 3).

Table 2 Wait time in obstetrics clinic

Month	Average In-clinic Wait Time (min)
January 2014	34
February 2014	84
March 2014	70
April 2014	63
May 2014	61
June 2014	65
July 2014	37
August 2014	53
September 2014	51
October 2014	32
November 2014	63
December 2014	63
January 2015	34
February 2015	30
March 2015	33

Overall improvements

1. Revised Maternal Health history forms (consent form and pre-printed formatted labels)
2. Implemented routing to lab before MH clinic with maps
3. Utilized 2 rooms for vital signs/weights
4. Prepare charts for initial OB visits prior to appointment
5. Wrote staff assignments in clinic on the nursing station white board
6. Requested door flag signals for clinics
7. Wrote standard work guidelines for patient registration
8. Patient reminder calls to confirm the appointments
9. Mounted hand sanitizer dispensers on the wall to move out of the reach of small children
10. Insert any charts, graphs, pictures, and quotes that show the changes led to an improvement
11. improved team work and daily staff activities
12. Completed an updated VMB every month
13. Better communication between medical team members and the patient

Discussion

The Sedgwick County Health Department investigated WIC wait times in an attempt to improve wait times by implementing standardized reminder calls and found that it may not be a productive use of time.[20] Ferris et al.[21] found that the consumer (or patient) perspective provides unique information that is essential to delivering quality care and that the process of completing satisfaction surveys may be a positive experience for the patient.[21]

Anderson et al.[22] compared the care given and patient satisfaction of women in 15 National Centers of Excellence in Women's Health (CoE) to women in the 1998 Commonwealth Fund Survey of Women's Health and the 1999 Consumer Assessment of Health Plans Study (CAHPS). They found that women in the CoEs received more clinical preventative services and experienced higher levels of satisfaction with their care, care comprehensiveness, and coordination.[22]

Anderson et al.[8] investigated what patients actually describe about the qualities of medical care by evaluating their ratings of the physicians. They discovered that the "core" qualities are

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communication, access, interpersonal skills, and care coordination and follow up, but poor performance in these areas tended to yield low ratings of the physician and negative comments.[8]

Cassidy-Smith et al.[23] used the Disconfirmation Paradigm (DP to propose that dissatisfaction arises when service expectations are not met, and furthermore, dissatisfaction with those times occurred throughput times exceeded expectations (r=0.42 to 0.64, p<0.01) and actual throughput times correlated weakly with overall satisfaction (r=0.00 to-0.22).[23] Interestingly, Eilers conducted a study where a patient satisfaction survey performed in a student health center showed that students rated waiting time as the lowest of several listed categories (categories contributing to patient satisfaction).[24]

Zandbelt et al.[25] found that visit characteristics such as waiting time, consultation duration, and reason for visiting the physician were not associated with either the patients' or the physicians' satisfaction, which suggests that the satisfaction is more indicative of the patient-physician relationship rather than the context of the visit.[25]

Steinwachs & Yaffe[26] studied the timeliness of care received in the department of medicine in a prepaid program and found that it is clinically important and related to the patient's reported outcomes of care and implications on anxiety and activity limitation.[26] While it may not always be feasible, according to Bruni et al.,[27] it may be beneficial to involve the public (i.e. the patient population) in the decision-making process of how to improve wait times.[27]

Conclusion

Patient flow analysis (PFA) via VMB is a simple, cost-effective method to measure patient throughput in a busy tertiary women's clinic. Therefore, the design and implementation of the intervention to reduce wait times and improve patient access may be effective after throughput bottlenecks are identified. If patient access is improved and efficient care is sustained, it is surmised that the female population could potentially receive overall better healthcare. This could translate into decreased incidence of chronic disease, better overall health, and also a decreased risk for cancer.[22,28]

By using a visual management board (VMB) as a Patient flow analysis (PFA), adding outpatient sessions, and increasing office efficiency, we were able to identify delays in patient throughput, improve patient wait times, and ultimately provide more efficient care to the women treated by our OB/GYN services.

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Conflicts of interest

The authors declare there is no conflict of interests.

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