



## CORRESPONDENCE

## Should local references or global standards be used to assess gestational weight gain?

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## TO THE EDITOR:

We read the recent manuscript by Thiruvengadam et al. [1] and the accompanying editorial by Hermanussen [2] with great interest. The study findings provide novel evidence on gestational weight gain patterns and its determinants in India and add to existing evidence on longitudinal weight gain patterns in low- and middle-income countries, previously described in charts from Malawi [3], China [4], and Brazil [5]. However, several methodological aspects related to the construction of gestational weight gain charts and the definition of optimal ranges should be considered before adopting those curves as a reference for monitoring weight gain during prenatal care.

First, the need for local reference charts or local cutoffs for weight gain recommendations warrants discussion. Although the observed distributions of pregnancy weight gain may differ between jurisdictions, this does not imply that the optimal ranges differ. It simply means that some populations may have higher or lower rates of excess/insufficient pregnancy weight gains. Conclusions about the need for a local reference should not be based on differences in the observed distribution of weight gain but rather on differences in the range of weight gain associated with the lowest risks of adverse outcomes. This evidence was lacking in the work by Thiruvengadam et al. [1]. We hypothesize that the relationship between gestational weight gain and adverse outcomes will be the same regardless of the location, i.e., there is no effect modification in the relationship between pregnancy weight gain and adverse outcomes by geographic location [6]. A single global instrument for assessing gestational weight gain has several significant practical advantages from an applied public health perspective: it provides recommendations for jurisdictions that may not have the research capacity to develop their own tool, standardizes care across locations, and enables the use of common dissemination tools. Research comparing the associations between pregnancy weight gain and adverse outcomes across different populations is needed before conclusions are drawn about the need for local vs. global references.

It is also important to recognize that Thiruvengadam et al. [1] published descriptive charts of how much weight women *actually* gained in pregnancy (i.e., references), not prescriptive charts describing patterns of healthy weight gain (i.e., standards, describing how much weight women *ought* to gain) [7]. As a result, the observed patterns presented in the charts do not necessarily represent optimal or recommended weight gain. Indeed, previous work has shown that values on the Intergrowth-21st weight gain chart [8] as low as the 50th percentile are linked with an increased risk for outcomes such as excess postpartum weight retention [9]. The construction of reference charts and the use of the obtained

percentiles (10/90th or any other combination) without defining the weight gain ranges associated with the lowest risks of maternal and infant adverse outcomes is not enough to adopt this tool for monitoring during prenatal care. Defining optimal weight gain ranges (based on charts or not) across multiple populations is a fundamental step for a tool to be useful for screening women at risk and for monitoring during pregnancy. In this process, using a reproducible approach and considering an array of maternal and infant short and long-term adverse outcomes is necessary [6, 10].

Thiruvengadam et al. [1] also refer to misunderstanding in the gestational weight gain terminology, which we disagree is a concern. Gestational weight gain is the amount of weight a woman gains between conception and delivery [11]. There are several ways of measuring this indicator [11], but the three most common are cumulative gestational weight gain, used in the construction of charts [5, 8, 12]; total weight gain, which does not allow for the identification of the pattern of weight gain during prenatal care, because it is only computed at the end of pregnancy; and gestational weight gain rate, which calculates the velocity of weight gain between two dates, accounts for gestational duration, and can be used when the first measurement of weight (either pre-pregnancy or first-trimester) is not available [11]. Using gestational weight gain velocity charts is less common, although Xu et al. [3] published a conditional growth chart for Malawi. However, creating velocity charts requires a different modeling approach from that adopted by the authors to develop cumulative curves.

We believe more consideration and research is needed before recommending these charts as a tool for gestational weight gain monitoring in India because they lack essential reflections on the difference between references and standards (and prescriptive and descriptive curves), on the optimal ranges for appropriate monitoring and counseling, and on the rationale for using local vs. global charts.

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## AUTHOR CONTRIBUTIONS

TC wrote the letter with input from JAH and GK. All the authors read and approved the final version and are responsible for its content.

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## COMPETING INTERESTS

The authors declare no competing interests.

## ADDITIONAL INFORMATION

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