

In Pursuit of Consensus – A National Review of Gestational Diabetes

S. J. Smyth^{1,2}, C. Dale¹, E. Tully¹, F.M. Breathnach^{1,2}

1. Department of Obstetrics and Gynaecology, Royal College of Surgeons in Ireland, Dublin, Ireland.
2. Department of Obstetrics and Gynaecology, Rotunda Hospital , Dublin, Ireland.

Abstract

Aims

Approaches to screening, diagnosis and therapeutic practices for gestational diabetes (GDM) demonstrate great international heterogeneity. We sought to evaluate the clinical experience of GDM care provision from an Irish perspective.

Methods

A web- based questionnaire was distributed to all Irish maternity units. Consultant obstetricians, consultant endocrinologists and midwives working in obstetric diabetes departments were consulted. Management pertaining to screening, diagnosis, prenatal surveillance, education delivery and future scope for telemedical approaches was evaluated.

Results

Feedback was received from all 19 Irish maternity units. Selective risk factor based screening was practiced by all units with the majority (n=18; 95%) subsequently adopting a one-step 75g two hour oral glucose tolerance test (OGTT) to complete the screening process. WHO 2013 diagnostic criteria were followed by 15 (83%) of obstetric diabetes units. Glycaemic surveillance and treatment thresholds were equally disparate . A wide variation was noted in the involvement of specialised dieticians in GDM management. Overwhelmingly, a desire for national cohesion and adaptation of existing care delivery pathways for GDM was identified.

Discussion

While the disparity in adopted clinical practice of GDM is not unique to Ireland it does highlight the need for a national strategic approach to the diagnosis and management of GDM ultimately aspiring to optimize maternal and neonatal outcomes.

Introduction

Gestational diabetes (GDM) is defined as the diagnosis and first recognition of abnormal glucose metabolism, resulting in maternal hyperglycaemia, in pregnancy¹. The condition encompasses all degrees of glucose intolerance but is notably controversial for failing to account for the possibility of pre-existing type 2 diabetes mellitus diagnosed for the first time in pregnancy². Additional controversy surrounds screening procedures, diagnosis and management of GDM.

Variations in diagnostic and therapeutic practices for the management of GDM are common both between different countries and between different jurisdictions of the same country³⁻⁵. A survey by the European Board and College of Obstetricians and Gynaecologists (EBCOG) issued to 33 European countries reported the use of selective screening based on risk factors in 64.3% of countries with the remaining countries adopting a universal screening approach to GDM⁶. There are no universally accepted criteria for diagnosis of GDM and, as a result, diagnostic thresholds for the condition demonstrate great heterogeneity internationally. In Ireland, the Health Service Executive (HSE) National Clinical Guideline Group have followed WHO guidance in endorsement of the WHO 2013 criteria.

Self-monitoring of blood glucose (SMBG) levels is the gold standard strategy for antenatal glycaemic surveillance of GDM and despite endorsements from National Institute for Health and Care Excellence (NICE) in the UK, American College of Obstetrics and Gynaecology (ACOG) and American Diabetes Association (ADA) in the United States and by the Society of Obstetricians and Gynaecologists of Canada (SOGC) it is not universally practiced in Ireland^{1,7-9}. Randomised control trials have yet to generate evidence supporting either the specific frequency of daily self-monitoring in GDM nor the treatment targets that impact on reducing fetal risk¹⁰. Proposed treatment targets in GDM are utilised by convention only, are not evidenced based and demonstrate significant international variability as highlighted in Table 1^{1,5,7,11}. The national clinical guideline for management of GDM endorsed by the Institute of Obstetricians and Gynaecologists suggests a fasting threshold of < 5.0mmol/l and a 1 hour postprandial threshold of <7.0 mmol/l, a measure that fails to distinguish antenatal surveillance of GDM from Type 1 or Type 2 diabetes mellitus¹². SMBG facilitates patient self-management by establishing a unique profile of daily blood glucose fluctuations that can be correlated with exercise and dietary adjustments by the patient¹³. Actively involving patients' in the treatment of their own condition has been found to correlate positively with patient empowerment with respect to health choices¹⁴.

Methods

We sought to explore current practices of GDM care provision in Ireland through the dissemination of an electronically circulated structured questionnaire. Contributing participants included midwives, consultant obstetricians and consultant endocrinologists working in obstetric diabetes services in the 19 maternity units in Ireland represented in Table 2. The survey was distributed to all levels of tertiary, regional and general hospitals delivering maternity care in Ireland. During the year that this questionnaire was circulated 59,796 babies were born to 58,726 mothers across the 19 maternity units in Ireland each of whom were screened for GDM risk factors at the initial booking visit.

The survey evaluated five key areas pertaining to GDM: (i) screening, (ii) diagnosis, (iii) prenatal surveillance and management, (iv) education delivery and (v) attitudes towards the potential for remote monitoring. The survey was conducted from January to July 2019 prior to the onset of the COVID-19 pandemic. Our aim was to receive one survey from each of the 19 maternity units. Each unit was reminded by telephone prompt where incomplete or no response was obtained after initial circulation. Telephonic completion was facilitated where mail survey did not permit access to the questionnaire software. Data were computerised on an excel database and descriptive statistical analysis was performed.

Results

There was a 100% response rate from each of the maternity units with the vast majority of respondents (76%, 19/25) being midwives working in obstetric diabetes departments. One general unit refers all women with a positive OGTT to a regional hospital within their hospital group for ongoing follow up and management of GDM. Therefore, the responses beyond initial screening approaches are acquired from the 18 maternity units that manage GDM.

Screening

All 19 maternity units in Ireland adopt risk factor- based screening strategy for GDM. For 18/19 units (95%) a one-step 75g two hour OGTT is performed at 24-28 weeks' gestation for women identified as having history-based risk factors for GDM. A single elevated glucose value confers a positive GDM diagnosis. A screening test may also be performed based on the emergence of antenatal maternal or fetal risk factors such as macrosomia, polyhydramnios or glycosuria. One unit used a non-fasting 50g glucose challenge test (GCT) initially for all women with identified risk factors with a positive result triggering a formal OGTT for diagnosis.

Diagnosis of GDM

Compliance with the HSE endorsed WHO 2013 diagnostic thresholds was recorded in 16/19 (84%) of units surveyed. Disparate diagnostic targets for the remaining three centres are noted in Table 2.

Gestational Diabetes Surveillance and Management

All women diagnosed with GDM are linked in with a dedicated multidisciplinary obstetric- diabetes team. In line with international standards, SMBG is offered from diagnosis of GDM in 16/18 (88.8%) of centres. Where SMBG was not offered (11%), mothers with GDM were asked to attend a midwifery-led fortnightly hospital based serum glucose assessment incorporating both fasting and 1-hour postprandial values. The frequency of hospital appointments varied between units for patients with diet controlled GDM but beyond 36/40 weeks all units reviewed these patients 2-weekly. Any patient with GDM requiring insulin therapy was reviewed every two weeks regardless of gestation in all units surveyed. In addition to an in-person hospital review, 4 units (22%) utilised telephonic consultation where all glycaemic data were manually logged by a midwife into a data bank. One unit requested that patients email a copy of their weekly glycaemic data for review by

the obstetric diabetes team. For SMBG- programmes a fasting threshold of <5.0 mmol/l and a 1-hour postprandial threshold of <7.0 mmol/l was adopted by 88.8% (n=16) of the surveyed obstetric diabetes departments. In the 16 units practicing SMBG, patients are asked to monitor their blood glucose levels seven times per day encompassing a fasting and postprandial level before and after each of the three main meals and a final measurement before bed. Only two of the surveyed obstetric diabetes departments considered reducing the frequency of monitoring for diet-controlled GDM patients when optimal glycaemic control was achieved.

Education delivery

GDM education and advice is delivered across all maternity units once GDM is diagnosed. Most commonly this is delivered by several members of a multidisciplinary team such as diabetes midwife and nurse specialists, dietitians and physiotherapists. Small group support sessions were the most common pathway of education delivery by the multidisciplinary team (66%; n=12) with the remaining 7/18 (38.8%) units offering one- on- one support to all women. There was a wide variation in practice across units with regard to access to dietetics services. Some units reported fortnightly routine dietitian review while others had a dietitian review at the time of diagnosis with subsequent consultations reserved for emerging management issues such as hunger, poor glycaemic control or weight loss. Others reported no review by a dietitian at any point (2/18).

Fetal Growth Assessment

The schedule of assessments for GDM care included a third trimester growth scan in all Irish maternity units.

Supplemental therapy

Respondents reported a broad range (17% - 50%) of requirement for transition to supplemental medical therapy beyond dietary and lifestyle modifications. This highlights the disparity between local guidelines and stresses the importance of a more cohesive framework for provision of GDM care in Ireland.

Attitudes to Remote Monitoring of BSL for GDM

Of the 18 maternity units providing care to women with GDM 66% (n=12) expressed that a remote/telemedicine approach to GDM monitoring would be feasible, acceptable and beneficial. Staffing constraints and a financial burden on patients were common themes amongst the 6 units who were less favourable in their assessment of transition to a remote based service of care delivery. In fact, 5 units already have adopted a telephonic midwife consultation as a supplement to in-person gestation diabetes care

Institution	Recommended Fasting threshold (mmol/l)	Recommended 1 hour Threshold mmol/l	Recommended 2 hour Threshold mmol/l
HSE	5	7	not assessed
NICE	5.3	7.8	6.7
SIGN if < 35/40	5.5	not assessed	7
SIGN if > 35/40	5.5	not assessed	8
ADA / ACOG	5.3	7.8	6.7
ADIPS	5	7.4	6.7

Table 1 International variations in glycaemic thresholds for antenatal surveillance of GDM

Hospital Grouping	Individual Hospitals	Level of Care
Ireland East hospital group	National Maternity Hospital Wexford General Hospital St Luke's Hospital Kilkenny Regional Hospital Mullingar	Tertiary General General General
Dublin Midlands	Coombe Women and Infants University Hospital Midlands Regional Hospital Portlaoise	Tertiary General
RCSI hospital group	Rotunda Hospital Our Lady of Lourdes Hospital Drogheda Cavan General Hospital	Tertiary Regional General
South / Southwest hospital group	Cork University Maternity Hospital University Hospital Waterford University Hospital Kerry South Tipperary General Hospital	Tertiary Regional General General
UL hospital groupings	University Maternity Hospital Limerick	Regional
Saolta University Healthcare group	University Hospital Galway Mayo University Hospital Portiuncula University Hospital Sligo University Hospital Letterkenny University Hospital	Regional General General General General

Table 2 Maternity Hospital Groupings in Ireland

WHO 2013 recommended diagnostic criteria for GDM (mmol/l)		Variations in diagnostic practices within Irish maternity Units (mmol/l)		
		Variation 1	Variation 2	Variation 3
Fasting	5.1	5.3	5.8	5.3
1 Hour	10.0	not assessed	not assessed	not assessed
2 hour	8.5	8.5	8.2	8

Table 3 Variations in diagnostic criteria for GDM

Governing Body	Criteria for Diagnosis	Early screening offered	Method of screening	1- Step / 2- Step	Glucose Load	Fasting	1- Hour	2- Hour	3- Hour	Threshold for Diagnosis
ADA	WHO 2013 criteria	Yes - If risk factors identified	Universal or Selective	1 Step	75g	5.1	10	8.5	-	≥1 value at or above threshold
	C & C criteria	Yes - If risk factors identified	Universal or Selective	2 Step	100g	5.3	10	8.6	7.8	≥2 value at or above threshold
ACOG	NDDG criteria	Yes- If overweight/obese and an additional risk factor	Universal	2 Step	100g	5.8	10.6	9.2	8	≥2 value at or above threshold
	C & C criteria	Yes- If overweight/obese and an	Universal	2 Step	100g	5.3	10	8.6	7.8	≥2 value at or above threshold

		additional risk factor								
Diabetes Canada	Preferred approach	Yes – If risk factors identified	Universal	2 Step	75g	5.3	10.6	9	-	≥1 value at or above threshold
	Alternate approach	Yes – If risk factors identified	Universal	1 Step	75g	5.1	10	8.5	-	≥1 value at or above threshold
NICE		Yes – If previous GDM	Selective	1 Step	75g	5.6	-	7.8	-	≥1 value at or above threshold
HSE	WHO 2013 criteria	Yes – If GDM suspected based on macrosomia, polyhydramnios, glycosuria	Selective	1 Step	75g	5.1	10	8.5	-	≥1 value at or above threshold
SIGN	WHO 2013 criteria	Yes – If risk factors identified	Universal	1 Step	75g	5.1	10	8.5	-	≥1 value at or above threshold
ADIPS	WHO 2013 criteria	Yes – If risk factors identified	Universal	1 Step	75g	5.1	10	8.5	-	≥1 value at or above threshold

Table 4 International variation in approach to GDM diagnosis

ADA: American Diabetes Association

WHO :World Health Organisation

C & C: Carpenter and Coustan

ACOG: American College of Obstetricians and Gynaecologists

NICE: The National Institute for Health and Care Excellence

HSE: Health Service Executive

SIGN: Scottish Intercollegiate Guidelines Network

ADIPS: Australian Diabetes in Pregnancy Society

Discussion

Since publication of the HSE National Clinical Guideline in 2010 other international bodies have recommended yet more variation to the management approach of screening, diagnosis and surveillance for GDM. This survey shows that the majority of Irish obstetric diabetes service departments adhere to the WHO 2013 criteria for screening and diagnosis of GDM as endorsed by the HSE in Ireland. However, disparities for both approaches have also been highlighted notably with regard to diagnosis where 7 obstetric diabetes departments deviate from the WHO 2013 criteria by modifying threshold levels of one or more parameters of the 75g OGTT (Table 2).

This issue is not unique to Ireland and leads to heterogeneity in the reported prevalence of GDM and its potential clinical, economical and psychological outcomes¹⁵. In a survey by Sukumaran et al evaluating adoption of the NICE 2013 criteria by UK maternity units, only 4% were compliant with guideline recommended fasting thresholds¹⁶. There are a variety of diagnostic thresholds endorsed by several different international bodies (Table 4). The WHO, ADA, FIGO and ADIPS endorse WHO 2013 acknowledging that its use compared with older diagnostic thresholds increases the prevalence of GDM almost two-fold^{1,5,17-19}. In a comprehensive national audit examining the impact of implementation of new diagnostic criteria on GDM prevalence in Ireland, McMahon et al demonstrated an increase from 3.1% in 2007 to 14.8% in 2016²⁰.

There is an obvious requirement for consistency with regard to diagnosis and antenatal surveillance and management of GDM across the maternity units in Ireland. In order to bring about parity and agreement it is imperative that local audit strategies are in place, that guidelines are both clear and comprehensive and that there is national oversight from a governing body. The National Women and Infants Health Programme was established to address the exact issues identified by this study. Since its inception in 2017 it is responsible for overseeing the delivery of consistent and high quality care for all women seeking maternity services in Ireland while simultaneously developing maternity networks across hospital groups. The NWIHP is in the process of developing a national guideline for GDM with the aim of aligning management practices nationwide. A further role of NWIHP is the allocation and direction of resources in the form of additional staff and funding to ensure compliance with national guidance.

An integral component of patient-centred care is the provision of education by all stakeholders to the patient, empowering them to remain activated and motivated in managing their condition. SMBG has not only been associated with achievement of optimised glycaemic indices but also with maternal feelings of self-efficacy²¹. Implementation of multidisciplinary care provision for women with GDM has been consistent across all Irish maternity units facilitating promotion of patient self-awareness and empowerment in the management of their condition. In view of the increasing prevalence of GDM it seems prudent to offer group education sessions rather than one-on-one for the majority of women with a new diagnosis of GDM. The benefits of group education for a GDM cohort can include a reduction in the workload for overburdened staff without compromising on patient satisfaction level²². This review of national practice found that just over one third of obstetric

diabetes services reported facilitation of individualised education delivery with the majority offering group sessions. Reduced health literacy has been correlated with sub-optimal glycaemic control in women with GDM. It is recognised that more tailored education delivery may be warranted for this cohort of individuals where communication and comprehension and retention of information may be impacted in a group environment²³. Medical nutrition therapy has been thought of as the cornerstone of management for GDM and involves specialist advice from dedicated dietetic departments linked to obstetric diabetes services. It was surprising therefore to see such a variance in the degree of dietetic expertise reported to be available to the maternity units overseeing GDM care. Evidence suggests that dietician-provided advice through a minimum of three scheduled sessions impacts on the requirement for supplemental hypoglycaemic therapy in pregnancies complicated by GDM²⁴.

The onset of the COVID-19 pandemic in March 2020 called for innovative strategies to continue surveillance of GDM without compromising on patient care. In line with international guidance issued in response to the pandemic, many Irish maternity units developed remote methods of surveillance through telephonic clinics and email review²⁵. Our review highlighted a desire for change and appetite for telemedicine models of care amongst the vast majority of Irish maternity units providing GDM care in pregnancy that predated the global pandemic. Supplemental telephone review clinics in addition to in-person visits were already a component of care delivery for some women with GDM in Ireland at the time of circulation of this questionnaire.

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Declaration of interest:

The authors have no conflicts of interest to declare.

Corresponding Author:

Suzanne Smyth,
RCSI Unit,
Rotunda Hospital,
Parnell Square,
Dublin 1.
E-Mail: suzannejksmyth@gmail.com

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