

## Prevention and management of steroid-induced hyperglycaemia in outpatient myeloma chemotherapy - a tertiary centre audit and quality improvement project.

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### INTRODUCTION

- Long term high dose corticosteroids are commonly used in outpatient-delivered myeloma chemotherapy regimes.
- Steroids can cause **hyperglycaemia** and result in **steroid-induced diabetes mellitus (SIDM)**.
- Risk factors for SIDM include **older age**, obesity and a family history of type 2 diabetes<sup>1</sup>. Myeloma is predominantly a disease of older adults<sup>2</sup>.
- According to national guidelines, patients at risk of SIDM should receive education and have baseline **capillary blood glucose (CBG)** and **HbA1c** checked. Once on steroids, HbA1c should be monitored 1-3 monthly and **CBGs should be monitored regularly**, between 1-4 times daily depending on risk factors. Once detected, hyperglycaemia should be treated appropriately<sup>3,4</sup>.
- Glycaemic control is often overlooked in the care of haematological patients. This can result in **serious complications** such as Hyperglycaemic Hyperosmolar State.

### AIMS

- To audit the **prevention, monitoring and management standards of SIDM in patients receiving outpatient-based myeloma chemotherapy in a Haematology tertiary centre in the UK** over 6 months.
- To assess patient education and consent practices and frequency for SIDM in this patient cohort.
- To compare the above to standards derived from guidelines produced by Joint British Diabetes Societies (JBDS), National Institute of Clinical Excellence (NICE) and local Trust Diabetes & Endocrinology department<sup>3,4</sup>.
- After the audit process, to raise clinician awareness and improve local prevention and management strategies for SIDM via targeted quality improvement goals.
- To re-audit in a timely manner to assess impact of implementations made and complete further PDSA cycles.

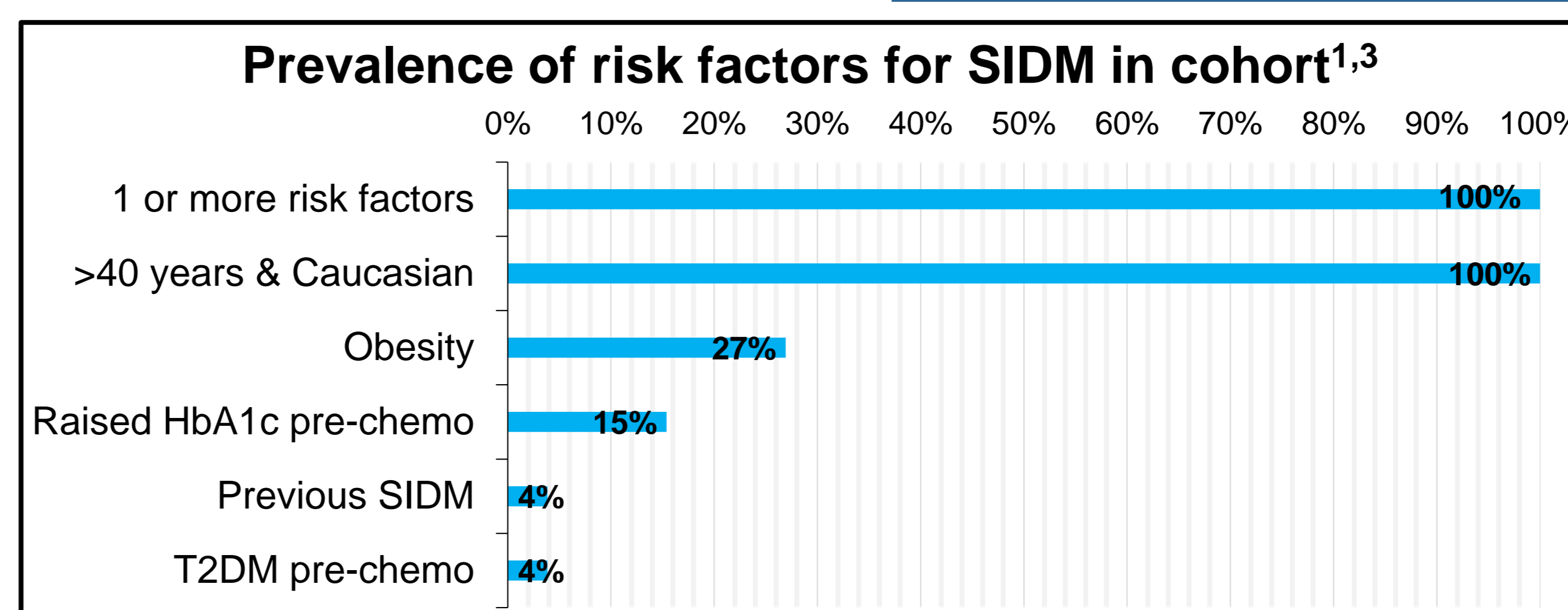
### METHOD

- All patients starting 1st cycle of outpatient myeloma chemotherapy involving high dose pulsed corticosteroids between **1st January and 1st August 2019 at Bristol Haematology and Oncology Centre (BHOC)** were identified (both first and subsequent line regimes).
  - N=26
- Regimes included: VTD21, VTD28, VCD21, VCD35, VMP, MPT.
- Audit standards were created using JBDS, NICE and local trust guidelines. 100% of cases were expected to comply.
- **Chemotherapy pre-assessment clinic (PAC) notes, clinic letters to GPs, laboratory results and consent forms** were analysed and compliance with standards was recorded.
- Results were analysed using standard Microsoft Excel software. Advice was sought from the local Diabetes & Endocrinology team.

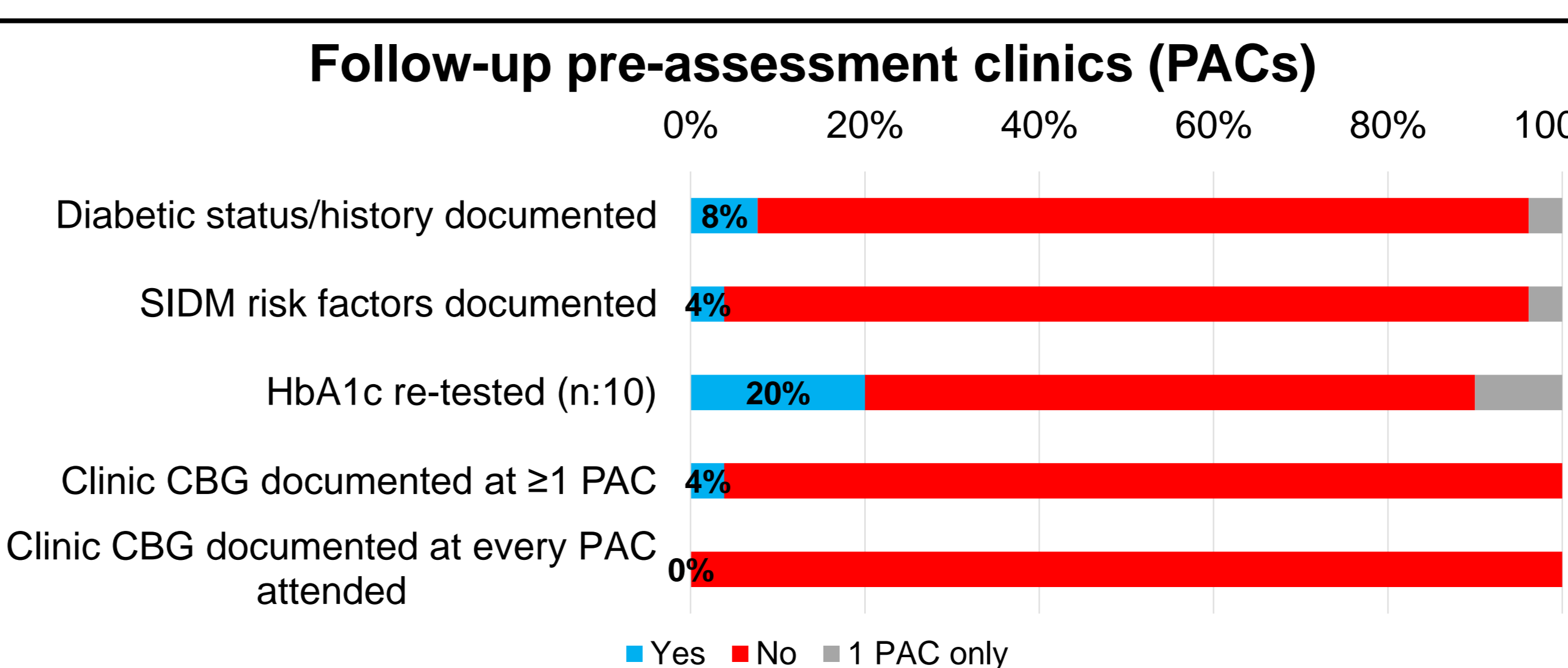
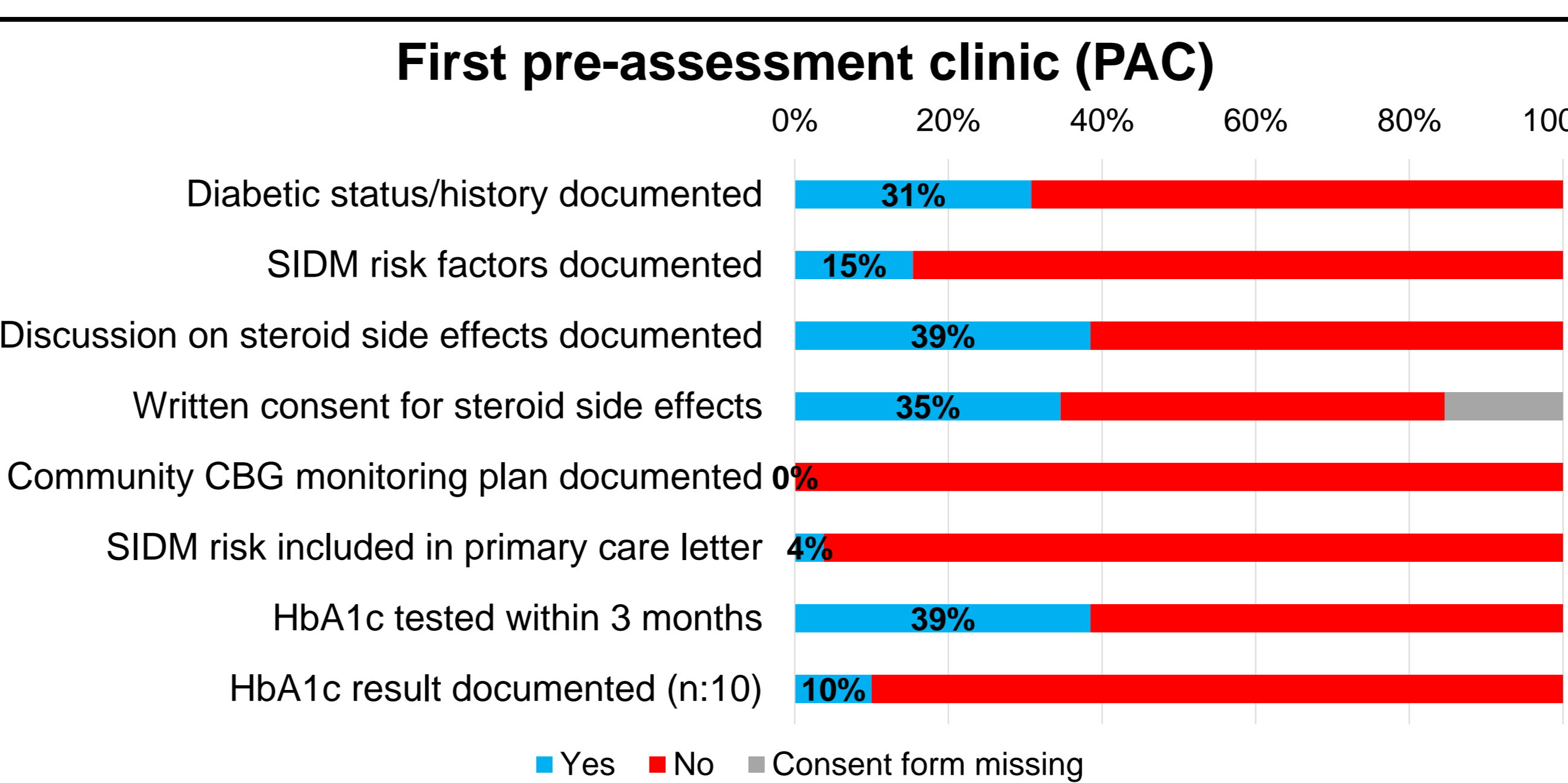
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3. Joint British Diabetes Societies for Inpatient Care, 2020. *Management Of Hyperglycaemia And Steroid (Glucocorticoid) Therapy*. [online] Guidelines.co.uk. Available at: <https://www.guidelines.co.uk/diabetes/jbds-hyperglycaemia-and-steroid-therapy-guideline/252759.article> [Accessed 21 October 2020].
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### RESULTS



Percentage of patients with risk factors for SIDM within the patient cohort. 100% of patients had at least 1 risk factor (>40 and Caucasian ethnicity) – this qualified everyone for at least once daily CBG monitoring while on steroids, as per JBDS and trust guidelines.



Compliance with guidelines-derived standards for SIDM prevention at first and follow-up pre-assessment clinics. N:10 = HbA1c tested within 3 months of starting steroids in only 10 patients (38%).

Average total steroid dose ranges per patient per cycle:  
**Dexamethasone: 80-160mg**  
(per 21-35 day cycle)  
**Prednisolone: 160-400mg**  
(per 28-35 day cycle)

All regimes included were described by trust endocrinology team as being at risk of inducing SIDM due to high-dose pulsed corticosteroid doses.

### CONCLUSIONS

- **Myeloma patients are often at risk of SIDM.**
- Diabetic history, status and risk factors for SIDM were not considered in most.
- Most patients **were not formally consented** for steroid side effects, including SIDM, prior to starting chemotherapy.
- **Regular, formalised CBG monitoring was not arranged for patients** – none were dispensed with glucose meters or had CBGs documented at each PAC.
- **HbA1c was not monitored appropriately.**
- No consistent **liaison with primary care** regarding risk and CBG monitoring.
- No cases of SIDM were formally diagnosed and documented in clinic. **However lack of monitoring may be leading to under diagnosis of SIDM and uncontrolled hyperglycaemia.**

### QUALITY IMPROVEMENTS

1. **Teaching for haematology department** on recommendations derived from guidelines, led by the audit team and diabetes specialist nurses (DSN).
2. **DSN training sessions for outpatient nursing team** on
  - How to test and record CBGs in clinic
  - Documenting CBGs at each clinic appointment
  - Dispensing glucose meters to higher risk patients and educating patients on their use (*funding for meters pending*).
3. **Addition of steroid monitoring and side effect section on pre-assessment clinic proforma.**
4. **Addition of HbA1c and random glucose to myeloma blood test profile** (which is sent at each PAC).

Full implementation of targets and re-auditing was unfortunately halted by COVID-19 pandemic – we are awaiting capacity to restart.

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### CONTACT INFORMATION

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