Best Practice & Research Clinical Obstetrics and Gynaecology 29 (2015) 1–4

Contents lists available at ScienceDirect

Best Practice & Research Clinical Obstetrics and Gynaecology

journal homepage: www.elsevier.com/locate/bpobgyn

Preface

Preface Issue 29.1

Public policies and health promotion actions for the prevention and control of non-communicable diseases (NCDs) focus on healthy lifestyle and are also aimed at reducing risk factors associated with NCDs, leading to joint efforts and coordinated approaches in combating the global burden of NCDs. However, the NCD field does not *directly* address maternal health, but the maternal health field has just begun to establish *its place* in the global awareness of NCDs [1].

This supplement to the *Best Practice & Research in Clinical Obstetrics & Gynecology* represents the ongoing maternal–fetal medicine (MFM) research and interventions aimed at addressing the global epidemic of NCDs. Early detection and timely treatment enable the prevention and control of NCDs, through improved reproductive, maternal, neonatal, and child health care. These interventions begin at preconception and continue through antenatal and postnatal care. Specific research presented in this issue is focused on the origins of NCDs in utero, maternal nutrition, control of diabetes, gestational diabetes mellitus (GDM), and surgical and lifestyle interventions in obesity.

Unfortunately, the NCD global epidemic was not yet identified in the Millennium Development Goals (MDGs). However, they did shift focus to late gestation, birth, and infancy as associated with substantial mortality and morbidity. Subsequently, in the past decade, we have achieved a considerable decrease in maternal and neonatal mortality rates, while maternal morbidity is still high. Unfortunately, this narrow short-term biomedical focus has failed to address the root causes and social determinants; thus, the vulnerable population of at-risk mothers and their offspring in many low- and middle-income countries still have the highest risk of NCDs later in life [4]. The post-MDG-2015 goals will be focused on sustainability: understanding the relationship between global health and social and economic development [3]. High-impact interventions are an excellent financial investment, which may reduce the need for more expensive treatments, thus being applicable in countries/family situations with different levels of resources [1]. Ensuring a healthy pregnancy and disease-free early childhood is the most effective means of attaining the best future health and preventing NCDs [4]. Leveraging health capital, even before conception, promotes resilience and reduces later dependency on health care [3].

Evidence of the origins of NCDs in utero has laid the foundation for current research on the developmental origins of health and disease (DOHaD). Maternal health directly impacts neonatal life and the offspring's lifelong risk and susceptibility to disease, in particular, obesity, heart disease, and diabetes. Prenatal and early-life development through epigenetic programming influences the risks of NCDs in later life.

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http://dx.doi.org/10.1016/j.bpobgyn.2014.09.005

Biological and epigenetic processes in utero and in early childhood, influenced by a wide range of maternal and environmental factors, provide potentially valuable early biomarkers of NCD risk. Thus, research efforts are focused on the early identification of these biomarkers and potential methods for monitoring the efficacy of interventions [3].

Even in a subtly unbalanced maternal nutrition environment, normative adaptive developmental plasticity occurs, inducing epigenetic changes in utero reflected in a greater metabolic disease risk in the offspring. The greater the imbalance the higher the consequential risks. Prenatal malnutrition and low birth weight create a predisposition to obesity, high blood pressure, heart disease, and diabetes later in life, while maternal obesity and GDM expose the fetus and newborn to an environment that induces responses creating a greater risk of subsequent obesity and insulin resistance.

Maternal obesity and GDM, "diabesity," via the feto-placental dialogue increase the likelihood of increased fat, or the deposition thereof, in the neonate [2], while genetic and epigenetic long-term effects of GDM impact future generations, specifically the female fetus during her future pregnancies [8]. Thus, the rapid rise in the global prevalence of maternal obesity and excessive weight gain during pregnancy also has intergenerational consequences.

As the onset age for diabetes decreases, and marital age and pregnancy age increase consequently, even more women will become pregnant with preexisting diabetes. While several markers (i.e., age, race/ethnicity, body mass index (BMI), family history of type 2 diabetes or GDM, etc.) are used to clinically identify women at a high risk of GDM, these makers fail to identify more than half of the women with GDM. Therefore, universal screening for hyperglycemia during pregnancy must become standard practice [4].

The primary components of the metabolic syndrome (diabetes mellitus and obesity), when properly treated prior to pregnancy, will prevent long-term health risks for the mother, her children, and the next generations by providing in utero primary prevention of NCDs. The goals of preconceptional care are to improve maternal health and perinatal outcomes, and to decrease adverse pregnancy outcomes. These can be achieved with *parental* health education, risk assessment, and appropriate interventions with proven efficacy. These interventions can also improve the general health of women in their reproductive years and beyond. This preconceptional counseling should be recognized and provided by a *multidisciplinary* team who initiate and make the appropriate referrals [5].

Preconceptional care decreases diabetes-related complications and is associated with improved outcome for later gestational complications (i.e., preterm delivery, macrosomia, and preeclampsia). Preconceptional care for diabetic women is proven to be cost-effective, yet still only 50% of diabetic women are estimated to undergo appropriate preconceptional glycemic control. The established critical time to achieve glycemic control is prior to 7 weeks of gestation, at which time organogenesis occurs. Our goal is to make preconceptional care affordable, accessible, and routine for all women in their reproductive years [5].

Prepregnancy obesity is genetically and environmentally inherited by the offspring; children born to obese women are more likely to be obese themselves and more likely to suffer from diabetes, hypertension, and the full spectrum of the metabolic syndrome – both at childhood and as adults [5].

The global obesity epidemic has brought forth extensive guidelines worldwide for obesity and pregnancy. Maternal obesity, as a high-risk pregnancy, should be closely monitored and treated by a *multidisciplinary* team, whose goal is to see the mother through her pregnancy and deliver a healthy child. This includes consultation in the third trimester regarding the mode of delivery and anesthesia. The patient should be kept informed and actively involved in the treatment. Thus, the ideal time for intervention is before conception and the primary care services should ensure that all women of childbearing age have consultation on how to optimize their weight prior to pregnancy [7]. Specific prepregnancy consultations to all obese women should include recommendations regarding weight loss prior to conception, while discussing potential complications as a high-risk pregnancy [7]. The consensus among all researchers is the recommendation that lifestyle changes, including both exercise and changes in caloric intake, can be taught and should be encouraged in all pregnant women, especially those who are overweight and obese, in order to prevent GDM and the consequences of GDM on the mother, the fetus, and the newborn.