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Strange linearities in human reproduction the example of gestational weight gain (and few others)

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There is a peculiar phenomenon: Two separate individuals (mother and foetus) have a mutual interactive dependency concerning their respective corpulence. Very thin mothers (14 kg/m²) have a natural tendency to have 22% of small for gestational age (SGA) new-born's and 3% of large for gestational age (LGA); Obese women (42 kg/m²) 5% of SGA and 20% of LGA. What is unexpected is that normal weighted women (22 kg/m²) have a natural tendency to have 10% of SGA as well as 10% of LGA (which is the very independent definition of SGA and LGA, 10th and 90th percentile of a neonatal population). When we plot on a graph, these SGA-LGA 10% are materialized by a crossing point. We propose to call this crossing point the Maternal Foetal Corpulence Symbiosis (MFCS). The aim of this study is to define gestational weight gain (GWG) in term pregnancies (MFCS point) for all categories of maternal pre-pregnancy Body Mass Index (BMI). In a 16.5 year-observational cohort study (2001-2017) the study population consisted of all consecutive singleton term (37 weeks onward) live births delivered at University's maternity in Reunion Island, French Overseas Department. Of the 59,717 singleton term live births, we could define the maternal pre-pregnancy body mass index and the GWG in 52,092 parturients (87.2%). We tested the MFCS point by BMI categories by 5 kgs/m² (15-19.9, 20-24.9 ...) in the function of GWG. The result is a linear law: $opGWG (kg) = -1.2 ppBMI (Kg/m^2) + 42 \pm 2kg$. The current IOM-2009 recommendations are adequate for normal and over-weighted women but not on the edges: A thin woman (17 kg/m²) should gain $21.6 \pm 2kg$ (instead of 12.5-18). An obese 32 kg/m² should gain 3.6 kg (instead of 5-9). A very obese 40 kg/m² should lose 6 kg.

Biography

Pierre-Yves Robillard is a Neonatologist, Epidemiologist, Specialist-in tropical diseases and perinatal epidemiology. He has 39 years of work experience in tropical countries (French overseas departments): 16 years in Guadeloupe (1979-1995, French West-Indies, Caribbean's), 3 years in Tahiti (1995-1998) French Polynesia, Pacific) and 20 years in Reunion (since 1999, Indian Ocean). His career is in level 3 NICU's. He is the Creator of the Reunion perinatal epidemiological database and the International Workshop on Immunology of Preeclampsia (since 1998). He has completed One year of post-Doctoral Fellowship in perinatal epidemiology (MUSC, Medical University of South Carolina, Charleston, USA, 1991-92) and an International course of Epidemiology CDC Atlanta (1992).

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