The Rowan Hillson Inpatient Diabetes Safety Award 2017 for the best digital initiative

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Abstract

Introduction: **The annual National Diabetes Inpatient Audit (NaDIA) in the UK continues to show a high incidence of errors in patients admitted to hospital with diabetes. It is clear that new initiatives are urgently required to address this risk.**

Methods: **The Joint British Diabetes Societies for Inpatient Care (JBDS-IP) organised the fourth national Rowan Hillson Insulin Safety Award on the theme of the best digital initiative to improve insulin and prescribing safety in hospital.**

Results: **The winner was Western General Hospital team (Edinburgh). The team created diabetes dashboards which helped collect high quality accurate data on capillary blood glucose from patients admitted to the hospital and deliver specific and concise messages to various wards. The team from King's College Hospital secured runner-up prize for their initiative which enabled reduction in hypoglycaemia during treatment of hyperkalaemia by adding a personalised dose of dextrose to insulin infusion.**

Conclusions: **These and similar innovations need to be developed, promoted and shared to improve patient safety in hospitalised patients with diabetes.**

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Introduction

Insulin and medication errors are common and preventable. The National Diabetes Inpatient Audit (NaDIA) 2017 showed that the percentage of inpatients with diabetes in the UK who are affected by errors has reduced compared with 2010 – for example, high

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rates of inappropriate insulin infusions (6.3% vs. 7.4%), medication errors (31.3% vs. 44.5%), prescribing errors (19.0% vs. 30.7%), glucose management errors (18.5% vs. 24.1%), insulin errors (18.6% vs. 25.8%), mild hypoglycaemia (16.7% vs. 22.8%) and severe hypoglycaemia (7.1% vs. 11.8%).[1] Since the first NaDIA, a number of attempts have been made to improve patient safety, such as e-learning modules, the ThinkGlucose programme, education of junior doctors regarding diabetes management during their induction and modifications of prescription charts. It is clear that further improvements are needed in all these aspects. Worryingly, there is considerable variation between different Trusts and sometimes at different times in the same Trust which requires addressing.

JBDS-IP therefore launched a national competition in 2017 led by Dr Umesh Dashora, Erwin Castro and Debbie Stanisstreet to find the best digital innovations with a positive impact on patient safety so that effective practices can be identified, rewarded and shared with other Trusts in the UK. A number of excellent national initiatives have been identified in the previous rounds and shared with the larger diabetes community.[2,3]

Rowan Hillson chaired the judging panel which consisted of Erwin Castro, Senior Diabetes Specialist Nurse, East Sussex Healthcare NHS Trust; Dr Clare Crowley, Lead Medicines Safety Pharmacist, Oxford University Hospital NHS Foundation Trust; Dr Ketan Dhatariya, Consultant Diabetologist, Norfolk and Norwich University Hospitals NHS Foundation Trust; and Oliver Jelley, Managing Director, Orange Juice Communications. Scoring was based on predefined criteria.

Results

There were four very high quality entries for the award. Dr Stuart Ritchie, Consultant Diabetologist, Tracey Rapson, Principal Information Analyst NHS Lothian and their team from Western General Hospital Trust (Edinburgh) won the award. Dr Charlotte Boughton, Dr Danielle Dixon and team from King's College Hospital secured the runner-up position.

Winning entry: Diabetes dashboard to improve patient safety

The winning entry used capillary blood glucose (CBG) readings collected in the Trust (40,000 per month) to construct and inform diabetes dashboards. One dashboard collected entries from CBGs done on 1,800 inpatients while another one was developed to identify key areas for improvements (eg, hypoglycaemia) which could be electronically fed back to the relevant clinical teams.

The project involved close collaboration with colleagues from information analytics. It was agreed that the Tableau data visualisation system the Trust was using for other acute performance and quality measures was suitable for this project. Codes for hypoglycaemia with blood glucose <4 mmol/L and appropriate treatment for hypoglycaemia, taken as a reading >4 mmol/L within 60 min of the initial reading, were set up. These codes were tested and quality controlled before being rolled out widely.

The initial dashboard development facilitated data visualisation at the level of a single acute site, clinical directorate or an individual unit, number and percentage of linked glucometers with correct patient identification number and healthcare professional identifier and the number and percentage of glucometer data readings <4 or >15 mmol/L.

A second dashboard was developed focusing on precise and concise messages to the ward staff in relation to the frequency and management of hypoglycaemia with electronic updates every 4 weeks. The Trust used ACCU-CHECK® Inform II Glucometers (Roche) utilising the COBAS IT system for central download to clinical biochemistry. The data were extracted from this and published on Tableau using an electronic code. Initial results showed that a significant number of readings did not have an accurate patient or healthcare professional identifier. With intensive education this improved. This intervention helped an inpatient specialist team covering 100 bed area on site to reduce hypoglycaemia by 35% and to increase appropriately treated hypoglycaemia by 57% compared with the whole health board. The team used the data to identify areas of high frequency of hypoglycaemia which helped facilitate cross-specialty discussion around interventions and solutions (eg, an updated variable rate insulin infusion protocol). The team is now able to map the peak times of hypoglycaemia, analyse the data and facilitate specific interventions to reduce the frequency. The team is planning to revise their insulin prescribing document following this experience.

This work was recognised and accepted for presentation at the NHS Lothian Clinical Change Forum, receiving the support of the board chairman, medical director, chief operating officer and chief quality officer. One student received the runners-up prize in the Undergraduate Endocrinology prize at Edinburgh University by using part of this work. The feedback and support from patients and managers was highly positive.

Runner-up: Preventing hypoglycaemia following treatment of hyperkalaemia in hospitalised patients

Dr Charlotte Boughton and colleagues designed a digital initiative to reduce the incidence of hypoglycaemia following treatment of hyperkalaemia with insulin and dextrose.

This was accomplished by designing a care bundle which mandated frequent CBG monitoring when treating hyperkalaemia with insulin. The team analysed 662 episodes of hyperkalaemia in 445 admissions and established an incidence of hypoglycaemia (<3.9 mmol/L) and severe hypoglycaemia (<2.2 mmol/L) in their cohort. They identified risk factors in patients who developed hypoglycaemia and concluded that high-risk patients may require a higher dose of dextrose (ie, 30 g) compared with 20 g in lower risk individuals.

Key messages

- The Rowan Hillson Safety Award is an initiative to find best practices in the UK to improve inpatient safety for people with diabetes admitted to hospital
- The 2017 round was to find the best digital initiative to improve patient safety in hospitals
- The Western General Hospital team (Edinburgh) won the award for the development of diabetes dashboard which led to a reduction in hypoglycaemia and improvement in the treatment for hypoglycaemia. The King's College Hospital team (London) was runner-up for their initiative which helped reduce hypoglycaemia during treatment of hyperkalaemia by mandating personalised dose of dextrose co-administration with insulin

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The implementation of this care bundle reduced hypoglycaemia from 30% to 12% (p<0.05) within 1 month, with a large concomitant rise in the frequency of CBG monitoring from 32% to 92%. The improvement persisted after 2 years with the hypoglycaemia incidence at 17.5% and frequency of CBG monitoing at 91.4%.

The team adjusted the care bundle to ensure that insulin is never given without 20% dextrose and is always added to a personalised higher dose of dextrose for those at higher risk of hypoglycaemia such as lower pre-treatment CBG, lower body weight and older age.

The project was presented at the Diabetes UK meeting in 2016 and 2018. It won first prize in the King's Health Partner Safety Connection event for innovation and impact. The challenge is human factors, and ongoing education is needed to address the fact that one-third of episodes of hyperkalaemia treatment did not have any dextrose prescribed or administered and in 8.6% of episodes no CBG monitoring was done. The feedback has been positive.

Other initiatives

Royal Free London NHS Foundation Trust developed a pathway for hyperglycaemia on a pilot ward with alerts for appropriate action which resulted in no serious incidents in a year on the ward, 95% reduction in 'unknown identifier code' for the CBG done, 10% improvement in NaDIA response to the adequate knowledge of diabetes in the staff members and 23% improvement in staff members being able to answer patients' questions.

Prince Philip Hospital, Hywel Dda University Health Board, Llanelli developed a real-time hypoglycaemia avoidance training for their staff. As the ThinkGlucose hypoglycaemia avoidance training was completed by only 200 out of 7,000 staff because of demand on their time, an alternative real-time animation video training tool was developed with the help of a media company. The content of this programme was taken from an earlier poster-based education which resulted in reduction in severe hypoglycaemia from 17% to 3% in NaDIA audit cycles.

Summary and conclusions

The Western General Hospital initiative used electronic CBG monitoring dashboards and supported staff to improve inpatient safety. The King's College Hospital project integrated electronic prescribing with personalised dose of dextrose co-administered with insulin when treating hyperkalaemia resulting in a reduction in hypoglycaemia.

In summary, the competition revealed some excellent IT-based innovations to improve inpatient safety which can be used and adapted by other Trusts to improve management of patients with diabetes.

References

1. NHS Digital. National Diabetes Inpatient Audit 2017. https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-inpatient-audit/national-diabetes-inpatient-audit-nadia-2017 (accessed 29 April 2018)
2. Dashora U, Sampson MJ, Castro E, *et al*. Rowan Hillson Insulin Safety Award 'best in class' insulin prescription chart competition. *Br J Diabetes* 2015;**15**:135–8. http://dx.doi.org/10.15277/bjdvd.2015.028
3. Dashora U, Sampson MJ, Castro E, *et al*. The best hypoglycaemia avoidance initiative in the UK. *Br J Diabetes* 2017;**17**:74–7. http://dx.doi.org/10.15277/bjd.2017.126