

2. Invited Commentary: The role of maternal health and maternal obesity in perinatal mortality.

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Introduction

A perinatal death is a death of an infant during pregnancy and up to the first seven days of life, weighing >500g or with a gestational age of ≥ 24 weeks at delivery, including deaths related to congenital anomaly.

Adjusted perinatal mortality is defined as the number of perinatal deaths (early neonatal deaths and stillbirths from 24 weeks gestation or weighing >500g) excluding deaths due to a major congenital anomaly. The 2020 NPEC report showed a perinatal mortality rate of 6.25 per 1,000 and an adjusted perinatal mortality rate of 3.68 per 1,000 births.¹ These increased from the 2019 figure of 6.04 per 1,000 and 3.73 per 1,000 births respectively.¹

The World Health Organisation (WHO) definition of obesity is the 'abnormal or excessive fat accumulation that presents a risk to health'. The Body Mass Index (BMI), which measures the weight in kilograms divided by the square of the height in metres (kg/m^2), is the most widely used measure of overweight and obesity. A healthy BMI is between 18.5-24.9, overweight refers to a BMI of between 25-29.9 and obesity is defined as a BMI of greater than 30.

Obesity rates are rising globally. Almost 21% of women in the world are predicted to have a BMI of greater than 30 by 2025.² Ireland has the sec-

ond highest prevalence of obesity in the European Union, according to Eurostat data, finding that 25% of women and 26% of all adults in Ireland live with obesity, higher than the European Union (EU) average of 16%.³ The same survey, conducted in 2019, found that 56% of adults and 49% of women in Ireland are classified as overweight.³ It is estimated that more than half of women who become pregnant are overweight or obese at the time of booking.⁴ A study from a large Irish maternity hospital found an increase in obesity rates amongst pregnant women from 16% to 18.9% between 2010 and 2017.⁵

NPEC BMI data

The most recent data from the National Perinatal Epidemiology Centre (NPEC) records the BMI at booking of the mothers who suffered a stillbirth or early neonatal death between 2011 and 2020, see Table 2.1. Thirty percent of women were overweight and 25.4% of women were obese. The perinatal mortality rate amongst women who were living with overweight, and obesity was 6.08 per 1,000 and 8.4 per 1,000 respectively in 2020. There was a statistically significant increased rate ratio for perinatal mortality of 1.3 for mothers who are overweight and 1.8 for mothers with obesity, see Table 2.2.

Table 2.1. Woman's BMI at time of her booking appointment in Ireland; 2011-2020

	2011-2019	2020	2011-2020	n(%)
Underweight (<18.5)	38	2	40	40(1.2)
Healthy (18.5-24.9)	1311	119	1430	1430(43.3)
Overweight (25.0-29.9)	888	105	993	993(30.1)
Obese (>30.0)	740	98	838	838(25.4)
Total	2977	324	3301	3301(100)
Not recorded	691	33	724	724(18)
All	3668	357	4025	4025(100)

Table 2.2. Perinatal Mortality rate relative to maternal BMI in Ireland; 2020

BMI Category (kg/m ²)	Rate per 1,000 (95% CI)	Rate Ratio (95% CI)	P-Value
Underweight (<18.5)	2.69(0.33-9.69)	0.58(0.14-2.33)	0.439
Healthy (18.5-24.9)	4.67(3.87-5.59)	1.00 (reference)	-
Overweight (25.0-29.9)	6.08(4.97-7.35)	1.3(1-1.69)	0.05
Obese (≥ 30.0)	8.4(6.83-10.23)	1.8(1.38-2.35)	<0.001

Note: 95% CI=Exact Poisson 95% confidence interval. Rate ratio compares risk of experiencing perinatal loss for women in each BMI category to the risk for women in the healthy BMI category.

Obesity, maternal morbidity, and perinatal mortality

Mothers living with obesity are more likely to present with reduced fetal movements and the risk of stillbirth increases with increasing maternal BMI.⁶ Additionally, the odds of infant death are higher for mothers with BMI > 30 (OR 1.42) and the risk appears to increase with increasing maternal BMI (OR 2.03 for women with BMI>35).⁷ Maternal obesity is also associated with subfertility, an increased risk of miscarriage and congenital anomaly, and a higher risk of pregnancy complications such as gestational diabetes, hypertensive disorders of pregnancy, caesarean birth and postpartum

haemorrhage.⁸ Women with obesity are more likely to be deficient in micronutrients such as B12, vitamin D and iron.⁹ This is also identified in the NPEC national clinical audit of severe maternal morbidity (SMM) in Ireland which showed that obesity was associated with a doubling of the risk of SMM compared to women with a healthy BMI in 20201 (see Table 2.3). High BMI was particularly associated with major obstetric haemorrhage, ICU/CCU admission, peripartum hysterectomy and pulmonary embolism.

Table 2.3: Risk of severe maternal morbidity (SMM) by body mass index (BMI) in Ireland; 2020

BMI category (kg/m ²)	Maternities	SMM cases (N=310)*	SMM rate (95% CI)	Rate ratio (95% CI)
Underweight (<18.5)	473(1.3)	1(0.3)	1.34(0.05-11.78)	0.30(0.04-2.17)
Healthy (18.5-24.9)	16,219(46.2)	113(36.5)	4.43(5.74-8.38)	1.00(ref.)
Overweight (25.0-29.9)	11,002(31.3)	93(30.0)	5.37(6.82-10.36)	1.21(0.92-1.60)
Obese (≥30.0)	7,428(21.1)	103(33.2)	8.81(11.32-16.82)	1.99(1.52-2.60)

*BMI was not known for 19 women who experienced SMM in 2020.

Guidelines on obesity in pregnancy

Healthcare providers have an essential role to play in tackling the rising rates of maternal obesity. In 2019 the International Federation of Gynaecology and Obstetrics (FIGO) launched the Pregnancy Obesity and Nutrition Initiative (PONI).¹⁰ The aims are to provide clear messages in tackling malnutrition and obesity before, during and after pregnancy, encouraging frontline healthcare providers to 'Think Nutrition and Weight First at Every Contact'.

FIGO have published a guideline to assist Obstetricians & Gynecologists in the management of women with obesity.¹¹ There are three time points for clinicians to intervene to improve outcomes for mother and baby- pre pregnancy, during pregnancy and postpartum (interpregnancy). A summary of these guidelines is shown below in Table 2.4.

Table 2.4. FIGO committee guideline for the management of prepregnancy, pregnancy and postpartum obesity

Prepregnancy	<ul style="list-style-type: none">• All women should have their weight and height measured and their body mass index (BMI, calculated as weight in kilograms divided by height in meters squared) calculated. Consider ethnic differences.• All women with a BMI of ≥ 30 should be advised of the effect of obesity on fertility, the immediate risks of obesity during pregnancy and childbirth, and the subsequent long-term health effect of obesity including the higher risk of noncommunicable diseases for them and their children.• All women with obesity should be encouraged to lose weight through diet and adopting a healthy lifestyle including moderate physical activity. If indicated and available, other weight management interventions might be considered, including bariatric surgery.• All women with obesity should be advised to take up to 5 mg folic acid supplementation daily for at least 3 months before conception.
Pregnancy	<ul style="list-style-type: none">• All women should have their weight and height measured and their BMI calculated at the first antenatal visit. Consider ethnic differences. Advise on appropriate gestational weight gain.• All women should receive information on diet and lifestyle appropriate to their gestation including nutrient supplements, weight management, and regular physical activity.• All women with obesity should be advised of the risks of obesity and excess gestational weight gain on pregnancy, childbirth, and long-term health including risk of noncommunicable diseases for them and their children.• All antenatal healthcare facilities should have well-defined multidisciplinary pathways for the clinical management of pregnant women with obesity including the identification and treatment of pregnancy-related complications.
Postpartum	<ul style="list-style-type: none">• All women with prepregnancy obesity should receive support on breastfeeding initiation and maintenance.• All women with obesity and pregnancy complications should receive appropriate postnatal follow-up in line with local resources, care pathways, and in response to the individual health requirements of each woman and her children.• All women with obesity should be encouraged to lose weight postpartum with emphasis on healthy diet, breastfeeding if possible, and regular moderate physical activity. They should be advised of the importance of long-term follow-up as they and their children are at increased risk for noncommunicable diseases.• Maternal obesity should be considered when making the decision regarding the most appropriate form of postnatal contraception.

Addressing maternal obesity

Healthcare professionals know the importance of weight and nutrition but often find this subject difficult to broach with women. Communication around weight, the adverse effects of obesity and advice about gestational weight gain (GWG) and nutrition provided to women by healthcare providers is often inconsistent.¹² Midwives, general practitioners (GPs) and obstetricians may shy away from addressing weight for fear of upsetting women.¹³ Furthermore, a recent systematic review identified that there is a 'significant gap' in knowledge about GWG amongst healthcare professionals.¹⁴ How women perceive the risks of obesity in pregnancy is influenced by the counselling they receive from healthcare professionals and if this is not approached sensitively women report feeling stigmatised and penalised for their weight.¹⁵

The FIGO Nutrition Checklist is a brief validated nutritional questionnaire designed to facilitate a discussion around weight and nutrition between women and their healthcare providers.^{16,17} It takes just two minutes to complete and a pilot study, using the checklist in a tertiary referral maternity unit, showed that women have a strong desire for nutrition and weight to be addressed by

clinicians during antenatal visits.¹⁸ Women found the checklist quick to complete, though Obstetricians felt there may be insufficient time to discuss the checklist in routine practice.¹⁹ However, if the checklist were to become part of routine antenatal care for every woman, it can be a useful resource to identify those at risk of malnutrition and obesity without stigmatising only overweight and obese women.

Other resources that can be useful to direct women to include smartphone applications such as the HOLLESTIC app recently launched by the UCD Perinatal Research Centre and the National Maternity Hospital Dublin. This evidence-based app, based on robust randomised controlled data that showed benefit in reducing excessive gestational weight gain with improved nutritional intake, is specifically devised for pregnant women, and provides nutritional and pregnancy advice as well as recipes and meal suggestions.²⁰ It is available to download for free from google app store and currently has over 3000 users across 5 countries worldwide. The use of mobile apps to support lifestyle interventions in pregnancy has been found to be simple to follow, affordable and enjoyable for women.²¹

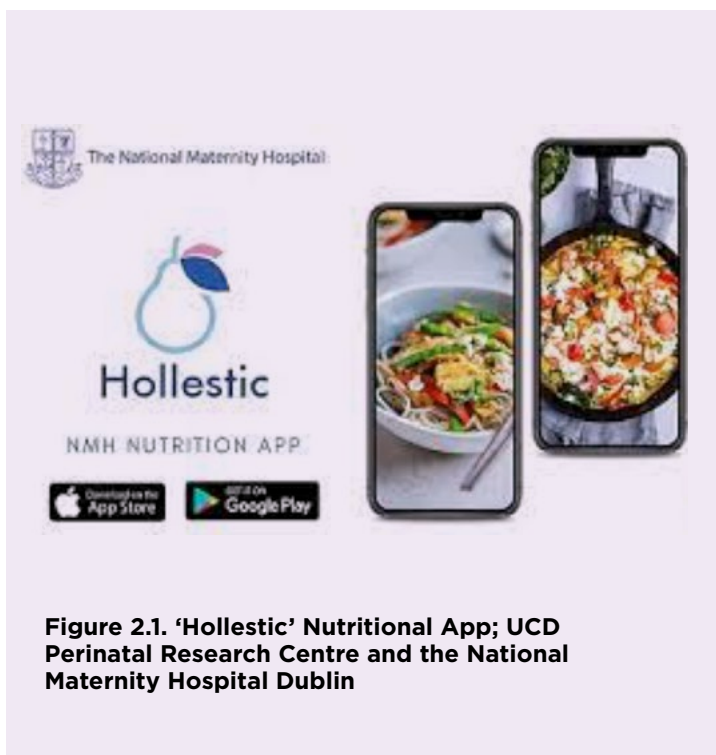


Figure 2.1. 'HolleSTIC' Nutritional App; UCD Perinatal Research Centre and the National Maternity Hospital Dublin

Lifestyle changes form the cornerstone of any health promoting intervention and include access to affordable, healthy food, adaptation of local diets and recipes to promote a healthy weight, and the creation of environmental opportunities for physical activity, such as safe parks and open spaces.

Call to action

All healthcare providers who have contact with women of reproductive age have a responsibility to help tackle maternal obesity. Obstetricians, GPs and midwives should see every interaction with a woman as an opportunity to address weight, nutrition and lifestyle to optimise her health.

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