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Improving Waiting Time Experience for Children with Diabetes at Boston Children's Hospital: Multifaceted Intervention

Haila Alshelowi*

CQIPS, Qassim Armed Forces Hospital, Saudi Arabia

*Corresponding Author: Haila Alshelowi, CQIPS, Qassim Armed Forces Hospital, Saudi Arabia. Received: December 08, 2021 Published: December 15, 2021 © All rights are reserved by Haila Alshelowi.

Abstract

When we think about the time we last spent sitting in a waiting room, at the doctor's clinic, at the mechanic's workshop, at the arrival hall or the departure hall at the airport, at the dentist's office, how long we were there, what did we do to pass the time till our turns were called in? If we think about the doctor's clinic, any person who has had to wait a long time has probably had an unforgettable experience in a waiting room. That waiting room might have had some magazines, newspapers, or pamphlets in it, maybe posters with instructions pertaining to specific diseases or medications, and even TV shows that may or may not have been showing specially prepared programs, news or documentaries. Now imagine children in the same situation - waiting at the doctor's clinic for a long time every month? What would they do to pass the time? Would they read medical pamphlets while they are waiting for their turn to see their doctor? The problem investigated in this research is the effect of a multifaceted intervention on improving waiting time experience for children with diabetes at Boston Children's Hospital. This is based on Press Ganey data suggesting that waiting times could be an area to improve inpatient satisfaction with the clinic.

Keywords: Children; Diabetes; Clinic

Having to wait for services is common in the medical setting. How do we perceive that waiting? According to Reimann and Strech (2010) [11], perspectives or conclusions by patients regarding the waiting experience are based on a complex compilation of environmental and psychological factors that work together to form a subjective perception of waiting duration. Anić, Radas, and Miller (2011) [3] suggested that when people focus on the passage of time, they perceive wait duration to last longer than it actually does and, if left unmediated, long waiting time duration can be perceived negatively. Consequently, actual waiting time, even when short, may have little or no impact on patient satisfaction (Thompson, Yarnold, Williams, and Adams, 1996) [12]. Furthermore, the temporal estimation of time can result in negative satisfaction, depending on whether the wait is felt to be longer or shorter than expected (Areni and Grantham, 2009) [4]. Medical services (Zoller., et al. 2001) [15] are not immune to this phenomenon. Thus, it is possible that mediating the perception of waiting time duration in

medical waiting areas by introducing multifaceted strategic interventions could have a positive effect on patient satisfaction.

What is the impact of long waiting times?

The perceived amount of time spent waiting for a medical service is considered as a highly contributing factor to overall patient satisfaction (Jatulis, Bundek, and Legorreta, 1997) [10]. A research study by Anderson, Camacho, and Balkrishnan (2007) [2] proved that patients have lower satisfaction scores when they feel unhappy with their wait time, even if the actual duration is less than what they perceive it to be. Zoller., *et al.* (2001) [15] indicated that misjudgment of waiting time duration affects patient satisfaction in primary care. Thompson., *et al.* (1996) [12] arrived at the conclusion that "Patients whose perceived waiting time to see a doctor was 'shorter than expected' were more satisfied with the ED [Emergency Department] encounter than patients whose wait was 'as expected,' and patients who waited 'longer than expected' were

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least satisfied" (p. 663). In a study by Camacho., *et al.* (2006) [6], it was concluded that patients weigh their delays against the benefits of the service provided as a factor to determine their willingness to return. These findings confirm the effects of satisfaction on continuity of care. There is also a relationship between a person's mood and their perception of time (Hornik, 1992) [9]. Hornik concluded that people with an upbeat mood are inclined to have a positive attitude regarding both the present and future. People in "depressed or neutral mood states" are generally more pessimistic.

What might work to improve perceptions of waiting times?

Improving satisfaction might be accomplished by introducing strategic interventions based on various psychological models to patients. Eagleman (2008) demonstrated that mediations based on dynamic interventions might be useful in changing how people subjectively perceive waiting time. Examples of dynamic interventions include, among others, electronic devices such as laptop computers, tablet computers, televisions displaying interactive videos, books, information cards requiring cognitive interaction, dialogue between patients and staff. Interactions with well-trained staff who understand patients' level of anxieties based the acuity of the patient's injury or illness is also considered a dynamic distraction. Improved technology has resulted in new research methods (Coull., et al. 2004) [7]. As technology changes, so do the opportunity for enhancing mediation strategies. Potential interventions available for further study include iPods, iPads, smartphones, and diseasespecific education material.

Neuroscientists (i.e., Eagleman., et al. 2005) have shown that when interventions are strategically selected and introduced, the perception of time duration is affected. For example, according to Areni and Grantham (2009) [4], "Engaging customers in conversation will almost certainly divert attention away from monitoring time; this would result in time seeming to pass more quickly than usual, and hence, a more favorable [sic] effective state" (p. (453). The result of the research studies reviewed suggests that it is possible to change the subjective perception of time duration, thereby improving patient satisfaction. Lastly, Harun and Fuziah (2008) [8] confirm the effectiveness of static environmental interventions. For example, the type of furniture and its arrangement, the brightness, quality and standard of lighting, and the spaciousness and general acoustics of waiting areas affect time perception. Based on these findings, it could be argued that the management and introduction of multifaceted interventions could be used to influence patient satisfaction. The question that guides the research study is: How will the introduction of a multifaceted intervention in medical waiting areas affect the satisfaction of children with diabetes at Boston

Children's Hospital?

Articulation of the risk

Worse perception of waiting times can increase the risk for patients. Alazri and Neal (2003) [1] revealed that satisfaction affects the continuity of care and can have a direct bearing on clinical results. Furthermore, Wittmann, Vollmer, Schweiger, and Hiddemann (2006) [14] revealed that patients' worries about the time they have to wait are magnified by their anxiety related to their illness or injury. Wittmann., *et al.* (2006) [14] explained that time-related anxiety leads to concerns about procedures or treatments and often leads to distrust of the medical system. Furthermore, patient satisfaction affects the financial performance of healthcare organizations (Ware, 1995) [13]. Accordingly, healthcare facilities always search for means to improve the patient experience and decrease waiting times. Understanding the subjective perception of time expands or contracts due to the interference effect (Brown, 1997) [5] might be useful in selecting mediations.

The figure 1 shows these and other risks of prolonged wait time to other stakeholders in the system.

Figure 1

Current state analysis

We used multiple QI tools to understand the current state and help us design interventions. These include the evaluation of baseline Press Ganey data, a force field analysis, process mapping, and a cause and effect diagram. Sources of information included a literature review, direct observation, interviews with patients, staff, and leadership.

Various tools can measure patient satisfaction. Press Ganey administered the survey used in this clinic. The survey is validated and developed by a review of the client's feedback, literature review, and experts' feedback from the Press Ganey Client Advisory Council. The survey focused on patient perception of care received in a physician's clinic. Boston Children's Hospital is participating in the patient experience survey quarterly through the Press Ganey portal. Review of BCH Diabetes Clinic patient experience data showed six concerns, as shown in (Table 1) which are: the convenience of office hours, ease of getting clinic on the phone, ease of scheduling appointments, information about delays, helpfulness on the phone, and waiting time at the clinic. These consistent four years of data showed opportunities for improvement available for intervention.

Top Box % by year						
	2016	2017	2018	2019		
Question	(n = 260)	(n = 275)	(n = 234)	(n = 221)		
Care received during Visit*	83.7%	82.1	80.8	85.8		
Cleanliness of our practice	83.3%	85.1	77.7	82.3		
Concern of nurses/asst for problem	73.5%	72.1	78.4	75.8		
Convenience of our office hours	49.8%	53.6	54.5	52.6		
Courtesy of registration staff	71.5%	69.5	70.0	73.3		
CP concern for questions/worries	87.2%	80.7%	84.8%	88.2%		
CP discuss treatments		1	1	92.9%		
CP efforts to include in decisions	87.3%	86.1%	85.9%	87.3%		
CP explanations of Prob/condition	86.9%	83.6%	86.7%	90.4%		
CP information about medications	87.2%	83.8%	88.1%	87.2%		
CP instructions for follow-up-care	83.9%	83.9%	84.3%	86.9%		
CP spoke using clear language	88.7%	88.3%	87.6%	88.7%		
Ease of contacting				69.2		
Ease of getting clinic on Phone	48.9%	50.2%	49.7%	47.4%		
Ease of scheduling appointments	49.2%	55.5%	52.8%	56.0%		
Friendliness/courtesy of CP	89.2%	82.5%	85.5%	88.4%		
Friendliness/courtesy of nurse/asst	80.5%	74.0%	78.8%	79.8%		
How well nurse/asst listen				91.7%		
How well staff protect safety	81.9%	83.3%	76.2%	80.6%		
Information about delays	48.3%	44.6%	46.3%	52.3%		
Likelihood of recommending CP	85.5%	85.1%	84.5%	88.1%		
Likelihood of recommending Practice	86.4%	83.9%	82.0%	87.6%		
Our concern for patients' privacy	81.5%	84.9%	75.0%	81.4%		
Our helpfulness on the telephone*	54.2%	62.7%	58.1%	61.6%		
Our sensitivity to patients needs	79.9%	82.5%	74.7%	83.1%		
Patients' confidence in CP	90.0%	86.9%	85.4%	87.9%		
Staff worked together	80.2%	78.4%	78.0%	82.6%		
Time CP spent with patient	86.4%	86.2%	85.8%	85.4%		
Wait time at clinic	53.6%	47.0%	51.2%	55.1%		

Table 1: Patient Experience survey top box score at Diabetes Clinic, Boston Children Hospital.

Force field analysis

Force field analysis was done to explore the forces that support or work against the improvement project "improving waiting time experience." Primary sources of information are literature review, staff, and leadership interviews. This analysis showed more driving forces for the change, especially the presence of leadership support.

Wait time data review

Wait time is not currently measured as part of the standard work. This quality data from the previous improvement project on

clinic efficiency represent the most recent baseline data for waiting time. They were able to make some improvements, although on a fraction of the total waiting duration. So, we hope to be able to build on this.

The below run chart (baseline data) are check-in times obtained in March 2019. The below run chart (post-intervention) are checkin times from August-September 2019. The x-axis representing the patients that were followed (in order), y-axis representing time in minutes from entering CA room to time paperwork is completed (and in-clinic door).

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Figure 2

Figure 3

Source: clinic's quality data, project led by Dr. Christine Cherella MD with Permission of Dr. Erinn Rhodes, MD.

Stakeholders

The list of stakeholders includes

- Diabetes care team (physician, nurses, educator): front liner for clinic visit
- Administrative team (receptionist, clinic supervisor): involved in reception, and appointment scheduling.
- Patients and parents: the survey will assess their perception and satisfaction with the care
- Patient experience team: running the quarterly patient experience survey.

Process mapping

After interviewing the staff, walking the Gemba for direct observation, and confirming with clinic leadership, I drew the process map. The purpose is to allow the team to identify the actual flow of events in the process of the endocrine clinic visit. The current process has multiple waiting steps, which are non-value added to the process.

Cause and effect diagram

After brainstorming with the frontline staff for possible causes of impaired waiting time experience, we build up this fishbone diagram. The purpose of the cause and effect diagram is to explore and visually display all the possible causes and to reach root causes. This cause and effect added the significant contribution of system and measurement issues.

Figure 4

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Figure 5

Input from patients

During a staff meeting (Jan 22nd, 2020), I presented a Power-Point presentation about the capstone project and proposed interventions. Dr. Rhodes moderated a discussion about the project. In conclusion, the group plan was to shadow patients to time their visit and to interview them after that to obtain their perception about waiting time experience. The investigators designed a questionnaire to allow for parents' input. I interviewed ten patients over three weeks using the following questionnaire (see appendix).

Q1. How often are seen in the endocrine clinic?

Visit frequency	Number of Pt	Percentage
First visit	1	10%
Q3 months	5	50%
Q6 months	4	40%

Table a

Q2. What is your usual waiting time before entering the provider's room?

Waiting time in minutes	Response frequency
< 10 minutes	20%
10-15 minutes	30%
16-30 minutes	40%
>30 minutes	10%

Table b

Q3. What has been your experience of any delay in the waiting area?

All responses included the same concept (none, no waiting, never, no major delays) of no concern with waiting time.

Q4. If you have experienced a delay, what steps, if any, has the clinic staff taken to keep you informed about your wait?

The answers were consistent (None, and Nil).

Q5. What are your suggestions for a better waiting time experience?

90% Toys, coloring pages, play area, more kids area.

10% books.

Q6. Is there anything that we could do to improve the comfort in the Reception area (e.g. Lighting, temp., reading materials. Etc.)?

None 20% Reading materials 10%

Foot massage 10%

Child engaging activities 60%.

Surprisingly, the majority were non-concerned about waiting time, which does not match with the four consecutive years patient experience survey score or with the staff input.

The possible explanation for this is interviewer bias because the person interviewed probably overreacted positively, with results that do not reveal the true feelings because of fear of sharing with providers.

Another explanation is non-response bias; the persons with negative feedback may have abstained from participation in the survey, mainly it was a convenient small sample.

I also interviewed one patient at length to get a more in-depth view of the patient experience in the clinic. The following Figure shows a persona that summarizes her thoughts.

Figure 6

In summary, my current state assessments first showed no measurement of waiting time, making it less likely to be addressed for management. There is a lack of shared mental models between the staff and under-recognition of the risk of negative experience with

tient about their experience. Patients have expressed the need forengaging activities for their children during interviews and shad-owing through the visit.

waiting time. We saw no closed-loop communication with the pa-

Identify opportunities

Figure 7

Impact effort analysis was done to assess for all available opportunities for interventions, then categorized based on their impact and the necessary effort to make them real. This was built based on brainstorming, review of the literature, and discussion with the staff.

One of the options mentioned is supervisor round every 15 minutes for monitoring and problem-solving. Although this is potentially useful, it takes high effort and required delegated personnel to intervene.

Another option was implementation and monitoring of apologies for the delay, explaining the reason for it, estimating how long it is expected to wait, and thanking patients for their cooperation. This policy needs a lot of education and monitoring until it becomes part of the culture.

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Another important choice is working on the existing patient's portal to support online scheduling/ rescheduling, online check-in, online queuing system, and uploading patients' data pre-arrival to the clinic. This option would be a high impact, but we recognize it requires programming and redesign of the current portal.

Design and description of the intervention

The proposed solution was to leverage and update the patient portal to collect the critical elements for patient evaluation in the endocrine clinic before the visit. We choose coproduction with patients to help to develop a smoother workflow. The portal was chosen because potentially it will reduce waiting time for patients from 10-20 minutes by an online check-in and upload of data prearrival to the clinic. Because the average time required to download data in the clinic is 10 minutes, and the ordinary time for registration for a new patient is 10-15 minutes. After reviewing the reception process, the critical elements needed to be collected in the portal before the visit include:

- Updated personal information: Name, date of birth, race, sex, caregiver, special needs, address, contact information, and preferred communication channel.
- Updated Insurance information
- Consent: General treatment consent, privacy consent, others if required at predefined intervals
- Upload patient data: Continuous glucose monitoring data, insulin pump data,...etc.
- Verify appointment detail and signature.

We decided on this list based on an interview with the receptionist and review of the Partner's Patient Portal.

We imagine the redesigned workflow to now look like this.

Figure 8

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Implementation plan

Disruptive innovation has occurred due to COVID 19 pandemic. All clinic visits are virtual visits or phone calls, which gives a chance for testing the patient's readiness for change and acceptance of online visit preparation. Although the current patient portal still does not support check-in or uploading patient monitoring data, the patients reported positive feedback to the patient experience team. They were asking to maintain virtual visit options for the future post-COVID 19 eras.

So, to implement the new process, we will need to work with clinical informatics in designing the workflow, creating a virtual queuing system, and a live feedback system. We would need to meet with all stakeholders to implement and monitor as well. These meetings would include the patient advisory council to represent the voice of the patient and finance for billing and cost evaluation.

Education plan

We would educate patients by using a forced function as the patient logs into the patient's portal to make patients read and acknowledge the new features of the check-in and queuing system before requesting an appointment.

We would educate the clinical staff by forced function through the EHR provider's interface to make them read and acknowledge the new process of online patient intake before requesting an appointment.

We would educate the non-clinical staff in the clinic by in-person training on the flowchart of the process and checklist of the required steps.

Measurement plan

The new process should include measurement of waiting time at each step of the process with immediate feedback to front liners, which allow comparing and developing the benchmarks. This data could be generated automatically through the portal using electronic time stamps to calculate the waiting time in minutes. The data could be shared in an SPC chart with all stakeholders.

Second, we will look for improvement in the patient experience survey, especially the waiting time/ experience, information about delays pre/post-intervention.

We would also expect some spillover improvement in questions about scheduling and communication because of increasing access to the new portal ,with more likely utilizing the online tool instead of the telephone for communication or scheduling.

Results to date

COVID 19 has led to a delay in the progress of the project. With an inability to implement solution shortly, due to pandemic impact and competing priorities for the leadership at the current time. But, I believe the gain of improving workflow and improving the experience with waiting is worth the future investment.

Conclusion and Learned lessons

The lessons I have learned from this project are the importance of:

- Creating the will within the hospital to adopt the change by addressing the sources of resistance, either fear of leaving the comfort zone, or the unpredictability, or others.
- Prioritizing and adapting changes based on the organization's specific needs and cultures.
- Involvement of frontline staff and making champions for every quality improvement effort to create loyalty and sustainability of the improvement.
- Continuously educate throughout the project and keep documentation for institution memory.
- Ensure commitment from leadership to sustain the funds, human resources, and accountability.
- The timely feedback and celebration of the success.

In my work going forward, I will always involve and empower the frontline staff, ensure leadership support, and maintain documentation.

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