

INTEGRATED CARE Tackling inequality in maternal health: Beyond the postpartum

Authors: Kate Womersley,^A Katherine Ripullone^B and Jane Elizabeth Hirst^C

ABSTRACT

Healthcare systems prioritise antenatal and intrapartum care over the postpartum period. This is reflected in clinical resource allocation and in research agendas. But from metabolic disease to mental health, many pregnancy-associated conditions significantly affect patients' lifelong health. Women from black and ethnic minority backgrounds and lower socioeconomic groups are at greater risk of physical and psychiatric complications of pregnancy compared to white British women. Without sufficiently tailored and accessible education about risk factors, and robust mechanisms for follow-up beyond the traditional 6-week postpartum period, these inequalities are further entrenched.

Identifying approaches to address the needs of these patient populations is not only the responsibility of obstetricians and midwives; improvement requires cooperation from healthcare professionals from a wide range of specialties. Healthcare systems must encourage data collection on the long-term effects of metabolic and psychiatric conditions after the postpartum, and support research that results in evidence-based care for the neglected field of women's postpartum health.

KEYWORDS: women's health, postpartum, inequalities, cardiovascular disease, gestational diabetes, perinatal mood and anxiety disorders, ethnic minorities, health systems

DOI: 10.7861/fhj.2020-0275

Introduction: pregnancy as a 'stress test'

Illnesses and complications that arise in pregnancy and the postpartum have long-term and wide-ranging negative effects on the health of women and their children. But who are the specialists, what are the services, and where are the systems to

monitor and manage at-risk women after they give birth?

Gestational diabetes mellitus (GDM), pre-eclampsia, pregnancy-induced hypertension and peripartum psychiatric illnesses have traditionally been thought of as anomalous problems that occur in pregnancy or soon after and resolve within days to weeks post-delivery. Healthcare providers, and by extension patients themselves, did not typically view 'pregnancy history' as a critical part of a woman's ongoing medical history. However, many researchers now agree that pregnancy is a 'stress test' for future health: pregnancy reveals a patient's underlying health vulnerabilities.^{1,2} Therefore, metabolic diseases and psychiatric conditions that emerge during and after pregnancy should be monitored through a woman's life.

In most healthcare systems, clinical resources and research agendas prioritise antenatal and intrapartum care. But many pregnancy-associated events continue into the postpartum and alter women's lifelong health profiles. GDM puts women at increased risk of developing type 2 diabetes (T2DM) and cardiovascular disease (CVD), while anxiety and depression in the peripartum increase a woman's likelihood of living with these conditions after the first year following delivery.^{3,4} These complications not only affect the health of women, but also that of their children. For example, a child has a six-fold elevated risk of developing T2DM if their mother had gestational diabetes while pregnant, compared to if their mother did not have GDM.⁵

Women from black and ethnic minority backgrounds and lower socioeconomic groups are at greater risk of physical and psychiatric conditions of pregnancy when compared to white British women. The most recent MBRRACE report on maternal mortality and morbidity in the UK confirmed the findings of previous reports that Asian women are twice as likely to die in childbirth, while black women are five times more likely to die in childbirth, compared to white British women.^{6,7} Migrant women have lower levels of engagement with healthcare services for many reasons, including a lack of familiarity with the systems of the NHS, uncertainty about whether they will be billed for care, concern that using healthcare services might affect their immigration status and language barriers.⁸ They also face challenges when accessing and using services that are not targeted to their needs. Without appropriate education about risk factors, such as obesity and smoking, as well as effective and robust mechanisms for follow-up beyond the traditional postpartum period of 6 weeks, these inequalities are reinforced.

Finding system-wide approaches to address the needs of these patients is not solely the responsibility of obstetricians and midwives. Initiative also rests with clinicians from other specialties including

Authors: ^Aacademic FY2, Royal Infirmary of Edinburgh, Edinburgh, UK, and honorary research associate, The George Institute for Global Health, Imperial College London, London, UK; ^Bacademic clinical fellow ST1, obstetrics and gynaecology, Oxford University, Oxford, UK, and honorary research associate, The George Institute for Global Health, Imperial College London, London, UK; ^Csenior fellow in perinatal health, Oxford University, Oxford, UK, and honorary senior research fellow, The George Institute for Global Health, Imperial College London, London, UK

general practice, cardiology, endocrinology, emergency medicine and public health who care for women throughout their life-course.

Current NHS postpartum care

Postpartum care in the UK, and worldwide, is relatively under-researched and under-funded. For a woman who is expecting an uncomplicated pregnancy and delivery, the NHS budgets £250 postnatally, compared to over £1,000 antenatally, and £1,800 for intrapartum care.⁹ This disparity in funding reflects the comparative paucity of clinical resources and research attention the postpartum period receives from obstetric and midwifery teams, as well as from other specialties. Immediate postpartum surveillance of new mothers relies on midwives for the first 10 days, and then on health visitors who review women on a schedule that depends on perceived need. In England, but not the devolved nations, a 6-week postnatal check by a GP was finally granted funding in February 2020. The purpose is to carry out screening of mood and discuss outstanding obstetric issues.¹⁰ However, disagreement about what questions, examinations and investigations this health check should contain, a lack of evidence supporting the recommendations, and variability in whether the check even takes place according to postcode are all causes for concern.¹¹

Since the onset of the COVID-19 pandemic, delivery of the 6-week check has been significantly reduced, despite guidance from the Royal College of General Practitioners that this is an essential service which should be maintained despite pressures on the NHS.^{12,13} Of the postnatal checks that have taken place, many have not been face-to-face. Increased use of telephone and video call clinics since the start of the pandemic is likely to have adversely affected patients who may not have access to this technology, women who do not speak English as a first language, and those who might depend on the dynamic of an in-person consultation to disclose mental health concerns and domestic violence. Previous disease outbreaks in other countries, such as Ebola, provide evidence for an overall decline in pregnant and postpartum women making contact with healthcare services during epidemics.¹⁴

In the UK, after the 6-week postnatal check, medical support for women falls away. A new mother must proactively present to her GP if she has ongoing concerns. NICE recommends that women with GDM should receive lifestyle advice, a fasting glucose between 6–13 weeks postpartum, and an HbA1c test after 13 weeks if the fasting glucose was not performed. Annual checks of HbA1c thereafter are advised to monitor progression to T2DM.¹⁵ However, a 2019 study showed that one in three women with GDM did not receive any follow-up.¹⁶ Since March 2020, GDM monitoring has been reduced to a single HbA1c test postpartum due to service limitations. Given the UK's non-centralised provision of primary care, it is particularly difficult to ascertain what proportion of the required annual HbA1c checks take place, in accordance with NICE Quality Statement 7.¹⁷ Neither general practice, nor any other specialty, is currently financially incentivised to offer these tests, which reduces the likelihood that women are adequately followed up.

Inequalities in metabolic disease

Racial, social, geographic and economic disparities magnify gaps in postpartum care. Long-term implications of perinatal illness have been linked to multi-morbid states. Risk factors such as obesity, smoking, pre-existing depression and diabetes all contribute to worse outcomes after the peripartum. These risks potentiate one

another: a woman has a higher risk of developing CVD if she has both pre-eclampsia and GDM, compared to if she only has GDM.

Gestational diabetes occurs in 3–5% of pregnancies in the UK, and incidence is increasing. Over the last decade, the average weight of women in pregnancy has risen, leading to an increase in GDM.⁷ Patients who develop GDM are ten times more likely to develop T2DM in the future, and experience accelerated development of CVD risk factors and associated events in later life.^{18,19} Meta-analyses have shown that women with GDM double their risk of future cardiovascular events, and that progression to T2DM did not affect this increase in risk, which means that the increased risk of CVD development is independent of progression to T2DM.²⁰

Evidence consistently shows that pre-eclampsia is associated with chronic hypertension, IHD, stroke and death from cardiovascular events.²¹ Importantly, these risks and negative outcomes have been shown to develop at an earlier age in women who have had pre-eclampsia, which compounds the implications of long-term effects.²² Standardised follow-up care for women who have pre-eclampsia is not widely established internationally, which is a limitation for longitudinal studies that might seek to inform the content and timing of effective interventions.

GDM and obstetric cardiovascular disturbances differentially affect subpopulations, which leads to worse outcomes for these groups. Women from BAME backgrounds experience higher rates of GDM and pre-eclampsia, and this risk is compounded by pre-existing obesity that is itself linked to deprivation.²³ Increased psychosocial and economic deprivation scores (on indices such as EPICES and Townsend) are associated with being overweight or obese, parity and non-European ethnic origin. (Psychosocial deprivation refers to psychological and social effects reflected in the concept of 'precariousness', apart from but related to economic deprivation, influencing how an individual interacts with and within society: for example, attitudes towards medical professionals and services and educational institutions.) Individuals with a higher level of deprivation have been shown to develop GDM earlier, have greater intensity of insulin treatment, and increased likelihood of large-for-gestational-age infants with associated complications such as shoulder dystocia.²⁴

One in four births in the UK are to women who were born outside of the UK, with this group over-represented in maternal and perinatal mortality figures.^{5,25} Prevalence of GDM is higher among South and South East Asian women. Differences in diet and nutritional education and limitations in English language proficiency mean that first-line treatments, such as lifestyle changes, are often less successful for such groups. Furthermore, these women are more likely to have abnormal postpartum follow-up tests and to progress onto T2DM, while Afro-Caribbean and Hispanic groups are more likely to develop hypertension.²⁶

However, Afro-Caribbean women at the point of entering pregnancy show a higher probability of having chronic hypertension and increased body-mass index (BMI). They are also more likely to develop mild as well as severe pre-eclampsia, and require higher doses of a wider variety of anti-hypertensive medication both in the peripartum period and long-term.²⁷ Differences in prenatal risk profiles do not fully account for differences in pre-eclampsia development and associated complications. More research is needed to understand these variations between ethnic groups to elucidate whether the differences in peripartum pre-eclampsia incidence, clinical course and complications are reflected in short, medium and long-term cardiometabolic consequences, and if so, how standardised follow-up can address these inequalities.

Inequalities in mental health

It is a common misconception that the window for concern about the onset of postpartum mental health disorders closes after the first 6 weeks. In fact, perinatal mood and anxiety disorders (PMAD) can be diagnosed at any point in the 12 months after delivery, and some specialists suggest this could be extended to 3 years.²⁸ Peripartum anxiety and depression are significant predictors of a woman's mental health status in the first year after delivery, and into the rest of her life. Approximately one third of women who experience PMAD continue to have symptoms beyond a year after delivery, with depressed mothers showing significantly elevated levels of anxiety 3.5 years after childbirth compared with non-depressed mothers.^{29,30} Timely intervention is key, particularly if a patient experiences psychosis in the postpartum. A Danish study suggests that a range of psychiatric presentations in the immediate postpartum period are associated with developing bipolar affective disorder over a 15-year follow-up period.³¹

Mental health issues reflect but also reinforce an individual's socioeconomic status. Patients with PMAD are twice as likely to become homeless, and approximately 1.5 times more likely to be at risk of homelessness than non-depressed mothers.³² Social support has a protective effect against PMAD, and depressed mothers report lower perceived social support than nondepressed mothers. Few studies have looked at the intersection of mental health and long-term physical health, but it has been shown that women with PMAD are more likely to develop cardiovascular and metabolic health complications, which seems to be driven by lifestyle factors.⁴ They are more likely to restart smoking if they had managed to stop during pregnancy, as well as use illicit drugs and alcohol to excess, compared with non-depressed women.^{33,34}

Ethnicity and migration status are both risk factors for PMAD. Black, Asian and minority ethnic (BAME) women are disproportionately affected by poor mental health and face challenges when trying to access mental health care in the perinatal period. Migrant women have an increased risk of mental health sequelae during and after pregnancy, exacerbated by stressors including social isolation, lack of familiarity with health systems, poor language proficiency and precarious legal status. Recent evidence from the Millennium Cohort Study showed that migrant and ethnic minority mothers were at greater risk of PMAD, with Indian and Pakistani women at greatest risk, yet were less likely than white British women to receive treatment for anxiety or depression.³⁵ Despite identification of these risk factors for PMAD, there is limited understanding about how to cater services to ethnic minority and migrant women so that they are not doubly disadvantaged by also not being able to receive treatment.³⁵

A further barrier to detection of PMAD in these groups is the flaws of available psychiatric diagnostic tools. International cross-cultural comparative research shows that women from non-Western cultures are more likely to present with somatic symptoms of PMAD, yet this is not recognised in widely used screening tests, such as the Edinburgh Postnatal Depression Scale (EPDS), which is favoured in the NHS. The EPDS focuses solely on psychological thoughts and feelings, while omitting physical symptoms.

The disadvantages afforded by ethnicity intersect with poverty to magnify negative health outcomes. Women from ethnic minorities who have low incomes experience challenges when accessing support, due to cultural stigma around mental health issues, wariness of the psychiatric profession, and pragmatic issues of childcare and transport which inhibit attendance at appointments.³⁶

Precise understanding of these disparities' effects is required to design services that facilitate accessibility and sustained treatment engagement beyond the early postpartum weeks.

Learning from abroad

Effective follow-up systems are central to ensure women with GDM and perinatal mental health diagnoses do not 'get lost', particularly when the disproportionate burden of these diseases falls on already disadvantaged groups. The UK lacks a joined-up postpartum care system, let alone a system that addresses multiple risk factors and health conditions which may co-exist in one patient. Analysing current NHS follow-up provision is challenging due to the lack of a centralised database.

Other countries have implemented system-wide approaches to ensure quality follow-up after the immediate postpartum. Australia has established a GDM register with a patient interface that provides information and advice to affected women.³⁷ The system initiates regular screening reminders to ensure that even if an individual relocates to another address, follow-up is not interrupted. Similar registries have been trialled on smaller scales as part of World Diabetes Foundation-funded projects in India and Cameroon.^{38,39} Programmes have used community outreach workers to give continued support, and offer financial incentives to care providers to ensure buy-in and compliance with care pathways.

For mental health follow-up, there are very few documented international examples of long-term monitoring and support strategies, although emerging evidence suggests that more sustained treatment with peer support leads to longer remission.^{40,41} In the UK, specialist community perinatal mental health teams and perinatal mother-and-baby inpatient facilities have been successfully scaled-up over recent years to support women with more complex and severe mental health needs.⁴² However, these teams target the most severely ill women, such as those experiencing puerperal psychosis in the immediate postpartum. The great majority of new mothers with PMAD suffer from milder forms of anxiety, depression, obsessive-compulsive disorder and post-traumatic stress disorder which can be managed in the community, and are too often missed. Despite less severe initial presentations, the impacts of these conditions may still be long-term and significant.

Who is responsible for these women in the UK?

It is currently unclear which NHS services are responsible for different strands of 'beyond postpartum' follow-up. Firstly, patients receive inadequate education and mixed messages about whether and how mental and physical health complications from pregnancy increase their risk of developing later health conditions, such as depression, CVD and T2DM. This prevents patients having self-determination over their ongoing health. Diabetes UK acknowledges on their website that women's understanding of the risks of GDM has not been formally studied, but that women are likely to be unaware of future health impacts on themselves and their children.⁵ The 2020 James Lind Alliance Priority Setting Partnership for Diabetes in Pregnancy identified that specific postnatal care and support for women with diabetes and their children, as well as research to prevent future diabetes after GDM, are top research priorities. However, this area seems to get lost because it falls between endocrinological, obstetric and community health research agendas.⁴³

NICE guidelines suggest best practice for treating women in the 'long postpartum', but there are not currently pathways to actualise the recommendations. NICE advises that women who have had a hypertensive disorder of pregnancy should be counselled about associations with increased risks of hypertension and CVD in later life.⁴⁴ Patients with pre-eclampsia should be advised to 'achieve and keep a BMI within the healthy range before their next pregnancy.' However, supporting and facilitating these commitments requires a well-funded service with expert clinicians who have sufficient time and resources. Currently it is unclear whether NHS hospital teams or community healthcare providers are responsible for implementing NICE's recommendations, nor is it defined at what point in peripartum care, and by whom, women should be given educational advice. Discussing long-term risk requires skill, and a sufficiently long consultation, particularly when pregnancy and the immediate postpartum are periods of psychological vulnerability when it may be stressful for women to receive stark warnings about their future health.

What can the UK do better?

There are three major pathways for improvement in the NHS: proactive screening programmes, opportunistic review of women who come into contact with primary or secondary care, and targeted research into effective postpartum interventions.

A woman's pregnancy history must be seen as a vital part of her ongoing medical history. Obstetric and peripartum factors could have serious implications for a patient's current and future health, and therefore should be reviewed routinely by clinicians in non-obstetric specialties, such as general practice, emergency medicine, cardiology and endocrinology. Also, women must be offered transparent and accessible educational information about how GDM and hypertension confer risk to developing CVD and T2DM. Rather than sheltering women from this information, clinicians should adopt a proactive stance that acknowledges women's rights to understand the risk they face, and be given an opportunity to make positive lifestyle changes to reduce it.

Systems for recording postpartum monitoring data need to be transparent. Neither the planned (but not yet launched) UK national diabetes audit of women with GDM, nor the pre-eclampsia registers which are currently being piloted, are easy to navigate. They do not have patient-facing interfaces to generate annual reminders for users. Technology to improve uptake of screening programmes is an essential addition, and here the NHS could learn from resource-scarce settings where apps have been critical to educate women about risk factors and effective lifestyle modifications to reduce their risk of T2DM.⁴⁵

The responsibility for follow-up cannot rest solely with GPs, who are already overburdened. Preventative care needs the continued involvement of health visitors and community health workers who have access to women from the immediate postpartum into the early years of a baby's life. Pairing maternal screening with routine childhood immunisations, beyond the 6-week postnatal check, is a validated approach that could safety-net women who are not being monitored but should be, for metabolic disease as well as their mental health.

Research is needed to guide best practice about optimal timing and content of interventions for women from different ethnic and social groups. Currently, little is known about effective strategies for following women who have GDM, pre-eclampsia, hypertension and PMAD because previous research has focused only on extreme endpoints such as myocardial infarction, stroke and admission to psychiatric facilities. Screening for the negative effects of these conditions on women under 50 is difficult because these classical extreme endpoints are not common in that age group. However,

signs of premature cardiovascular pathology are significantly accelerated in these female populations. Premature risk acquisition – such as atherosclerosis, plaque formation and obesity – needs to be proactively detected and managed. For psychiatric conditions, outcomes of interest could include a woman's ongoing use of SSRI medication to treat anxiety and depression beyond the early postpartum, for example, or reliance on substances such as alcohol and drugs to manage her mood. If endpoints of interest are not tailored to the population of interest, an opportunity is missed to detect and address pathological processes and impaired wellbeing before severe and possibly fatal endpoints are reached.

All three of these pathways – screening, opportunistic review and targeted research – rely on the inclusion and involvement of women from disadvantaged and minority groups in the design of future screening programs and interventions. Many healthcare programs suffer from poor uptake and adherence; users must be consulted on how systems can be improved so that they are sensitively tailored to be most helpful. Better accountability for screening targets through the proposed National Pregnancy in Diabetes (NPID) audit and possible future GP incentive schemes are likely to improve screening uptake, but ultimately interventions such as these are only part of expanding our understanding about the effects of pregnancy on health throughout the life course. Robust systems will not only underpin essential collection of data on the long-term effects of obstetric conditions for patients, but also allow for evidence-based care to address this neglected area of women's health.

Before integrated and multidisciplinary pathways of screening, opportunistic review and targeted research can be conceived and implemented, a cognitive and professional shift is needed among the medical specialties. Colleagues in general practice, hospital-based medicine and public health are key to changing the status quo so that clinical encounters in a wide range of specialties consider women's health 'beyond the postpartum', in order to optimise their future health. ■

References

- 1 Williams D. Pregnancy: a stress test for life. *Curr Opin Obstet Gynecol* 2003;15:465–71.
- 2 Sikkema JM, Bruinse HW, Visser GHA, Franx A. Pregnancy complications as a risk factor for metabolic and cardiovascular disease in later life. *Ned Tijdschr Geneesk* 2006;150:898–902.
- 3 Carr DB, Utzschneider KM, Hull RL *et al*. Gestational diabetes mellitus increases the risk of cardiovascular disease in women with a family history of type 2 diabetes. *Diabetes Care* 2006;29:2078–2083.
- 4 Meltzer-Brody S, Stuebe A. The long-term psychiatric and medical prognosis of perinatal mental illness. *Best Pract Res Clin Obstet Gynaecol* 2014;28:49–60.
- 5 Diabetes UK. *Children six times more likely to develop Type 2 diabetes if mother has gestational diabetes*. Diabetes UK, 2015. www.diabetes.org.uk/about_us/news/gestational-diabetes-and-children [Accessed 18 January 2021].
- 6 Public Health England. *Maternity high impact area: Reducing the inequality of outcomes for women from Black, Asian and Minority Ethnic (BAME) communities and their babies*. PHE, 2020. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/942480/Maternity_high_impact_area_6_Reducing_the_inequality_of_outcomes_for_women_from_Black_Asian_and_Minority_Ethnic_BAME_communities_and_their_babies.pdf [Accessed 18 January 2021].
- 7 National Perinatal Epidemiology Unit. *MBRRACE-UK: Saving lives, improving mothers' care 2020: Lessons to inform maternity care from the UK and Ireland confidential enquiries in maternal death and morbidity 2016-18*. NPEU, 2020. www.npeu.ox.ac.uk/assets/

- downloads/mbrace-uk/reports/maternal-report-2020/MBRRACE-UK_Maternal_Report_Dec_2020_v10.pdf [Accessed 18 January 2021].
- 8 Feldman R. *What price safe motherhood? Charging for NHS maternity care in England and its impact on migrant women*. Maternity Action, 2018. Available from <https://maternityaction.org.uk/2018/09/what-price-safe-motherhood/> [Accessed 18 January 2021].
 - 9 NHS England. NHS England. Funding for personal maternity care budgets (PMCBs). www.england.nhs.uk/mat-transformation/mat-pioneers/questions-and-answers-about-maternity-pioneers/pmcb-funding/ [Accessed 18 January 2021].
 - 10 Universal six-week postnatal check for new mothers confirmed in GP contract. *Pulse*, 10 January 2020. www.pulsetoday.co.uk/news/uncategorised/universal-six-week-postnatal-check-for-new-mothers-confirmed-in-gp-contract/ [Accessed 18 January 2021].
 - 11 Shakespeare J, Adams C, deGiorgio S *et al*. We need to improve postnatal care, starting with the maternal six week postnatal check. *BMJ* 2020;368:m252.
 - 12 Womersley K. *Maternal postnatal checks cancelled during Covid-19*. www.bmj.com/content/369/bmj.m2107/r-r-2 [Accessed 18 January 2021].
 - 13 Royal College of General Practitioners. *Managing general practice during a pandemic: RCGP Guidance on workload prioritisation during COVID-19 (Version 5)*. RCGP, 2020. www.dispensingdoctor.org/wp-content/uploads/2020/03/RCGP-workload-prioritisation.pdf [Accessed 18 January 2021].
 - 14 Jones SA, Gopalakrishnan S, Ameh CA *et al*. 'Women and babies are dying but not of Ebola': the effect of the Ebola virus epidemic on the availability, uptake and outcomes of maternal and newborn health services in Sierra Leone. *BMJ Glob Health* 2016;1:e000065.
 - 15 National Institute of Health and Care Excellence. *Diabetes in pregnancy: management from preconception to the postnatal period [NICE Guideline NG3]*. NICE, 2015. www.nice.org.uk/guidance/ng3/ [Accessed 18 January 2021].
 - 16 Walsh S, Mahmoud M, Htun H *et al*. A comparison of follow-up rates of women with gestational diabetes before and after the updated National Institute for Health and Care Excellence guidance advocating routine follow-up, and the association with neighbourhood deprivation. *B J Diabetes* 2019;19:14–8.
 - 17 National Institute of Health and Care Excellence. Quality statement 7: Annual HbA1c testing after gestational diabetes. In: *Diabetes in pregnancy (Quality standard QS109)*. NICE, 2016. www.nice.org.uk/guidance/qs109/chapter/Quality-statement-7-Annual-HbA1c-testing-after-gestational-diabetes [Accessed 18 January 2021].
 - 18 Vouzoulaki E, Khunti K, Abner SC *et al*. Progression to type 2 diabetes in women with a known history of gestational diabetes: systematic review and meta-analysis. *BMJ* 2020;369:m1361.
 - 19 Shah BR, Retnakaran R, Booth GL. Increased risk of cardiovascular disease in young women following gestational diabetes mellitus. *Diabetes Care* 2008;31:1668–9.
 - 20 Kramer CK, Campbell S, Retnakaran R. Gestational diabetes and the risk of cardiovascular disease in women: a systematic review and meta-analysis. *Diabetologia* 2019;62:905–14.
 - 21 Basky T, Erkan K. Cardiovascular system in preeclampsia and beyond. *Hypertension* 2019;73:522–31.
 - 22 Turbeville HR, Sasser JM. Preeclampsia beyond pregnancy: long-term consequences for mother and child. *Am J Physiol Renal Physiol* 2020;318:F1315–26.
 - 23 Walker IV, Cresswell JA. Multiple deprivation and other risk factors for maternal obesity in Portsmouth, UK. *J Public Health (Oxf)* 2019;41:278–86.
 - 24 Cosson E, Bihan H, Reach G *et al*. Psychosocial deprivation in women with gestational diabetes mellitus is associated with poor fetomaternal prognoses: an observational study. *BMJ Open* 2015;5:e007120.
 - 25 Office for National Statistics. Births by parents' country of birth, England and Wales: 2019. ONS, 2020. www.ons.gov.uk/people-populationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/parents-country-of-birth-england-and-wales/2019 [Accessed 18 January 2021].
 - 26 Yuen L, Wong VW. Gestational diabetes mellitus: Challenges for different ethnic groups. *World J Diabetes* 2015;6:1024–32.
 - 27 Siddiqui A, Deneux-Tharoux C, Luton D *et al*. Maternal obesity and severe pre-eclampsia among immigrant women: a mediation analysis. *Scientific Rep* 2020;10:5215.
 - 28 Putnick DL, Sundaram R, Bell EM *et al*. Trajectories of maternal postpartum depressive symptoms. *Pediatrics* 2020;146:e20200857.
 - 29 Howard LM, Molyneaux E, Dennis C-L *et al*. Non-psychotic mental disorders in the perinatal period. *Lancet* 2014;384:1775–88.
 - 30 Vliegen N, Casalin S, Luyten P *et al*. Hospitalization-based treatment for postpartum depressed mothers and their babies: rationale, principles, and preliminary follow-up data. *Psychiatry* 2013;76:150–168.
 - 31 Munk-Olsen T, Laursen TM, Meltzer-Brody S *et al*. Psychiatric disorders with postpartum onset: possible early manifestations of bipolar affective disorders. *Arch Gen Psychiatry* 2012;69:428–34.
 - 32 Curtis MA, Corman H, Noonan K, Reichman NE. Maternal Depression as a Risk Factor for Family Homelessness. *Am J Public Health* 2014;104:1664–70.
 - 33 Allen AM, Prince CB, Dietz PM. Postpartum depressive symptoms and smoking relapse. *Am J Prev Med* 2009;36:9–12.
 - 34 Chapman SLC, Wu L-T. Postpartum substance use and depressive symptoms: a review. *Women Health* 2013;53:479–503.
 - 35 Moore L, Jayaweera H, Redshaw M, Quigley M. Migration, ethnicity and mental health: evidence from mothers participating in the Millennium Cohort Study. *Public Health* 2019;171:66–75.
 - 36 Stevens NR, Heath NM, Lillis TA, McMinn K, Tirone V, Sha'ini M. Examining the effectiveness of a coordinated perinatal mental health care model using an intersectional-feminist perspective. *J Behav Med* 2018;41:627–40.
 - 37 Diabetes Australia. *National Gestational Diabetes Register*. www.ndss.com.au/about-the-ndss/national-gestational-diabetes-register [Accessed 18 January 2021].
 - 38 World Diabetes Foundation. *Supporting Uttar Pradesh state NCD response: Maternal care and diabetes in the public health system*. www.worlddiabetesfoundation.org/projects/india-wdf12-678 [Accessed 18 January 2021].
 - 39 World Diabetes Foundation. *Cameroon National Diabetes and Hypertension Programme*. www.worlddiabetesfoundation.org/projects/cameroon-wdf16-1429, [Accessed 18 January 2021].
 - 40 Bauer NS, Ofner S, Pottenger A *et al*. Follow-up of mothers with suspected postpartum depression from pediatrics clinics. *Front Pediatr* 2017;5:212.
 - 41 Khanlari S, Barnett AM B, Ogbo FA, Eastwood J. Re-examination of perinatal mental health policy frameworks for women signalling distress on the Edinburgh Postnatal Depression Scale (EPDS) completed during their antenatal booking-in consultation: a call for population health intervention. *BMC Pregnancy Childbirth* 2019;19:221.
 - 42 Stephenson LA, Macdonald AJD, Seneviratne G *et al*. Mother and baby units matter: improved outcomes for both. *BJPsych Open* 2018;4:119–25.
 - 43 James Lind Alliance. *The Top 10 research priorities for diabetes in pregnancy*. JLA, 2020. www.jla.nihr.ac.uk/news/the-top-10-research-priorities-for-diabetes-in-pregnancy/26184 [Accessed 18 January 2021].
 - 44 National Institute of Health and Care Excellence. *Hypertension in pregnancy: diagnosis and management. NICE guideline [NG133]*. NICE, 2019. www.nice.org.uk/guidance/ng133/ [Accessed 18 January 2021].
 - 45 Nagraj S, Kennedy SH, Norton R *et al*. Cardiometabolic risk factors in pregnancy and implications for long-term health: identifying the research priorities for low-resource settings. *Front Cardiovasc Med* 2020;7:40.

Address for correspondence: Dr Kate Womersley, The George Institute, Imperial College London, 84 Wood Lane, London W12 0BZ
Email: v1kwomer@ed.ac.uk