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*SHE defined as number of hypoglycaemic events requiring third-party assistance (with or without medical assistance). 1. Puhr S *et al.* Diabetes Technol Ther. 2019;21(4):155-158. 2. Puhr S *et al.* J Diabetes Sci Technol. 2020;14(1):83-86. 3 Heinemann L, *et al.* Lancet 2018;391:1367–1377. Dexcom, Dexcom G6, Dexcom Follow, Dexcom Share, and Dexcom CLARITY are registered trademarks of Dexcom, Inc. in the U.S. and may be in other countries. www.dexcom.com | +1.858.200.0200 | Dexcom, Inc. 6340 Sequence Drive San Diego, CA 92121 USA | MDSS GmbH Schiffgraben 41 30175 Hannover, Germany. LBL021139 Rev001.

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DIABETIC Medicine

COMMENTARY

2020 NICE guideline update: Good news for pregnant women with type 1 diabetes and past or current gestational diabetes

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In December 2020, the National Institute for Health and Care Excellence (NICE) reviewed the evidence and updated their recommendations on intermittently scanned (commonly known as Flash) and Continuous Glucose Monitoring (CGM) during pregnancy for women with type 1 diabetes.[1] The NICE guidelines now recommend offering CGM to all pregnant women with type 1 diabetes to help them meet their pregnancy glucose targets and improve neonatal outcomes. Their evidence review, based on the CONCEPTT randomised trial[2] and a Swedish observational study[3] found that, compared to capillary glucose monitoring, CGM resulted in more women achieving their blood glucose targets, fewer caesarean sections and fewer neonatal intensive care admissions. Health economic modelling found that while Flash was the cheapest option (compared to CGM and capillary glucose monitoring) the quality of the evidence for Flash was very low, with concerns about clinical benefit, accuracy in the low glucose range and the number of daily capillary glucose tests required to use Flash safely. They concluded that there was high quality evidence that CGM was associated with better clinical outcomes and a 94% chance of CGM being cheaper than capillary glucose testing. They also updated the recommendations on education and support for pregnant women using CGM or Flash to ensure they get the full benefit. Online resources (user videos and webinars) to support diabetes self management using technology before and during pregnancy are available to support implementation of the NICE guidelines (Figure 1). The Diabetes Technology Network (DTN) has also produced Top Tips for CGM users and Best Practice Guidelines for health care professionals (https://abcd.care/dtn/CGM). NICE did not provide clear guidance for time-in-range pregnancy glucose targets, which are more than 70% CGM time-in-range (TIR 3.5–7.8 mmol/L), less than 25% time-above-range (TAR > 7.8 mmol/L) and less than 4% time-below-range (TBR < 3.5 mmol/L) in type 1 diabetes pregnancy.[4]

It is increasingly clear that measures to reduce the progression from gestational diabetes mellitus (GDM) to type 2 diabetes are urgently needed. Another very welcome NICE guidance update is to offer referral into the NHS Diabetes Prevention Programme for women with a previous GDM pregnancy. Women with GDM were previously eligible based on an elevated postnatal fasting plasma glucose (>6.0 mmol/L) or HbA_{1c} (39–47 mmol/mol; 5.7%–6.4%). Eligibility criteria for the NHS Diabetes Prevention Programme has been expanded to all women with a history of previous gestational diabetes, including those with normoglycaemia (FPG < 5.5 mmol/L or HbA_{1c} < 42 mmol/mol). There is no time limit on when the GDM pregnancy occurred, so all women with a history of previous GDM are eligible but it is recommended that the HbA_{1c} be carried out within the past 12 months. This supports the widespread view that a major shift is needed in the clinical management of GDM; focusing not only on the short-term obstetric and neonatal complications but also including increased emphasis on the longer-term maternal risks of type 2 diabetes and cardiometabolic disorders.[5] This is highlighted by the recent distribution of coronavirus shielding letters to women with a history of previous GDM. Women with previous GDM (within the past decade) are classed as clinically extremely vulnerable (CEV) and advised to have a HbA_{1c} as soon as feasible unless performed within the past 12 months.[6] Nationwide implementation of postnatal HbA_{1c} measurements at 3–6 months in conjunction with infant vaccinations, instead of or in addition

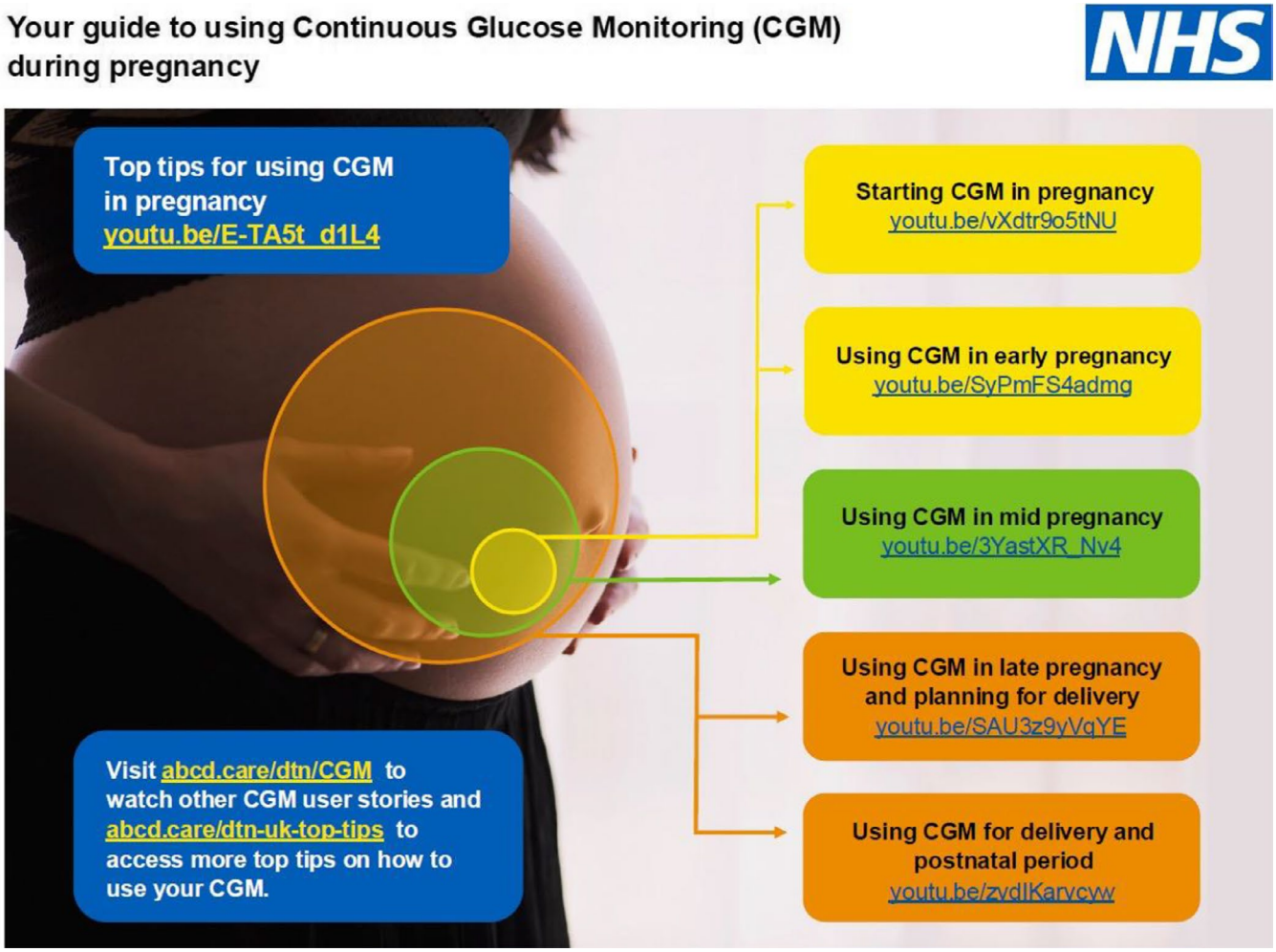

FIGURE 1 Summary of NHS Online Resources Available for the use of CGM in Pregnancy

to a fasting plasma glucose at 6–12 weeks, may further improve postnatal GDM care.

The annual National Pregnancy in Diabetes (NPID) audit measures the quality of antenatal care according to the standards set out by NICE, providing pregnancy outcome information for individual maternity units, regional clinical networks and women with diabetes.[7] The NPID team has recently published data on 17,375 pregnancies in 15,290 women with diabetes, the largest contemporary population-based diabetes pregnancy cohort.[8] These data confirm that half of all pregnancies in women with pre-existing diabetes occur in women with type 2 diabetes with a striking socio-economic gradient as noted by the seven times higher rate of conceptions (41.5 vs. 5.7%) among women with type 2 diabetes living in the most compared to the least deprived regions. Women with type 2 diabetes were more likely than those with type 1 diabetes to take potentially harmful statins (5.3 vs 1.5%) and ACE/ARB inhibitors (4.1 vs. 1.2%) at conception suggesting inadequate attention to contraception and pregnancy planning. Information and advice about the importance of contraception and pregnancy planning is not reaching the majority of women with type 2 diabetes. Even though two thirds of women with type 2 diabetes were taking metformin and hence engaging with healthcare professionals, only one in five were taking 5 mg folic acid and treated with insulin before pregnancy. Thus, almost two thirds of pregnant women with type 2 diabetes enter pregnancy with HbA_{1c} levels above 48 mmol/mol (6.5%). Greater emphasis on treating women with type 2 diabetes of reproductive years to target glycaemia is urgently needed. The NICE research recommendations identified a need for qualitative research focused on exploring the barriers to achieving pregnancy glucose targets (Box 1). Given the importance of periconception HbA_{1c}, this could be expanded to include the pre-pregnancy and interpregnancy management of women with diabetes.

Despite clear evidence that maternal glucose levels are the key modifiable predictor of perinatal death,[7-9] NICE did not comment on the role of glucose monitoring for the growing numbers of pregnant women with type 2 diabetes. Women with type 2 diabetes are mentioned indirectly as 'pregnant women who are on insulin therapy but do not have

BOX 1 Key NICE research recommendations

- To examine the effectiveness and acceptability of insulin pump therapy and CGM use in women with diabetes who are planning pregnancy.
- To establish if earlier testing, diagnosis and intervention for gestational diabetes improves maternal, foetal and neonatal outcomes, including foetal hyperinsulinaemia
- To explore the barriers to achieving pregnancy glucose targets in women with gestational and pre-gestational diabetes.
- To determine the most clinically and cost-effective approaches for identifying foetuses most at risk of death.
- To investigate what pharmacological interventions may delay or prevent type 2 diabetes developing in women with gestational diabetes.

type 1 diabetes'. They can be considered for CGM if they have problematic severe hypoglycaemia (with or without impaired awareness of hypoglycaemia) which applies to a minority (2%–3%) of women with type 2 diabetes. However, use of CGM or Flash can be considered for pregnant women with 'unstable blood glucose levels that are causing concern despite efforts to optimise glycaemic control'. Pregnant women with type 2 diabetes, and HbA_{1c} > 48 mmol/mol (6.5%) have, by definition, 'unstable glucose levels' and an increased risk of stillbirth and neonatal death (Odds ratio of 3.9; 95% CI 2.5–6.2),[7,8] thus use of CGM or Flash should be considered for all women in this category. The 'unstable glucose' indication covers approximately two thirds of women with type 2 diabetes in early pregnancy. Whilst CGM is preferred to Flash because of the randomised controlled trial evidence and the increased risk of severe hypoglycaemia in type 1 diabetes pregnancy, Flash may be suitable for pregnant women with type 2 diabetes. More data regarding the clinical effectiveness of Flash and CGM and appropriate pregnancy glucose targets for HbA_{1c} and CGM time-in-range metrics are urgently needed in type 2 diabetes pregnancy.

Although NICE 2015/2020 recommends aiming for an HbA_{1c} of less than 48 mmol/mol both before and during pregnancy in all women with pre-existing diabetes, it is worth noting that earlier 2008 NICE guidance actually recommended a tighter target of aiming for HbA_{1c} below 43 mmol/mol (6.1%) where safely achievable. This is challenging to safely achieve in type 1 diabetes pregnancy. However, it may be more readily achievable before and during pregnancy in type 2 diabetes and during the second half of pregnancy in those with type 1 diabetes. In Denmark, the HbA_{1c} recommendations are adjusted for advancing gestation; with pragmatic HbA_{1c} targets of <50 mmol/mol (6.7%) before 20 weeks and <40 mmol/mol (5.8%) after 20 weeks gestation based on data suggesting that the upper normal range of HbA_{1c} in healthy pregnancy was around 38 mmol/mol (5.6%).[9,10] The American Diabetes Association (ADA) also recommends trimester-specific HbA_{1c} targets; below 48 mmol/mol (6.5%) in the first trimester and below 43 mmol/mol (6.1%) thereafter.[10,11] Given that maternal glycaemia is the key modifiable predictor for adverse outcomes in both type 1 and type 2 diabetes pregnancy,[7] NICE should also consider trimester-specific HbA_{1c} targets and/or reconsider whether HbA_{1c} < 43 mmol/mol (6.1%) is applicable throughout type 2 diabetes pregnancy.

Overall the NICE guidelines bring good news for pregnant women with gestational and type 1 diabetes, but more work is needed to improve the pregnancy preparation and attention to pregnancy glucose targets, possibly requiring more stringent glycaemic targets, in pregnant women with type 2 diabetes. In addition to interventions for delaying and preventing type 2 diabetes, more work is needed to optimise the immediate post-natal and annual glucose surveillance in all women with a previous pregnancy complicated by GDM.

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