



**Fig 1. SGLT2 inhibitor improved seasonal change of HbA1c.** Seasonal changes of HbA1c in 30 subjects are shown. The change of HbA1c from summer 2013 was obtained. For summer, we calculated the mean value of three HbA1c measurements from June through August and for winter we calculated the mean value of three HbA1c measurements from December through February. SGLT2 inhibitors were started at the beginning of autumn (mean value from October and December). Error bars represent the standard deviation. The winter HbA1c values were significantly lower in 2015 than 2013 and 2014 (\* $p < 0.05$ ). HbA1c = glycated haemoglobin; SGLT2 = sodium glucose co-transporter 2

weight, blood pressure and estimated glomerular filtration rate (eGFR) were also measured at each visit. Plasma glucose and HbA1c concentrations were determined as previously reported.<sup>5</sup> The median duration of type 2 diabetes mellitus was 4.7 (range 3.5–18.7) years. All patients reported that they had no infections during the observation period, including any common cold symptoms. We observed no statistically significant change in eGFR, body weight or systolic or diastolic blood pressure after SGLT2 administration.

Seasonal change of HbA1c in the previous 3 years is shown in Fig 1. Their HbA1c was lower in summer and higher in winter before the initiation of SGLT2 inhibitors. SGLT2 inhibitor administration could avoid the tendency for HbA1c to get worse towards winter season as indicated.

Seasonal change of diabetic control triggers treatment difficulties because these variations are usually accompanied by excess calorie intake and a decrement of physical activity.<sup>1–4</sup> If these patients are then administered excess amounts of either endogenous or exogenous insulin without correcting their excess caloric intake and/or improving their decreased physical activity, they will experience inappropriate body weight gain although their blood glucose control may be improved. In this study, we added SGLT2 inhibitors to the patients' current medication and observed whether SGLT2 inhibitor administration could attenuate the tendency for HbA1c to get worse towards winter season. We did not face any hypoglycaemic episodes and body weight gain by the addition of SGLT2 inhibitors. Furthermore, patients experienced neither dehydration nor cerebral infarction. SGLT2 inhibitors are a good option to treat seasonal change of HbA1c levels. ■

## Conflicts of interest

The authors have no conflicts of interest to declare.

## Author contributions

TS, EY, YN and SO took care of patients in this study. SO and MY analysed the data and prepared the manuscript.

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## Poor knowledge of safety aspects of long-term steroid use among patients and healthcare professionals

### Introduction

Hypoadrenalism (primary and secondary) affects 4/10,000 individuals.<sup>1</sup> But the commonest cause of hypothalamo-pituitary-adrenal axis suppression is exogenous steroid use, and about 1% of the UK population are on such therapy.<sup>2</sup> These steroid-treated subjects have a higher incidence of adrenal crises (15.2/100 patient years) compared with patients with Addison's and pituitary disease. Mortality is increased in hypoadrenalism and 25% die of an adrenal crisis.<sup>2</sup> These crises should be preventable with education of patients and healthcare professionals (HCPs). However, studies show significantly poor knowledge in both groups,<sup>3,4</sup> leading to failure to increase

steroids during 'stress' and potentially an adrenal crisis. Knowledge is poor about 'sick day' rules, the importance of 'steroid cards' and the utility of parenteral steroids.<sup>5</sup> We studied knowledge of these safety aspects of long-term steroid therapy in patients and HCPs, in a university health board hospital.

## Methods and results

### Patients

97 consecutive patients (median age 63.2 years) on steroids for 6 weeks to 20 years were recruited. A questionnaire was completed relating to (a) ownership of a 'steroid card' or bracelet; (b) dose adjustment during strenuous exercise, vomiting once or more, a 'bad cold', high fever, broken bone, infections requiring antibiotics, illness requiring hospital admission, minor surgery without anaesthesia and major surgery under anaesthesia; (c) HCP advice about 'sick day' rules; (d) availability of parenteral steroids at home (Table 1).

The most common steroid used was prednisolone (69%), with hydrocortisone and dexamethasone next. Common indications were rheumatological (33%), chest (30%) and others (10–14%).

### Healthcare professionals

84 HCP were recruited: internal medicine and endocrine physicians (56%); nurses in acute medicine (34%) and pharmacists and medical students (10%). The questionnaire assessed knowledge about (a) issuing 'steroid cards'; (b) advice to patients during the scenarios detailed above; (c) prescribing steroid emergency packs; (d) advice to patients about 'sick day rules'; (e) sources of advice about long-term steroid therapy (Table 1).

As a service improvement/audit project, this study was exempt from ethics approval was not required. Verbal consent was obtained from all participants.

## Discussion

There are significant gaps in knowledge about safety aspects of long-term steroid therapy among patients and HCPs in this locality. This is of great concern as HCPs are the main source of information for patients about steroid therapy.<sup>5</sup> This study confirms findings of previous studies from community and hospital settings.<sup>5</sup> Of significant concern is the poor use of steroid cards and bracelets, poor knowledge of the need to increase steroids during 'stress' and the lack of emergency packs at home. HCPs had poor knowledge of when to issue 'steroid cards', did not give advice about 'sick day' rules and over a tenth failed to recommend increasing steroids at times of stress.

A recent study from Germany showed that although physicians identified situations requiring increased steroids, only 9.6% identified all of them.<sup>3</sup> Furthermore, patients had difficulty in persuading HCPs to increase steroids at times of acute stress.<sup>5</sup> Therefore, HCP education is vital in preventing adrenal crises. However, patient education alone does not guarantee success, as patients on steroids failed to adjust dose.

We recommend formal patient education (patient registers, information leaflets, group teaching etc) when long-term steroids are prescribed. Education of HCPs is equally important and should be part of their continuing professional

**Table 1. Knowledge about the safety aspects of long-term steroid use among patients and healthcare professionals**

	Response
<b>Patients (n=97)</b>	
Regularly carries 'steroid card'	39/97 (40%)
Wears an identifying bracelet	13/97 (13%)
Received instructions about 'sick day' rules from HCP	20/97 (20%)
Access to parenteral steroids at home	2/97 (2%)
Scenarios of 'minor and major 'stress''	Increase dose: 6 (6%) Same dose: 15 (15%) Did not know: 66 (68%)
<b>Healthcare professionals (n=84)</b>	
Knowledge of criteria for issuing 'steroid card'	17/84 (20%)
Advise patients about 'sick day' rules at start of treatment	39/84 (46%)
Recommend parenteral steroids for emergency home use	36/84 (42%)
Don't recommend increasing steroid dosage during 'stress'	10/84 (12%)
Aware of sources for advice on steroid therapy	33/84 (39%)

\*Heavy exercise, vomiting, fever, infection, surgery etc.

HCP = healthcare professional

There were significant gaps in knowledge and practice, among both patients and healthcare professionals, about the safety aspects of long-term steroid use. This could lead to poor outcomes during times of 'stress'.

development. These aspects of care appear to be seriously deficient in our practice. ■

## Conflicts of interest

The authors have no conflicts of interest to declare.

## Author contributions

IK, MA, LP – conceived study; KG, IN – data collection; MA, LP – writing of manuscript; KG, IK, MA, LP – contribute to final draft.

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## Sleep awareness and education among clinical practitioners

In the past 3 decades, the frequency of sleep complaints has increased.<sup>1</sup> Most recently, in a study of Hirotsu *et al*,<sup>2</sup> 76% of the Brazilian population reported at least one sleep complaint – comprising insomnia, sleep apneas and snoring. Despite these alarming findings, the number of individuals seeking medical services for sleep problems did not change.<sup>1</sup> These results may be distinctly interpreted. In part, there is still a lack of qualified health professionals and centres to diagnose and manage sleep disorders. In contrast, the patients often do not receive enough information about sleep, impairing perception of their sleep symptoms.

Health professionals frequently do not receive an adequate educational background in sleep medicine. Consequently, several health professionals are not trained to recognise and treat sleep disorders, especially in primary healthcare. Less than 3 hours is the mean duration dedicated to sleep education in medical schools around the world.<sup>3</sup> Most alarmingly, data show that only 17 minutes is reserved for paediatric sleep topics. Because of this lack of education, there is still a low rate of diagnosis of sleep disorders – less than 1% in some communities.<sup>4</sup>

Regarding the general population, one of the most effective strategies is to promote access to information via public events or social media, including television and websites. Access to information has increased in recent years, augmenting the coverage of health issues, particularly sleep disorders. Information, education and communication strategies have been effective in raising awareness and improving self-reporting of several diseases.<sup>5</sup> In this sense, educational and awareness programmes about sleep are important; they are potential public health strategies to improve the self-reporting and perception of sleep symptoms by patients. Scientists and clinicians have an essential role in disseminating information, educating society and influencing public policies with the goal of increasing sleep awareness.

In summary, for an improvement in management of sleep disorders, we should consider two main factors:

- 1 Patients should be aware of the consequences of sleep disorders, in order to promote better symptom perception, self-reporting and encourage patients to seek medical services.
- 2 An adequate sleep educational background is warranted for health professionals. Adequate training of physicians and practice nurses, particularly in primary care, has the potential to improve patient access to sleep services, which may benefit some regions where the access to specialist services can be limited.

The current situation highlights the importance and necessity of developing sleep awareness and qualification programmes for clinicians around the world. ■

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## Author contributions

All authors contributed to study concept, drafting of manuscript and critical revision of manuscript for intellectual content.

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