Improving patient outcomes with technology and social media in paediatric diabetes

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Abstract

The UK has the highest number of children and young people with diagnosed Type 1 diabetes mellitus (T1DM) in Europe, but the lowest numbers attaining good diabetes control (1, 2). Novel strategies and incorporation of digital strategies were identified in the team for development to improve overall patient care and outcomes in our population of children and young people with T1DM.

Within a dual-site integrated care organisation, 3 digital initiatives were proposed from 2012-2013 to 1) establish Facebook communications with parents/patients, 2) to implement an electronic diabetes information management system (using Twinkle.Net) and 3) to undertake routine uploading of blood glucose meters and insulin pumps (using DIASEND®) with the aim to improve outcomes in paediatric diabetes care. Key objectives for the three initiatives were aimed to optimise the following outcomes:

- Reduce HbA1c levels
- Decrease emergency admissions, reduce diabetes-related complications and minimise the length of hospital stays
- Improve patient satisfaction and communication
- Improve efficiencies with mandatory audit submissions
- Empower patients, parents, and the multidisciplinary team with accurate, real-time information.

These digital initiatives showed effective use of technology and social media in achieving significant improvements in all the outcomes within the objectives.

Problem

Recent UK National Paediatric Diabetes Audit (NPDA) report 2015 (3) showed that children and young people (CYP) with T1DM continue to have very poor glycaemic control and the incidence of emergency admissions for diabetes ketoacidosis (DKA) had increased. NPDA 2015 report showed that only 16.1% of children aged 12 years and older received all seven recommended care processes, while 18.4% of CYP had an HbA1c <58 mmol/mol (<7.5%), and 23.9% had an HbA1c >80 mmol/mol (>9.5%). During adolescence, metabolic control often deteriorates and problems are seen across units in engaging and motivating young people to manage diabetes effectively. Over a quarter of admissions for DKA in the country are in the 16 to 25-year-old age group.

Southport and Ormskirk Hospital NHS Trust is an integrated care organisation and the principal healthcare provider to 350,000 people across Southport, Formby, and West Lancashire. In 2012, mean HbA1c in the population of CYP was 74mmol/mol, admission rates were 28%, and median hospital length of stay was 2.7 days. Annual submissions to NPDA were reliant on manual CSV files and in 2011 the Trust had 43% incomplete record of care processes due to manual data entry procedures.

Background

The NHS National Paediatric Diabetes Service Improvement Delivery Plan 2013-2018 aims to drive a reduction in the proportion of children in DKA at diagnosis, a decrease in admissions for diabetes-related acute complications (DKA and hypoglycaemia) and a reduction in HbA1c over the next decade (4). In addition, the Department of Health National Service Framework for Diabetes encourages clinicians to improve current targets by providing efficient and high-quality care using minimal additional resources such as technological and digital strategies (5).

It is essential that CYP are supported to manage their diabetes effectively in order to prevent the development of early complications by education and self-management towards maintaining good glycaemic control. Globally, social media has been shown to contribute to patient-doctor communications related to diabetes care. Information technology and digital strategies can provide a high quality service to enable better outcomes for CYP with T1DM.

Baseline measurement

Baseline measurements were:

HbA1c levels

Emergency admissions

Length of hospital stays

Patient satisfaction

In 2012, mean HbA1c was 74 ± 8.1 mol/mol with 23.7% of patients achieving HbA1c less than 7.5% in 2011.

Admission rates were 28% and median hospital length of stay was 2.7 days. Regular engagement and feedback meetings with patients, families, and carers from the local children and families with diabetes support group, Southport, Formby, & Ormskirk Children's Diabetes Club, 'The Lancelots' reported poor patient satisfaction in the way outpatient clinics were conducted and suggestions were discussed jointly to improve patient engagement.

Design

The team aimed to develop 3 digital technology strategies using 1) Facebook social media communications, 2) Twinkle.Net integrated paediatric diabetes electronic management system, and 3) Diasend® blood glucose and insulin pump downloading system aimed to optimise therapy in outpatient clinics.

A paediatric diabetes team Facebook page was formed to create an interactive communications channel for CYP with T1DM. The page also maintains frequent updates on diabetes education for patients, carers, and families and provides service-users and their families support, education, and direct access to the team.

The team also established an electronic paediatric diabetes management system Twinkle.Net that allowed monthly audits which identified specific patients who had poor metabolic control (high HbA1c) and those who were recurrent non-attenders to clinic. These patients were identified for more intensive contact with the diabetes team at home. Monthly audits of patients with high HbA1c and non-attenders using Twinkle.Net electronic management system enabled increased efficiency and allowed the team to target patients efficiently.

The Diasend® blood glucose monitoring system allowed patients and the diabetes team to download insulin pumps and blood glucose from as many as 15 different manufacturer's glucose meters within less than 2 minutes at home and within outpatient clinics. It allows easy access and joint analysis of patients' blood glucose data in clinic and enables the team to individualise treatment regimes. The visualisation of the system provided a tangible outcome for CYP who collect blood glucose readings daily, and helps the team identify patients who test their blood infrequently or who may falsify their records.

Strategy

The team developed an integrated approach which combined submitting business cases to the organisation to fund a validated paediatric diabetes information management systems, a data downloading system to enable effective patient monitoring and to maximise time spent efficiently in outpatient clinics and concurrently developing a social media communication avenue to increase patient engagement with fulfilment of the range of Information Governance requirements. All the initiatives helped restructure the paediatric diabetes service and played a major part in improving patient outcomes.

Results

The results of the initiatives showed improvement in all aspects of patient outcomes.

In 2013, mean HbA1c was reduced to 65 ± 9.5 mmol/mol ($p < 0.05$) and 27.9% of CYP achieved an HbA1c of less than 7.5%, compared with 23.7% in 2011. Hospital admissions and length of stay have also improved, with admission rates fallen to 19% in 2013 and the median hospital length of stay down from 2.7 days to 1.8 days.

A patient satisfaction survey conducted within the outpatient clinics in 2013 showed that use of technology had been positively received with over 81% of respondents felt they had benefited from the download technology for glucose meters and insulin pumps, and 87% believed that the technology has enhanced patient management decisions in clinic. There was unanimous consensus across the team members that the use of integrated technologies has helped the unit identify trends and tailor individual responses as well as supporting collaborative efforts to manage patients' diabetes effectively.

In addition, use of a validated paediatric diabetes management system via Twinkle.Net resulted in substantial gains in efficiency and data integrity.

Lessons and limitations

The use of information technology and digital strategies advances the quality of care provided to CYP with Type 1 diabetes mellitus. The digital strategies are easily adapted into any paediatric diabetes service however, it requires the support from IT and the organisation to enable effective and efficient use of the initiatives.

Conclusion

The digital initiatives at Southport and Ormskirk Hospital NHS Trust provide strong evidence that the effective use of information technology and social media can significantly improve patient outcomes. The achievements of this project also act as a reminder that the use of information technology and digital strategies must be aimed at patient benefit in order to achieve success.

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Declaration of interests

None declared

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Ethical approval

Nil required