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The Relationship Between Obesity and Pregnancy

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ABSTRACT

Pregnancy outcomes for both the mother and the foetus are greatly impacted by obesity, a growing global health concern. With an emphasis on the physiological, metabolic, and obstetric ramifications, this study examines the intricate relationship between obesity and pregnancy. Preeclampsia, hypertensive disorders, gestational diabetes, and caesarean delivery are all linked to maternal obesity. Additionally, it can have a detrimental effect on foetal development, resulting in complications like preterm birth, macrosomia, and long-term metabolic disorders in the offspring. The study also emphasises the difficulties in controlling obesity during pregnancy and the significance of weight-loss plans, dietary advice, and preconception counselling. It is essential to comprehend this relationship to enhance prenatal care and lessen unfavourable outcomes for both mother and child.

Keywords: Obesity, pregnancy, maternal health, fetal outcomes, gestational diabetes, preeclampsia.

1. Introduction

Obesity in pregnancy continues to be an area of increasing interest to public health, especially given the increasing rates of obesity among women of childbearing age. Maternal obesity is believed to have a significant relationship with pregnancy outcomes, yet our understanding of how it affects different aspects of pregnancy is poor. This essay will focus on obstetric outcomes rather than gestational complications of maternal obesity. To frame the issue of maternal obesity and pregnancy, this essay will begin by discussing the historical context of maternal obesity in pregnancy. It will then explore current rates of obesity in pregnant women, where they are, and the complicating factors that obesity may play in pregnancy. Finally, this essay will discuss definitions and epidemiological trends [1- 5].

Obesity in pregnancy is a growing public health issue: the annual prevalence of maternal obesity in the UK is increasing, as is the mean pre-pregnancy BMI of pregnant women. Women from a lower socioeconomic group are significantly more likely to be overweight or obese at the time of conception, and this social divide is widening. A number of potential explanations exist for these socioeconomic differences, including differing dietary habits, physical activity, stress, and mental health. Although more requires investigation, such social disparities should be taken into account by restorative strategies. Before we continue, an explanation of key epidemiological terms is in order. Prepregnancy BMI refers to the weight of the woman prior to conception, usually measured as a combination of weight and height in order to calculate a BMI [6-10].

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1.1. Background and Significance

Recent decades have seen an increase in both the prevalence of maternal obesity and rates of obesity in women of childbearing age. Factors associated with this include greater calorie availability and a sedentary lifestyle that includes less domestic and agricultural work, while people in more advanced countries can use cars and more advanced technology in their daily working life. Other contributing factors are low socioeconomic status and an abundance of junk food, while it is estimated that our environment is responsible for about 50–60% of the increased obesity rates [11-14].

It is now understood that the environments experienced by our ancestors have transitioned significantly from our current modes of living. In several countries, crimes are rare and consequently, children have the freedom to travel short distances to local parks, pools, and sporting and entertainment venues. As a result of this, an increasing number of preschool children are not able to swim and therefore have a greater risk of dying from drowning. Maternal obesity is a health challenge in modern society. It is a significant predisposing factor for many life-threatening health conditions and significantly increases maternal morbidity in pregnancy. This review focuses on the difficulties of contemporary pregnancy and discusses how unhealthy maternal parameters may influence pregnancy outcomes. The review clearly shows that understanding pregnant women's health is of incredible importance if we wish to limit adverse events for the unborn baby and the adult they become, as these factors are inevitably linked. The events of fetal life affect the development of the adult more profoundly, or lastingly, than do the events of adult life. In today's society, obesity is a growing concern for individuals and communities in so-called advanced countries. Data reveal that a significant proportion of women of reproductive age are approximately ¾ obese or overweight, and many of these women are in their childbearing years [5, 15- 18].

It seems feasible, therefore, that one mechanism of fetal adaptation to these factors would later prepare the body for a lifetime of obesity. The increasing obesity epidemic is largely responsible for the expected major public health and financial burden in the future, because obesity increases the likelihood of an individual developing a variety of conditions, such as type 2 diabetes, cancers, and cardiovascular diseases. Recent government strategies across the globe have aimed to prevent obesity and increase health and life expectancy through improved lifestyle counseling and education, primarily in adults. Although it appears to be an excellent priority for health services and governments, the other side of the coin is the idea that perhaps the fetus is making the best of the circumstances it might experience outside the uterus. When a woman is pregnant under suboptimal health conditions, one can argue that the pre-programmed conceptus is just adapting with epigenetically driven modifications, preparing it for a future of less available energy [19-22].

2. Prevalence of Obesity in Pregnant Women

The shift observed in the prevalence rates of obesity cannot be overlooked, nor can the impact of obesity on pregnancy. Epidemiological studies show obesity rates in pregnant women that are consistently on the rise. Poland has seen an almost two-fold increase in their rates of obese pregnant women from 2003 to 2015. The correlation between the rate of obesity and pre-pregnancy rates further demonstrates the rise and consequences of obesity prevalence. Pre-existing health conditions, also on the rise, now affect over 50% of pregnant women. The survey respondents showed that 15% of pregnant women belong to the age group, 10% belong to the socio-economic status, and 40% to the ethnic subpopulations at greater risk for obesity. In another survey, approximately 15% and 7% of

the pregnant women were morbidly obese and super morbidly obese, respectively [23- 27].

Factors contributing to obesity in pregnant women are well known and include maternal demographics like age, ethnicity, and socio-economic determinants. Although finding directly comparable statistics is challenging, it is imperative to note disparities in the prevalence within a single nation. There is clear evidence of global shifts in obesity prevalence in the last two decades. Countries such as the UK, the US, Australia, and parts of Asia are all experiencing an increase in the number of pregnant overweight and obese women. These high rates alone have been enough to motivate the development of and the need for new healthcare systems to support those women classified as 'unhealthy fat pregnant' in their journey. Between three and 34% of patients who qualify as morbidly obese will qualify with an obesity-attributable diagnosis. Obesity has been proven to increase the risk of developing various chronic and pregnancy-related conditions. Any targeted interventions in the pregnancy population can clearly look at the influence of obesity in these index pregnancy patients, which not only improves pregnancy and perinatal outcomes but also the healthcare-associated cost [28- 32].

3. Impact of Maternal Obesity on Pregnancy Outcomes

Maternal obesity is associated with a range of negative pregnancy outcomes. Some of these outcomes occur during the antenatal period, and others take the form of chronic disease in the offspring or mother. Potential pregnancy complications in obese women include a higher risk of gestational diabetes, manifesting as an increase in insulin resistance and other metabolic dysregulations shortly before or during pregnancy. Higher incidences of hypertensive disorders, such as preeclampsia and gestational hypertension, are also documented in obese women. Preeclampsia is currently defined as new-onset hypertension and new-onset pregnancy proteinuria. Preeclampsia cases with no proteinuria but with severe hypertension and severe features are also diagnosed if newly diagnosed thrombocytopenia, renal insufficiency, impaired liver function, pulmonary edema, or the new development of cerebral or visual disturbances occur [3, 4,14,33].

Given the increasing prevalence of obesity among women of reproductive age and the links between maternal obesity and the incidence of gestational diabetes, hypertensive disorders in pregnancy, increased likelihood of undergoing a cesarean section, and fetal macrosomia, the implications of maternal obesity are wide-reaching and place additional demands on prenatal care and, to a lesser extent, postnatal care as well. Observational studies have also shown a potential link between maternal obesity and negative birth outcomes, including an association between very severe maternal obesity and an increased prevalence of large-for-gestational-age infants, and the proportionally increased risk of simultaneous small-for-gestational-age infants as well [34- 36].

3.1. Gestational Diabetes

This subsection is dedicated to gestational diabetes. It has been starkly associated with maternal obesity, especially if mediated through disparate metabolic pathways in South Indian women. A surrogate definition of gestational diabetes is diabetes that is recognized in the pregnant state and is of sufficient severity to merit intervention. All of the commonly occurring forms of diabetes have a common pathophysiologic association with the state of obesity, but may involve different molecular pathways. The risk of gestational diabetes is proportional to increasing maternal obesity. It is recognized that both genetic and environmental factors, particularly diet and physical activity levels, may play a role. Women who develop type 2 diabetes in later life, as well as their offspring, are

prone to central obesity [37- 41].

Gestational diabetes can be associated with several adverse effects on the mother and fetus. The offspring of mothers with gestational diabetes have an increased risk of neonatal or perinatal mortality, macrosomia, hypoglycemia, and hyperbilirubinemia. While the presence of macrosomia may be explained by other factors such as parity and sex, women with gestational diabetes are also at increased risk of having a preterm delivery. What really adds to the clinical relevance of gestational diabetes in obese women is that they are at risk of persistent glucose intolerance in the postpartum period and are more likely to develop permanent diabetes. The management of gestational diabetes should be based on the severity of hyperglycemia, even if found to be relatively mild, because of the potential longer-term risk to the mother. To decrease the negative effects of gestational diabetes, prenatal screening is crucial. Once diagnosed, care should be modified to include earlier and more aggressive intervention, especially with cost-effective approaches such as diet, exercise, and the possible use of medication in obese women [42- 46].

3.2. Hypertensive Disorders

Hypertensive disorder in pregnancy occurs in roughly 5-14% of pregnancies and includes chronic hypertension, gestational hypertension, preeclampsia, and white coat hypertension. Based on the time of onset of hypertension and the time of resolution of hypertension after pregnancy, we primarily group hypertension into two groups: preeclampsia and gestational hypertension. Preeclampsia is further subdivided into preeclampsia with severe features and preterm and term preeclampsia. Women with gestational hypertension may ultimately develop a preeclampsia-like syndrome, but efforts to predict these outcomes remain difficult. The placenta of a woman with obesity has an exaggerated inflammatory response and increased dysregulation in pro-/anti-inflammatory cytokines, leptin, and insulin resistance [47- 52].

Chronic obesity may predispose women to develop hypertensive disorders such as chronic hypertension and superimposed preeclampsia. We know that hypertensive disorders in pregnancy are more common in women with obesity, and also that as the BMI increases, so does the risk. Pregnant women who are either overweight or obese have higher blood pressure levels when compared to those with a normal BMI. There is evidence showing that obesity may also increase blood pressure levels during pregnancy via increased plasma volume expansion and cardiac output. Women with obesity have a fourfold increased risk for preeclampsia compared to women with a normal BMI and an increased risk of gestational hypertension. Risk factors for preeclampsia in obese pregnant women include not just the body mass index, but also weight gain, and some have shown impaired insulin signaling to be associated with preeclampsia in obese women. The presence of chronic hypertension before pregnancy also adds to increased blood pressure in pregnancy, suggesting that it is not simply gestational factors alone that result in increased blood pressure. Preeclampsia appears to result in significant risk factors for maternal death; a percentage of women died secondary to preeclampsia in the cohort. It has a significantly increased risk for gestational diabetes mellitus and postpartum weight gain and has a strong link with metabolic syndrome. It is imperative in patients with obesity and pregnancy to monitor blood pressure with caution throughout pregnancy and to appropriately treat hypertension. Lifestyle interventions and medical treatment in hypertensive disorders in pregnancy are varied but include medications for severe preeclampsia and anti-hemorrhage prevention in chronic hypertension. Early interventions like daily aspirin have been used for long-term placental health and

preeclampsia prevention. The use of intermittent pharmacologic treatment for severe gestational hypertension based on blood pressure cut-off is varied throughout the world [53- 58].

3.3. Cesarean Delivery

Cesarean delivery is the most commonly performed surgical procedure in the United States. The likelihood of cesarean delivery increases with increasing maternal obesity, with obese women having a 1.5-fold increased risk of cesarean as compared to normal-weight women. This is contributed to by the increased likelihood of an obese woman having an indication for a cesarean delivery, such as failed induction or labor arrest due to cephalo-pelvic disproportion, or due to concerns for labor-indicated and non-reassuring fetal status that may prompt a decision for cesarean. Heavier women have an increased likelihood of fetal macrosomia as compared to normal-weight women, serving as an indication for cesarean when the estimated fetal weight approaches 5000 g. Maternal obesity likely also has physiologic effects in the induction of labor and the progression of labor, further contributing to observed cesarean delivery rates in this population [3,14, 59- 62].

The performance of cesarean delivery poses increased risks in women with maternal obesity, relating to surgical considerations as well as the potential for existing comorbidities. There are multiple factors to evaluate and discuss when addressing this increasing trend of obstetric surgical intervention in the population of women with a BMI of 30 or 35 and above. Labor progression in obese women poses significant challenges, and the cervix is more likely to be unfavorable, which reduces the chance of proceeding to an induction of labor. Therefore, the high cesarean rates may represent an overlap in both maternal and fetal indications. Obstetric management guidelines regarding the induction of labor in obese women differ among international obstetric societies, but with a tendency to lower the rate of induced labor. One strength of any health professional's multidisciplinary approach is regular data collection and timely review, which may contribute to early recognition of women at risk of poor surgical outcomes and reduce the rate of injury. Reducing the high cesarean rates may involve earlier assessment of labor outcomes from the first trimester and more physician training and education in delivery before surgical intervention. The multidisciplinary approach may also improve the ability to assess the laboring woman and her fetus and achieve optimal timing for a safe and low cesarean section rate, not waiting until the induction of labor commences and problems arise. In shaping a multidisciplinary model of care, it is important to examine the benefits of strategies for reducing both primary and repeat cesarean sections. The challenge remains one of outlining methods for increased vaginal births, both with and without cesarean section, and exploring the potential for decreasing the rate of indicated primary cesarean sections. Reducing rates of primary, repeat, and emergency cesarean sections, therefore, requires a successful approach at reducing risk factors for antepartum and intrapartum complications [63- 68].

3.4. Fetal Macrosomia

3.4.1. Definition

Fetal macrosomia can be defined as an excessive fetal body weight following a gestational age of at least 40 weeks, often between the 95th and 97th percentiles or at least 4000 to 4500 g, along with a heavy fetal abdominal circumference according to gestational age [69].

3.4.2. Prevalence

Fetal macrosomia is more frequently observed in the offspring of obese and diabetic women. It has been shown that obese women are more than twice as likely to give birth to a baby weighing 4000 g or more, compared to normal-weight women.

Additionally, large-for-gestational-age occurrences were elevated fivefold in women who were obese and suffered from gestational diabetes, compared to women of normal weight. High glucose values, independent of type 1 and type 2 diabetes, are significantly associated with relative lymphocyte count. Furthermore, the prevalence increased with the increase in maternal body weight. In summary, the updated odds ratios were 1.58, 5.72, and 19.72 for the consequences of overweight, obesity, and severe obesity, respectively. As a result, the odds were ten times higher in obese women than in overweight women without impairment. Pregnant women with low birth rates had exceedingly high odds of large-for-gestational-age births due to a five times higher probability [70].

3.4.3. Complications

Fetal macrosomia is a potential risk factor for birth traumas. In addition to being more frequent in mothers with higher body weight and height, macrosomia is also associated with an elevated risk of C-section. For example, obesity-induced excessive weight gain during pregnancy was significantly and positively associated with an elevated C-section rate in women. Since birth traumas and shoulder dystocia are particularly concerned with macrosomia, this factor should also be suspected in pregnancies and childbirth characterized by these complications [71].

3.4.4. Mechanisms

There are several possible mechanisms through which maternal obesity can lead to the development of macrosomia in utero: hyperglycemia and insulin resistance can lead to severe hyperinsulinemia in the fetus; excessive lipids and amino acids can be transferred across the placenta from an obese mother to the fetus; abnormal nutrition and growth patterns are assumed to be associated with increased fat accumulation, which already occurs prenatally; endocrine abnormalities such as high levels of non-esterified fatty acids, abnormal catecholamine excess, or differences in the leptin-adiponectin axis can exert long-term programming through inappropriate responses to insults. The activation of certain individual abnormalities may vary between neonates [69].

3.4.5. Long-Term Implications

Fetal macrosomia, which can also develop from obesity, seems to be associated with other long-term outcomes. Here, maternal obesity is an independent risk factor for obesity and metabolic syndrome in the offspring in the first decades of life. However, according to general data, being male, tall, or having a high birth weight has been associated with a higher risk of obesity, metabolic diseases, and other chronic diseases in childhood and adolescence as well as later in life. High weight gain further increases this risk in relation to the individual male neonate [70].

3.4.6. Obstetric Management

Therefore, serial ultrasound scans for the early detection of excessive fetal growth should be carried out in women with a pre-morbid body weight of at least 30 kg/m² and diabetes mellitus type 1 or type 2. Macrosomia can be managed during labor by either induction or a planned C-section, although elective induction is also associated with the avoidance of long-term risks for the mother [72].

4. Management and Interventions for Obese Pregnant Women

Management and care for the obese pregnant woman should be individualized. Programs should be tailored to the woman experiencing the pregnancy and may include the use of perinatal caregivers, who will understand and implement her individualized care. Nutrition counseling is an essential element of care; dietary counseling does not follow the conventional template. Medical nutrition therapy for pregnant women [73- 77].

Illuminates how to avoid hunger and implement

healthful eating. Her neonate will be born, and more vitally, their energy storage is limited. Pediatric grievances are related to rapid in utero weight gain. Postpartum care can begin with breastfeeding initiation and educational interventions that encourage obese mothers to breastfeed. Pediatric specialties that promote nutrition interventions with circumspection to the playful neonate failed to mention formula choices. Obesity in pregnancy represents an infusion of nutrition care between obstetrics and pediatrics, much like diabetes care. Pregnant women need lessons on food buying in addition to food preparation. A care model should provide support in areas such as grocery shopping, locating appropriate local social support systems, and the provision of respite care for the parent of a new baby [78- 80].

Obstetricians are encouraged to provide individualized counseling for all women to meet the dietary needs of pregnancy, focusing on advising on the limits of food for mothers and options for unplanned calories. Treatment decisions in pregnancy must place the well-being of the woman and the fetus first, and obesity intervention should be secondary in importance. Results highlight the need for education and resource disparity in perspective. Women need access to available services that encourage pre- and triple medication use, emphasizing the last treatment option, which is a properly supervised diet and weight loss program before pregnancy. Pregnant women and obese women seeking to become pregnant should be provided access to educational materials, programs, or services that include clauses for and promote the implementation of healthy lifestyles, including good nutrition, exercise, and a moderate-fat diet. Intervention for body mass index reduction with the health promotion strategy in a community of women ages 21-39 resulted in a suggestion for a policy concerning the availability and use of birth control by women. Screening or surveillance of pregnant and pre-pregnant women for weight fluctuation is not broadly proposed [81-83]

4.1. Nutritional Counseling

Nutritional counseling is important in the care of the pregnant obese woman. A personalized dietary plan can be developed for the woman once a thorough nutrition assessment has been completed that accounts for pregnancy and nutrition needs at an individual's current nutritional status, including planning based on estimated caloric needs in pregnancy and ensuring adequate nutrient requirements are met. As the benefits of a balanced diet can outweigh any risks associated with maternal obesity, ensuring that women are educated on healthy eating can be important in reducing the development of risks associated with maternal obesity. The need for increased calorie and nutrient requirements during pregnancy indicates that nutritional guidance should be a cornerstone of clinical care for the pregnant woman. The usage of weight management techniques can also be taught to women with obesity to help reduce the risk of excessive gestational weight gain, and women have been found to respond well to education surrounding weight management. However, it is important to keep in mind that gestational weight gain in pregnancy remains a relative fat mass gain, and the emphasis should remain on balancing nutrient requirements rather than establishing a woman's absolute body weight [73,77, 84- 86].

Studies have shown that proper prenatal nutritional care and support can lead to reduced gestational weight gain without causing an absolute loss of weight in pregnancy, which reduces the risk of maternal and infant complications. Effective nutritional education of pregnant women can result in improvements in dietary intake and weight control. Nutritional counseling and classroom-based nutrition education regarding healthy eating for both preconception and pregnant

women by public health care providers and dietitians has been shown to be effective in addressing short-term maternal weight reduction, though drawbacks include high attrition rates. Challenges to providing healthy eating education and weight reduction support include a lack of availability of program spaces, support workers, and cost. Furthermore, pregnant women face additional barriers to attaining this education, such as limited access to healthcare professionals, including dietitians. Women of low socioeconomic status leading inactive lifestyles also did not respond well to a structured classroom intervention. One randomized controlled trial found that a 2-day, one-on-one intervention with a registered dietitian was not effective in reducing gestational weight gain in healthy women, providing further evidence that only structured interventions in high-risk women will reduce excessive gestational weight gain. However, preconceptional weight reduction and nutritional and physical activity education can improve outcomes for women with obesity in low-risk pregnancy care. Management of gestational weight gain should vary according to individual risk factors [75,87- 91].

4.2. Physical Activity Recommendations

Physical activity

Appropriate physical activity is one of the most important things that can be done to improve outcomes for obese pregnant women. Physically active women, regardless of body mass index, tend to gain less weight in pregnancy, maintain better maternal fitness levels, and have better overall health status, including lower rates of complications during labor and delivery. Regular exercise, provided that there are no contraindications, is recommended among the obese pregnant population. Whether or not a pregnant woman was exercising before she became pregnant, it is quite safe to start an exercise program for most pregnant women. Although exact duration and frequency have not been studied, doing some physical activity each day is ideal for health and pregnancy outcomes [75, 92- 96].

When considering appropriate exercises for this population, healthcare providers can simply tell obese women to go for a walk, since walking is the most popular form of physical activity undertaken by women before, during, and following pregnancy. Low-impact activities, such as walking, stationary pedaling, taking the stairs, and gardening, are good recommendations. For the remaining few who have been inactive and have contraindications to physical activity, moderate physical activity is recommended. Prenatal patients should be advised to perform only those activities that feel comfortable while doing them. Pregnant women should be able to talk while exercising; if they cannot speak while exercising, they are exercising too vigorously. Most women can continue their usual activities without limitation throughout pregnancy. Based on maternal comfort, hydration status, history of falling, and other factors, recommended activities can be updated at each prenatal visit [94,97- 100].

4.3. Monitoring and Surveillance

As patients complicated by obesity are at increased risk for a variety of complications during their pregnancy and delivery, monitoring and surveillance are crucial. Appropriate surveillance targets of both maternal and fetal health should be available locally wherever possible, and the results of these should be reviewed. Surveillance and close monitoring allow early identification of end-organ dysfunction in pregnancy as well as pregnancy complications, and allow for appropriate and timely intervention. Patients complicated by obesity should be offered technologically advanced and multi-disciplinary antenatal surveillance, including adequate non-invasive and invasive testing. Follow-up of pregnancy, particularly in the third trimester, should be performed in our center and

more often in selected cases. Engaging obese women in surveillance strategies will require their understanding of the meaning of the disease and knowledge of the potential complications. Both physical and virtual contacts with their caregiver should be frequent and continuous in order to guarantee prompt medical assistance when necessary and to optimize the cost-effectiveness for the referring center. A thorough plan for counseling the patient, including preconception and pregnancy counseling and care with regard to the worst obstetric outcomes, should be elaborated and individualized. A joint hospital multi-disciplinary team approach for the surveillance of pregnant obese women will allow the sharing of organizational, technical, cultural, and scientific resources. Monitoring of pregnancy in obese women includes basic strategies such as early diagnosis of pregnancy, accurate gestational dating by ultrasound, and appropriately timed blood tests. Importantly, progressive monitoring strategies should also underpin organized screening and management of pregnancy complications, which is optimal with patient-centered, multi-disciplinary team care. Drug therapy, where suitable for the mother, should be one part of the intervention, but the greatest benefit is likely to come from self-management by the individual with overweight or obesity. Thus, pregnancy-monitoring information is important to share with the women themselves, rather than merely with clinicians alone[2,4,42, 75, 101-103].

5. Conclusion and Future Directions

This narrative provides extensive support for the contention that obesity is associated with a range of problematic pregnancy outcomes. Such findings are associated with both short- and long-term implications for maternal and infant health, further supporting the notion that tackling maternal obesity would be advantageous both within and beyond the context of an individual pregnancy. We have discussed the need for an interdisciplinary approach to obesity care if we wish to achieve sustainable and cost-effective improvements in health. However, translating midwifery public health guidelines supported behaviors into local practice remains challenging. This may in part reflect the findings of this narrative, which suggest that healthcare providers do not necessarily feel that the evidence in support of intervening on obesity in pregnancy is strong. Efforts to reduce obesity in pregnancy would therefore seem to be a wise investment from a public health perspective and one that is potentially bound up with cost-effectiveness within the relatively short timelines associated with an average hospital stay, but also in the longer-term reduction of conditions such as type 2 diabetes and an increase in good physical and mental maternal and child health. Looking forward, it is important that obesity in pregnancy intervention work continues to be conducted in a methodologically rigorous way in order to build the evidence base further. Our approach works at preventing obesity in pregnancy rather than treating it once established, which may increase the chance of benefit. Ensuring changes are in line with what is recommended in national and international guidelines and that interventions are as evidence-based and replicable as possible will also ensure that these interventions have credibility among the scientific and wider communities. Clearly, however, work must be undertaken in parallel to address those women for whom pregnancy is a time during which preventative health care messages have not been heeded. In both cases, it is important that stakeholders from across the public and private sectors come together in order to align policy and practice to deliver cohesive approaches across the life course [2, 75, 101- 103].

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