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Evaluating the utility of texting in the ambulatory care of paediatric patients with type 1 diabetes: a quality improvement report

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ABSTRACT

Introduction Type 1 diabetes (T1D) is a chronic and costly disease that is often diagnosed in childhood. Achieving excellent glycaemic control during this period requires attention to multiple factors. Advances in technology now allow clients (patients/family members) to fine-tune their insulin delivery, necessitating support from highly skilled nurses, dietitians and physicians (clinicians). Despite quarterly team-based appointments, interim issues and questions often arise, and families may not always reach out for support. The incidence of T1D is rising, and yet barriers exist to expanding the clinical team. Additionally, clinicians are not necessarily colocated, making timely and efficient communication challenging. We postulated that offering texting as a communication modality would increase client interactions by 20%, and that clients and clinicians would find it a desirable tool in the delivery of efficient and timely ambulatory care.

Methods A prospective interventional quality improvement project was conducted between July 2022 and August 2023. Baseline data were obtained for the number of interactions. Parents, caregivers and age-appropriate patients were then registered onto the texting platform (N=125) and received a weekly check-in message. The number of interactions and clinical time spent texting and providing care because of a text interaction were collected.

Results There were approximately 30 interactions per week, an increase of >2300%. The average additional clinical time required was 56 min per week (average of 30 s/interaction). Qualitatively, 100% of our clients expressed a desire to continue texting with the team. 97% of clients felt that texting was an important way for them to contact their diabetes team. Our clinicians also wished to continue texting, valuing the improved efficiency of communication and experiencing a greater degree of connection with their clients.

Conclusions Texting is a welcome modality of communication between clients and their clinical care team in the setting of ambulatory T1D care, resulting in increased engagement.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The ambulatory management of type 1 diabetes (T1D) during childhood is very challenging, and uniformly tight glycaemic control is elusive in most paediatric T1D clinics. There has been some research into the use of texting in adolescents and adults with T1D to improve support.

WHAT THIS STUDY ADDS

⇒ In an entire paediatric T1D clinic over the course of a year, texting was a welcome modality of communication for patients, their families and their clinical care team. It increased engagement and ease of communication and interaction. It highlighted the ability to be nimble and provide high-quality support despite an increase in the size of the clinic patient population and no additional human resources.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Texting is currently not a standard way in which clinical care is provided for T1D. However, this study highlights that it is a patient-centred approach that is also highly supported by clinicians and leads to improved joy in work. These are important considerations for healthcare organisations to reflect upon when making decisions around service delivery.

INTRODUCTION

Problem description

Type 1 diabetes (T1D) is a chronic and costly disease,[1] and most patients in Canada are diagnosed during childhood.[2] There have been great advances in the management of diabetes through technologies such as insulin delivering pumps and continuous glucose monitoring (CGM) devices, the goal being excellent glycaemic control in order to mitigate many of the known downstream complications of diabetes.[3 4] The International Society for Pediatric and Adolescent Diabetes (ISPAD) 2022 Guidelines recommends quarterly visits, with the expectation that families will reach out in between these scheduled visits for help; however, this does not happen consistently for the population as a whole. Frequent adjustments in insulin settings are required as children move through different developmental phases.[5] Patients need to increase their self-management skills through

adolescence and take greater responsibility for the overall care of their disease. The incidence of diabetes is increasing in British Columbia,[6] Canada, thus placing more pressure on multidisciplinary teams to provide 'just-in-time' support to patients and their families. The team members are often not colocated, thus creating challenges in ensuring timely and efficient team-based communications about the patients.

Over nearly two decades, the use of texting via mobile phones in the T1D ambulatory care setting has been considered by several diabetes care teams, for both adults[7–9] and adolescents. The ISPAD 2022 Guidelines identify the opportunity to use texting messaging in the ambulatory care setting.[5] However, there is a paucity of literature that describes the standardised use of texting in an entire paediatric diabetes clinic and evaluates client and provider satisfaction. Some studies have looked at feasibility and acceptance;[10] others have looked at outcomes such as improved glycaemic control specifically during adolescence[9 11–18] with mixed results. Still other work has focused on understanding the value of texting to improve the success of transition from paediatric to adult diabetes care systems.[19]

Available knowledge

Advances in technology aim to refine the ability to maintain tight control of blood sugar readings. However, many factors affect glycaemic control, and patients and families still benefit from anticipatory guidance and timely support from their diabetes teams in between scheduled quarterly clinic visits. Mobile phone technology is ubiquitous and very familiar to patients and families living with T1D.

Rationale

If we could improve the ease of communication between our clients and clinicians in between scheduled clinic visits, then we would have more engagement with them. This would allow us to provide more 'just-in-time' education and support.

Specific aims

The aim of this project was to increase engagement with patients and families (clients) in the paediatric diabetes clinic at Vernon Jubilee Hospital in the Interior Health Authority (IHA) of British Columbia, Canada by 20% over a 1-year period, ending in August 2023.

METHODS

Context

Vernon Jubilee Hospital is a referral hospital serving a catchment area of 86 000 people in the North Okanagan region of British Columbia, within the IHA. Geographically, this is the second largest health authority in British Columbia, Canada.

The paediatric diabetes clinic functions within a larger diabetes clinic that serves adults with T1D, gestational diabetes and T2D. There are two diabetes nurses, one diabetes dietitian and three paediatricians with special expertise in diabetes who comanage 80 patients and their families. 94% of the clinic clients use a CGM, and 80% are on an insulin pump. In March 2020, a team decision was made to provide teaching of new medically stable patients with T1D in the outpatient setting, largely due to the declaration of the COVID-19 pandemic.

Prior to the introduction of text messaging communication in our clinic, if a client had a question in between a scheduled quarterly clinic visit, there were three possible options to reach out:

1. Call the paediatrician's office. The office administrative assistant would notify the paediatrician, and the paediatrician would arrange to have a telephone or in-person visit to address the issue. The paediatrician would need to remember to send an email to the other team members to ensure that they were kept informed.
2. Call the diabetes clinic. The office administrative assistant would email the clinician most appropriate to handle the issue. This clinician would attempt to resolve the matter with the client by telephone (sometimes resulting in 'playing phone tag'), send an email or less often, arrange an in-person or virtual visit. They would then need to send an email update to the rest of the team.
3. Wait to discuss at the next scheduled quarterly appointment (often resulting in a missed opportunity for insulin setting adjustment or 'in the moment' learning).

Interventions

Our goal was to provide 'just-in-time' care to our clients, what we have termed 'soft and medium touches', while monitoring the burden and workflow disruption to the clinicians.

1. Consenting process. Caregivers and age-appropriate youth were provided with verbal and written information regarding the IHA texting policy. Specifically, they were informed to refrain from providing self-identifying information. Shared decision-making/conversations occurred when registering minors onto the texting platform.
2. Nurse/dietitian assignment to monitor incoming texts. At the time of registration, it was made clear to patients and their families that this was not an emergency service, and that responses to their texts would be provided within 24 hours of a business day. The assigned nurse/dietitian for the day would have the platform open on their desktop and check for new messages periodically throughout the workday (Monday–Friday, 8:00–16:00). They would answer and triage messages based on capacity and to the most appropriate clinician (including paediatrician). The assigned nurse/dietitian would have the texting platform tab open alongside the IHA electronic medical record tab. The paediatrician would similarly have the texting platform tab open on their desktop, or as a shortcut icon on their smartphone.

3. Weekly check-in messages. These texts (sent out at noon every Monday) were intended to remind clients that the clinicians are available to help, thus actively inviting contact. These messages included jokes, educational tips (eg, "Do not reuse insulin that becomes accidentally frozen"), and thought-provoking questions (eg, "Would you like to know more about glycaemic index?").
4. Text responses. Patients and families were provided general education, as well as specific pump, CGM and other technological support (including review of uploaded CGM data). Emotional support and encouragement were also given.

Study of interventions

The number of baseline interactions (67) in between scheduled clinic visits was collected through a manual review of all patient charts over the preceding year as these data were not felt to be accurate within the electronic medical system of the diabetes clinic.

Measures

The primary aim of this project was to increase engagement between our clients and our clinical team members. Therefore, the number of interactions between them was used as a proxy for engagement. This was the primary outcome measure. An interaction was defined as any encounter (in person, email, telephone and text) with a client that was not a scheduled quarterly visit. A text interaction was defined as at least three back-and-forth text messages.

The secondary project aim was to evaluate the acceptability of text communication for clients and clinicians. Qualitative data were collected from both groups using surveys.

Process measures included the percentage of clients texting at least one question per week and the number of client-initiated texts per week.

The balancing measure was the time required by clinicians to provide care as a result of using the texting platform. This included time spent texting, documenting clinical advice in the IHA electronic medical record, and any additional clinical encounters generated from the text conversation.

Analysis

SPC control charts were used to evaluate the effects of introducing this new modality of communication; I charts were used to graph the number of interactions and additional time spent by clinicians due to the use of texting with clients. These data were stored on the IHA server.

The qualitative data were collected through deidentified surveys that were administered through REDCap, an IHA-approved secure web application for building and storing data collection instruments.

Patient and public involvement

Two parents and an adolescent patient were part of the project team and participated at the level of 'involve' on the IAP2 spectrum of public participation.[20] They provided input into the project direction, as well as more granular advice such as the content of the Monday text messages.

RESULTS

An increase in the number of interactions was identified between July 2022 and August 2023; specifically, there was an average of 30 interactions per week compared with 67 interactions for the entire year prior to the introduction of texting (>2300% increase) (figure 1).

Despite the significant increase in interactions, this only resulted in 56 min per week of additional clinician work, an average of 30 s per interaction (figure 2). Some interactions were very short ("When is my next clinic appointment?" "Tomorrow at 2 PM" "Thanks, see you then"). We coined the term 'soft touch' for this type of quick communication. Other interactions required a bit more 'work' ('medium touch'); for example, ("Can I get a travel letter? We're going to Mexico and need to carry on our diabetes supplies" "Sure, no problem-I'll email it to you" "Thanks a lot!"). Some text messaging interactions, particularly those relating to issues of glycaemic control, required a greater amount of time ("We're having troubles with his bedtime sugars and I can't seem to get them into target" "Can you upload the data from the past two weeks? After I look at it, we can discuss it. I have an opening 3 PM this Friday; does this work for you?" "Perfect!").

The qualitative data from clients indicated that they felt that this was a highly valuable tool to enable timely and efficient communication with their clinical team. 100% replied that they wished to continue using texting after the project ended. Various reasons were provided, including the peace of mind that came with "even knowing someone is there", and "this is a 10/10 for convenience" for communicating with the care team. Patients themselves (the youngest being 10 years of age), shared that "it helps me feel more independent with my diabetes" (table 1).

The survey data from the clinicians revealed that 100% wished to continue using texting to provide support to their clients. Reasons for this included the value of all team members seeing the messages 'in real time', and the fact that they felt that texting 'meets the patient and family where they are at'. They have expressed a higher degree of connection with their clients. 83% reported that they would recommend this to other similar clinics.

During the project period, 12 new cases of T1D were diagnosed, representing a 15% increase in workload for the small clinical team. Intensive outpatient support was provided to these families without the need for any additional clinician resources.

DISCUSSION

Summary

By introducing texting as a modality for communication between patients and families living with T1D and

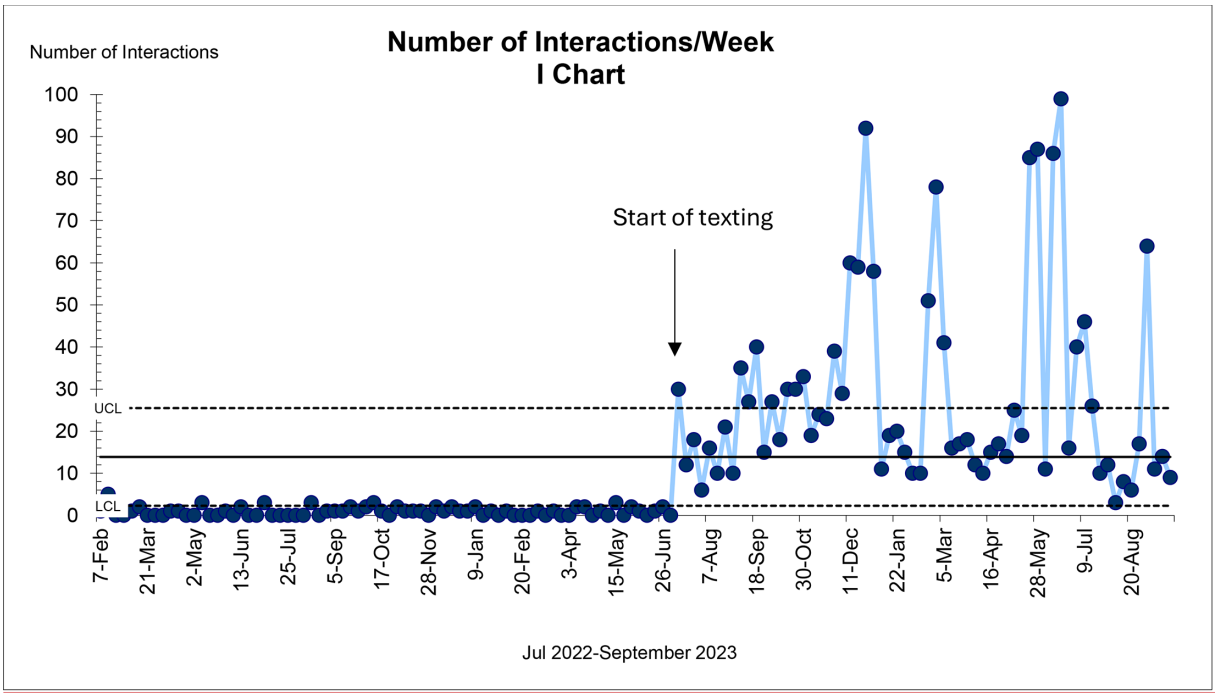

Figure 1 Number of interactions.

their clinical team, the number of interactions increased by >2300%, which was consistent with our theory that improving the ease and efficiency of communication would result in increased engagement with the diabetes team. Qualitative data from clients and clinicians indicated the high acceptability of using texting in the ambulatory care setting of paediatric T1D care.

Interpretation

The project was born out of the regular observation that there were infrequent and, therefore, untimely interventions in between the standard scheduled quarterly visits. We needed a way to be more accessible to our patients and families, and yet had funding constraints that prevented us from hiring more clinicians, despite a rising number of patients.

The use of texting was very favourably received by families as well as the clinical team, the former feeling that support was more accessible, and the latter finding it an easy way to connect with clients as well as each other.

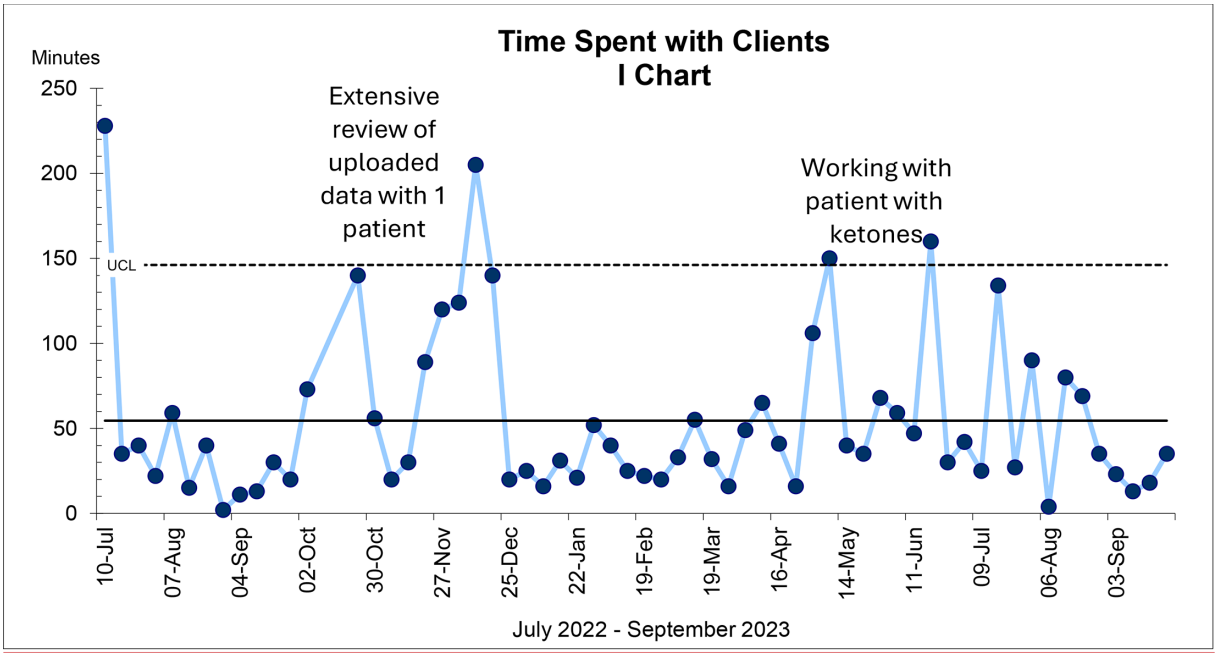

Figure 2 Clinician time texting/result of texting interactions.

Table 1 Patient and family survey

Survey question	
Is it important for you to be able to text your Care Team?	97% Yes 3% No
Was there a time where the texting service helped you with a situation?	85% Yes 15% No
How would you rate the texting service overall?	71% 5 Stars 17% 4 Stars 9% 3 Stars 0% 2 Stars 3% 1 Star
How often do you interact with the texting service? (this could be replying back with questions, comments or inquiries) Please check all that apply	0% Very often 42% Often 50% Sometimes 8% Rarely 0% Never
Would you like to continue using the texting service?	100% Yes
Please explain why texting is or is not important.	Is Important ► Helps me feel independent with my diabetes ► I can text when I have questions about my diabetes or need support ► Easy accessible help, feels less invasive ► Removes some of my anxiety ► Saves time ► Diabetes is unpredictable and team meetings every 3 months is not enough Is not importantI don't usually have questions
Please describe a situation where texting helped you.	► Before I went to camp ► With my summer blood sugar changes ► With a question (about diet/snacks, A1c, glycaemic index, how to deal with highs and stubborn lows, my prescription, a school situation, potentially frozen insulin, sunscreen and pods, site problems, when sick, when on vacation, troubleshooting nose bleeds, adjustments for fitness) ► Set up an appointment ► Made me smile on a day that was not fun ► Helps me all the time. ► Knowing someone is there if I need them.
What would you change about the texting service to make it better for you and your family?	► Nothing ► Get a response right away, including on weekends ► More jokes and puns, and memes
Respondents n=35.	

The average response rate to weekly check-in messages was 5%. When we explored this with clients, they replied that they appreciated the regular check-ins, but did not necessarily feel the need to reply if they did not have any questions or concerns at the time.

Towards the latter half of the project, we began to see changes in the topics of conversation in the scheduled quarterly clinic visits. Previously, the hour-long appointments were often consumed by discussions around technology and settings. Presently, as much of this work is addressed via texting in between the scheduled team visits, appointments are used to discuss other important topics such as transitioning to adulthood and mental health.

This project has also resulted in greater joy in work for the clinicians; they are able to respond to the needs of their clients in a timelier manner and provide more holistic care. The clinicians have operationalised the way in which the platform is monitored, and how the work is triaged. Specifically, the assigned nurse or dietitian reviews and responds to the text messages. If there are capacity issues, and the matter is more urgent, the problem is triaged to an available team member, including the paediatrician.

Limitations

The collection of clinician time was accomplished using a template (paper, electronic) in which they recorded the time they spent texting as well as clinical time because of texting. This was self-directed and relied on their abilities to ensure accuracy of time keeping and recording.

CONCLUSIONS

Through this QI project, we have established that texting is a desirable way in which patients and families wish to receive ambulatory support as they live with T1D. They feel a sense of comfort knowing that they have easy entry into the system should they have even small questions ('soft touches'). We have seen a greater degree of engagement with our families and have discovered it to be an efficient way in which to provide timelier education, coaching and insulin dosing support. We have also found

it to be an effective way in which the entire clinical team can keep abreast of patients' issues without the need for additional communication (emails, phone calls, personal cell phone texts). With the rising incidence of T1D, the complexity of its management, and ongoing human resource crisis, the ability to text patients and families has allowed us to provide care that is more appropriate, accessible and efficient. The clinical team fully supports the use of this communication modality and has been able to incorporate this into standard work. It has improved work efficiency and job satisfaction within the team, thus stabilising the membership and allowing the team to continue to provide high-quality, patient-centred care despite an increasing workload.

Moving forward, we will be expanding to other paediatric T1D clinics in the health authority to continue to learn how to leverage this communication tool and to see if it will result in sustained improvement in glycaemic control. Our hope is that we can provide improved upstream care for a chronic disease that is associated with significant personal and health system impact. Sustainability will require funding for the secure texting platform and resources (data analyst, project coordinator) to enable spread. Further discussions with the Digital Health portfolio of IHA need to occur to understand how this work might dovetail with their larger digital strategic plan.

Contributors EW conceptualised the project. The design and project development were shared by EW and SW. Project support (including managing the technical aspects of the texting platform and sending out weekly text messages) and data collection was done by MB. EW drafted the initial manuscript, with SW and MB providing edits. EW is the guarantor. I used AI to achieve the word count for the abstract as it was originally ~500 words.

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Competing interests None of the authors received any financial incentive for the use of the texting platform (WelTel).

Patient and public involvement Two parents and an adolescent patient were part of the project team and participated at the level of 'involve' on the IAP2 spectrum of public participation. They provided input into the project direction, as well as more granular advice such as the content of the Monday text messages.

Patient consent for publication Consent was obtained from patients and their participating family members to share the deidentified results of this project.

Ethics approval This study involves human participants. As a Quality Improvement project, it underwent ARRECCI review (as well as a Second Opinion Review). All recommendations from the SOR were incorporated into the project design. As such, formal ethics review board approval was not required by the Interior Health Authority. A Privacy Impact Assessment was performed and approved through the Health Authority in which this project was conducted. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request.

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