Establishing a Smart-Phone Calculator for Optimal Gestational Weight Gain for Chinese Pregnant Women may be Accomplished Quickly

Pierre-Yves Robillard1,2 MD, Malik Boukerrou2,3 MD, PhD, Brahim Boumahni MD1

1Service de Néonatologie. Centre Hospitalier Universitaire Sud Réunion, BP 350, 97448 Saint-Pierre Cedex, La Réunion,
2Centre d’Études Périnatales Océan Indien (CEPOI). Centre Hospitalier Universitaire Sud Réunion, BP 350, 97448 Saint-Pierre cedex, La réunion,
3Service de Gynécologie et Obstétrique. Centre Hospitalier Universitaire Sud Réunion, BP 350, 97448 Saint-Pierre cedex, La réunion

COMMENTS

We have demonstrated 2 years ago that if we take as principle that the optimal optimal gestational weight in term pregnancies (optGWG) is to have “harmonious babies” for all women whatever their pre-pregnancy Body Mass Index (ppBMI), this is linear curve (y= ax+b). Based on the simple axiom: “what is the optimal gestational weight gain at term in pregnant women to achieve the natural rate of 10% of SGA (small for gestational age) as well as 10% of LGA (Large for gestational age) in newborns in my population”. We propose then an alternative solution if Chinese scientists/epidemiologists confirmed in the Chinese population our preceding findings. It will be easy to make this linear equation accessible everywhere on smartphones for health workers and women themselves. Knowing the specific SGA-LGA definitions of newborns in China, allows to easily find the “Maternal Fetal Corpulence Symbiosis, MFCS” Chinese’s curve. The Chinese calculator will probably be the same for Japanese and Korean women (and perhaps for Vietnamese, Thais or Cambodian women).

ABSTRACT

International IOM 2009 recommendations for gestational weight gain during pregnancy are highly contested in Asia by Chinese (and Japanese and Korean) scholars. We have demonstrated 2 years ago that if we take as principle that the optimal optimal gestational weight in term pregnancies (optGWG) is to have “harmonious babies” for all women whatever their pre-pregnancy Body Mass Index (ppBMI), this is linear curve (y= ax+b). Based on the simple axiom: “what is the optimal gestational weight gain at term in pregnant women to achieve the natural rate of 10% of SGA (small for gestational age) as well as 10% of LGA (Large for gestational age) in newborns in my population”. We propose then an alternative solution if Chinese scientists/epidemiologists confirmed in the Chinese population our preceding findings. It will be easy to make this linear equation accessible everywhere on smartphones for health workers and women themselves. Knowing the specific SGA-LGA definitions of newborns in China, allows to easily find the “Maternal Fetal Corpulence Symbiosis, MFCS” Chinese’s curve. The Chinese calculator will probably be the same for Japanese and Korean women (and perhaps for Vietnamese, Thais or Cambodian women).

Keywords: Pregnancy, epidemiology, pre-pregnancy body mass index, gestational weight gain, caesarean section, obesity

optGWG (kg) = -1.2 ppBMI (Kg/m²) + 42 ± 2kg [1,2].

When we plot on a graph maternal pre-pregnancy BMI (ppBMI), and the babies’ percentiles, 10% SGA-LGA 10% is materialized by a crossing point. The fact that this 10% corresponds to a given maternal BMI category suggests that there is a biological maternal-foetal connection. We proposed to call this crossing point the Maternal-Fetal Corpulence Symbiosis (MFCS) [1].

Very important, since it is a mathematical linear equation it allows that all EACH WOMAN may be considered as a SINGLE PLOT and that we may calculate for each woman at the beginning of pregnancy her individualized optGWG for that pregnancy. This is of paramount importance because we do not classify women in underweight/normal weight/overweight/obese class I/obese class II…Simply, any health worker may say: “you have that BMI at the beginning of pregnancy, it is better to gain (or lose for very obese women) X kilograms”.

We have put an online calculator consultable on smart phone at REPERE.RE (REseau PERinatal REunion), in three languages (French, Spanish and English) [2] for Reunionese women.

*Correspondence to: Dr Pierre-Yves Robillard. Service de Néonatologie. Centre Hospitalier Universitaire Sud Réunion, BP 350, 97448 Saint-Pierre cedex, France. Tel : ## (262) 2 62 35 91 49. Fax : ## (262) 2 62 35 92 93. E-mails: robillard.reunion@wanadoo.fr, pierre-yves.robillard@chu-reunion.fr
Recently Guan et al. stated in China that “IOM weight gain recommendations have been criticized by (Chinese, Koreans and Japanese) as being ill-adapted for Asian women” [3]. He did his study on GWG in Chinese pregnant women with an “adapted Asian IOM recommendation” (obesity ≥ 28 kg/m², overweight 24.0-27.9 kg/m²). He stated also that the mean BMI of his Chinese population was 20.3 kg/m² (therefore an IOM recommendation of a weight gain of 11.5-16 kg), while in his population the mean GWG was 17.8 kg [3]. Are the IOM guidelines, made mainly on Caucasian population, adequate for other population such as Asian women for example? For Chinese, Japanese, and Korean scholars, the answer is clearly NO [3-5-11], notably, as there are relatively few overweight or obese women in their populations. They even argue that the IOM recommendations in contrary are too low for underweight women [3,5-11]. With the Reunion formula the optimal GWG for a 20.0 kg/m² woman is of 18 kg [2].

However, we do not feel fair to state that our formula, designed in our Reunionese population, would be adapted everywhere [1,2]. MFCS is based on the 10% crossing point of NEWBORN’S SGA-LGA FOR EACH SPECIFIC POPULATION. Therefore, these SGA/LGA definitions might be different in different ethnicities (e.g. Chinese, Eastern Asians, India, Africa etc…). Reunion island’s population is mainly composed of Creole people (European/African mix), Africans (ap. 15%), a high minority of Dravidian Indians (ap. 15-20%) and women from European descent (ap. 10%), and very few Chinese origin (<5%).

Let us consider the problem of SGA: for us, in Reunion island, being SGA at term is to be approximately less than 2500g. But, in India, the physiological SGA birthweight at term is 2200g [12,13]. This may be also in line with a recent WHO study arguing that definition of low-birthweight should be different (< 2200g in Africa, < 2100g in Asia, < 2200g in Latin America) between different populations, and no more the universal below 2500g [14].

Considering the mothers, and countries like China, Japan or India which have a high rate of lean women [3,5-15]. In our formula [1,2], lean women of 18.5 kg/m² should have an optGWG of 20 kg (instead of 12.5-18 kg, IOM 2009 recommendations), but we do not feel that counselling a great proportion of Chinese or Japanese women to gain 20 kg in their pregnancies before knowing the local newborns’ SGA-LGA rates. Considering now the problem of LGA: for example, macrosomic newborns with birthweights ≥ 4000g, in Reunion represent 3.9% of term babies, but it is 0.5% in India, 6.9% in China, 2.0% in Niger, 2.2% in Thailand, 9.3% in Paraguay 1.3% in Philippines, Nepal, Sri-Lanka etc… [16].

Therefore and logically, a Chinese , Indian, Japanese, or Swedish linear equation should then be slightly different than ours ( y = -1.2 x + 42). This has been recently stated also by Guan et al.: “There are specific Chinese birthweight curves for neonates. Therefore, with knowledge of the 10th percentile (SGA) and the 90th percentile (LGA) of newborns, we could test the proposed ‘maternal-fetal-corpulence symbiosis’, which was recently proposed by Robillard et al…..” [3]. It is time and urgent to verify and establish in all continents their specific MFCS linear equation. It is easy to accomplish while specific neonatal curves exist in China [17] and probably also large databases on Chinese women’s GWGs, using the simple methodology proposed in 2018 in the Heliyon paper [1].

CONCLUSION

We may have significant health (and cost) benefits by lowering low-birthweights babies in lean women or c-section rates, preeclampsia, macrosomic babies and LGA babies in overweight/obese women in term pregnancies [18]. It is also easy to make this accessible everywhere on smartphones for health workers and women themselves [2]. Knowing the specific SGA-LGA definitions of newborns in a setting or a country, allows to easily find the MFCS curve everywhere. The Chinese calculator accessible on smart-phone will probably be the same for Japanese and Korean women (and why not for Vietnamese, Thais or Cambodian women).

Disclosure of Interest

All the authors attest that no conflict of interest exists regarding this work.

Contribution to Authorship

All authors participated equally to this work and writings of the manuscript.

Ethics Approval

This study was conducted in accordance with French legislation. As per new French law applicable to trials involving human subjects (Jardé Act), a specific approval of an ethics committee (comité de protection des personnes-CPP) is not required for this non-interventional study based on retrospective, anonymized data of authorized collections and written patient consent is not needed. Nevertheless, the study was registered on UMIN Clinical Trials Registry (identification number is UMIN000037012).

Funding

No special funding besides the normal existence of the South-Reunion perinatal database since 2001

REFERENCES

Robillard, et al.: Establishing optimal gestational weight gain for Chinese women


