Does the Use of a Colour Coded Inpatient Capillary Blood Glucose Monitoring Chart Influence Outcomes?

Dhiraj Sharma[1], Matthew Gerlach[2], Vivek Sharma[3], Ketan Dhatariya[4,5]

1. Brighton and Sussex Medical School, 2. Department of Medicine, Norfolk and Norwich University Hospitals NHS Foundation Trust, 3. Cambridge University Medical School, 4. Elsie Bertram Diabetes Centre, Norfolk and Norwich University Hospitals NHS Foundation Trust, 5. Norwich Medicine School, University of East Anglia

Background: Diabetes is present in ~20% of all hospital inpatients[1]. The data from the National Diabetes Inpatient Audit (NaDIA) shows that glucose monitoring is usually carried out, but often at an inappropriate frequency, with no action taken when glucose concentrations are out of range (<4.0mmol/l, or >15mmol/l). This dysglycaemia is associated with increased patient harms[2,3]. In addition, action to treat dysglycaemia remains frequently undocumented.

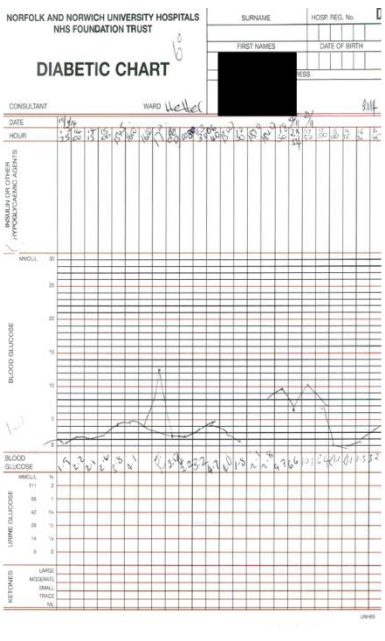
Aims: To assess whether the introduction of a colour coded capillary blood glucose monitoring chart had an impact on inpatient glycaemic control; documentation of action taken; length of stay and mortality in an unselected cohort of hospital inpatients.

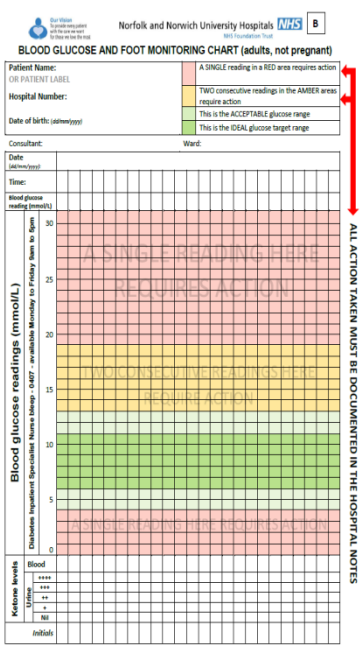
Methods: A cross sectional study before (September 2014) and after (August 2017) the introduction of the new colour coded chart in 2015. Data were collected for the 24 hours prior to inclusion on number of dysglycaemic episodes, whether action was documented in the hospital records. Data were then collected on length of stay and inpatient mortality.

Results: Data were collected from 55 patients in 2014, and 160 in 2017.

The introduction of the colour coded charts led to a statistically significant reductions in the use of inappropriate use of short acting insulin and the use of variable rate intravenous insulin infusions - p=0.0321 and p=0.0134 respectively. In addition, there was a statistically significant reduction in dysglycaemic episodes (p<0.0001).

Furthermore, since the introduction of the colour charts there was also a statistically significant improvement in the recording of 'action taken to remedy the change in blood glucose' (p=0.0077) and a statistically significant improvement in appropriate actions (p=0.0481). This was offset by the statistically significant reduction in the recording of treatments and episodes in the notes (p<0.0001). The average LOS reduced by nearly 2 days, but this was not statistically significant reduction (p=0.4662).





For those who experienced dysglycaemia and in whom no action was recorded mortality was 30% and 20% in 2014 and 2017, compared to 6% and 15% respectively for those who had no dysglycaemia.

Conclusion: The introduction of a colour coded blood glucose monitoring chart led to more action being recorded on the chart when dysglycaemia occurs (although not in the patient notes), lower length of hospital stay, and lower mortality.

1. National Diabetes Inpatient Audit (NaDIA) – 2016. http://digital.nhs.uk/catalogue/PUB23539 Last accessed 1st March 2018 2. Umpierrez GE et al Journal of Clinical Endocrinology and Metabolism 2002;87(3):987-982 3. Bruno A et al Diabetes Care 2008;31(11):2209-2210

ketan.dhatariya@nnuh.nhs.uk www.norfolkdiabetes.com