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Brief report

Weight gain during pregnancy in women with gestational diabetes: How little is too little?

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ABSTRACT

We evaluated maternal weight gain in women with gestational diabetes, and assessed their compliance with the Institute of Medicine (IOM) weight gain targets. Only 28% of women achieved the IOM targets, with 40% gaining inadequate weight. Those who gained inadequate weight did not suffer any increase in adverse pregnancy outcomes.

The Institute of Medicine (IOM) guideline in 2009 advocated weight gain targets during pregnancy based on the women's pre-pregnant body mass index (BMI) [1]. The essence of this guideline was that women with higher pre-pregnant BMI should gain less weight, while those who were underweight could put on more weight during their pregnancies. This guideline was intended for use in the United States (US) and was appropriate for different ethnic groups. However the applicability of these targets to women with gestational diabetes mellitus (GDM) awaits validation, even though studies outside US had used IOM targets in assessing weight gain for women with GDM [2–4].

The aim of this study was to determine the proportion of women with GDM who achieved IOM weight gain targets during pregnancy. We also assessed whether failure to comply with these targets resulted in adverse pregnancy outcomes.

1. Methods

We conducted a retrospective review of women with GDM who attended diabetes service at Liverpool Hospital from 2009 to 2012. We service women who came from south-east Asia, middle-east, south Asia, Pacific Islands and Europe. Only women with singleton pregnancies were included. The women's demographic data and birth outcomes were documented. Large-for-gestation age (LGA) was defined as neonates with birth-weight >90th percentile, while small-for-gestation age (SGA) was defined as neonates with birth-weight <10th percentile. The birth-weight percentile was derived from a percentile calculator (available on gestation.net), which takes into account maternal pre-pregnant weight, height and ethnicity.

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All women with GDM received medial nutritional therapy (MNT) from an accredited dietitian with emphasis on fulfillment of nutritional requirements for pregnancy. The women were advised not to over-restrict their carbohydrate intake. The MNT at our institution was not specifically designed to achieve IOM weight gain targets.

One-way analysis of variance (ANOVA) was used to compare the proportion of women with excess (or inadequate) gestational weight gain across different BMI groups. Chi-Square test and *t*-test were used to assess difference in a parameter between 2 groups. Linear regression analysis was used to assess correlation between gestational weight gain and other variables. A *p*-value <0.05 was considered statistically significant.

2. Results

Between 2009 and 2012, there were 1457 women with GDM on our database, and 881 had weight data available. There was no difference in age, BMI and ethnic background between women with or without weight data. Amongst these 881 women, 19.5% had previous GDM and only 20.1% were from Anglo-European background.

Using IOM targets as reference, 32% of women gained excessive weight, but 40% of women gained inadequate weight. Those in higher BMI groups were more likely to gain excessive weight (Fig. 1) (ANOVA, $p < 0.001$). In contrast, a greater proportion of women in the lower BMI groups failed to reach the IOM weight gain target (ANOVA, $p < 0.001$).

Apart from BMI, gestational weight gain was negatively correlated with maternal age ($R = 0.19$, $p < 0.001$) and was lower in women with previous GDM (9.3 ± 7.1 vs 10.7 ± 6.2 kg, $p = 0.006$). There was no association between gestational weight gain and ethnicity, smoking history or insulin therapy.

In terms of pregnancy outcomes, 13.3% of neonates in our cohort were LGA and 10.1% SGA. For women who gained weight in excess of IOM targets, the risk of LGA was higher than those who achieved target weight gain (21.1% versus 9.4%, $p < 0.001$). This difference persisted after correcting for maternal age, parity, need for insulin therapy and pre-pregnant BMI. Furthermore, the risk of neonatal hypoglycaemia requiring treatment was higher (39.4 versus 28.8%, $p = 0.012$). There was no difference in other outcomes such as need for intensive care support or peri-natal death.

For women whose weight gain was below IOM targets, the risk of SGA was not significantly different to those who achieved IOM targets (12.1% versus 14.4%, $p = 0.516$). There was also no difference in other neonatal outcomes.

3. Discussion

Currently there are no weight gain guidelines specific for women with GDM, but IOM targets are often used as reference [2–6]. We found that achieving maternal weight gain in accordance to IOM targets was difficult, with only 28% of our cohort achieving those targets. This finding is comparable to another study where only 37% of women with GDM achieved IOM target weight gain [4]. We observed

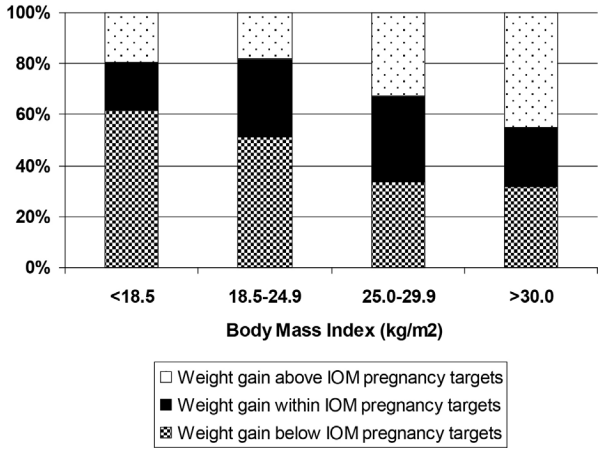

Fig. 1 – Ability of women with gestational diabetes to achieve the weight gain targets set out by the Institute of Medicine (IOM) according to their pre-pregnant body mass index (BMI): BMI < 18.5: 12.7–18.2 kg; BMI 18.5–24.9: 11.4–15.9 kg; BMI 25–29.9: 6.8–11.4 kg; BMI >30: 5.0–9.1 kg [1]. ANOVA, $p < 0.001$ for proportion of women with weight gain above IOM targets across BMI groups; ANOVA, $p < 0.001$ for proportion of women with weight gain below IOM targets across BMI groups.

that women in the lower BMI groups often failed to gain adequate weight while those with higher BMI were prone to gaining too much weight. Our results were consistent with other studies that weight gain in excess of IOM targets during pregnancy was a strong predictor for LGA [2,5,6]. However, we showed that that weight gain below the IOM targets did not increase the risk of SGA or other adverse pregnancy outcomes.

We were surprised that 40% of women failed to gain the IOM recommended weight during pregnancy. Following diagnosis of GDM, intervention from the diabetes team may reduce the degree of weight gain in these women. However, inadequate weight gain may imply maternal undernourishment, which could result in fetal growth restriction [7]. Some women with GDM may over-restrict their carbohydrate intake to achieve good glycaemic control, but women could have a nutritionally balanced diet yet failed to gain the amount of weight recommended by IOM. In these cases, it is not justified to advise additional caloric intake for these women in order to achieve the IOM target weight gain. The fact that we did not observe any increase in adverse pregnancy outcomes in these women suggested that the lower IOM weight gain targets for women with GDM may need to be re-examined. In fact, a study of overweight Korean women with GDM showed that weight gain below IOM targets may reduce adverse pregnancy outcomes [6].

We fully support the IOM guidelines that appropriate weight gain and balanced nutritional intake is important for fetal well-being, and that the recommendations should be used in concert with good clinical judgment [1]. Nevertheless, we advocate caution in routinely adopting IOM targets to assess weight gain during pregnancy for women with GDM, especially in a population outside US.

Conflict of interest

None.

Disclosures

None declared.

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None.

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