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Self-monitoring of blood glucose in type 2 diabetes: patients' perceptions of 'high' readings

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We recently published data on self-monitoring of blood glucose (SMBG) behaviour among non-insulin treated patients with type 2 diabetes mellitus in Tayside, Scotland, and their behavioural responses to SMBG readings¹. We now present additional data relating to the perceptions of high readings of 207 patients (58% male; mean age 63 years; range 36-76 years). They all had electronic records of SMBG prescriptions dispensed and were a representative sample recruited from primary care¹. Diabetes duration ranged from <2 years (8%) to >10 years (29%). 80% were treated with metformin and/or sulphonylureas, 10% with injections of exenatide or liraglutide, and 12% by diet/lifestyle. Patients were asked to indicate what blood glucose readings that they 'were happy with', and those that they 'considered to be high'. For specified values, we calculated the proportion that would be 'happy with' these readings (Fig 1), with the majority being 'happy with' readings between 5 and 7mmol/l. Notably, though, 35% were 'happy with' 8mmol/l, and 17% with 9mmol/l. Although these values were not related to specific times of the day, only 11 (5%) patients reported that they checked their blood glucose levels after meals (when higher values are acceptable). When patients were asked what they considered to be a 'high' reading, some gave very specific ranges (e.g. '12.9 to 13'; '10.5-11.1') while others were more general (e.g. 'anything above 10'; 'double-digits'). Fig 1 shows the proportions of patients who considered specified values (or over) to be high. Where a range was given, we determined the lowest value of this range. For 68% of patients, this was 10mmol/l. For 10%, it was 16mmol/l. Interestingly, 128 of the patients reported having received information/education on SMBG, 112 of whom stated that they had been told what their targets should be.

Although these findings may help to explain the lack of empirical evidence surrounding the clinical benefits of monitoring (ie; the failure of many studies to identify an association between SMBG and improved glycaemic control may be because many patients are satisfied with high blood glucose readings and do not respond to readings recognized clinically to be high), they do need to be interpreted with caution. While many patients may not have knowledge of appropriate target ranges, it may also be that some use SMBG principally to avoid hypoglycaemia (around half of our patients were treated with sulphonylureas). Clinicians therefore need to understand the particular reasons and motivations of patients who self-monitor when they discuss target ranges, and also be aware that there may be upward slippage in patients' targets over time (as observed among patients with type 1 diabetes for a variety of reasons²). If patients do wish to continue SMBG, they need to have education on appropriate blood glucose level targets for their particular context, and this may need to be re-inforced over time.

1. **Evans JMM**, Mackison D, Swanson V, Donnan PT, Emslie-Smith A, Lawton J. Self-monitoring among non-insulin treated patients with type 2 diabetes mellitus: Patients' behavioural responses to readings and associations with glycaemic control. *Diabetes Research and Clinical Practice* 2013; 100: 235-242.
2. Rankin D, Cooke DD, Heller S, Elliott J, Amiel S, Lawton J. Experiences of using blood glucose targets when following an intensive insulin regimen: a qualitative longitudinal investigation involving patients with Type 1 diabetes. *Diabetic Medicine* 2012: DOI: 10.1111/j.1464-5491.2012.03670.x

1. Fig 1: Proportions of patients who would be 'happy with' readings of a specified level (mmol/l) (upper panel), and proportions who considered readings of a specified level (mmol/l) to be 'high' (lower panel)



