

## What to assess in a healthy pregnant with adequate weight at the beginning of the pregnancy: body mass index or body adiposity?

### *¿Qué evaluar en la gestante sana de peso adecuado al inicio de la gestación: índice de masa corporal o adiposidad corporal?*

Calixto Orozco Muñoz<sup>1</sup>✉, MD, MSc; Oscar Cañizares Luna<sup>1</sup>, MD, PhD; Nélide L. Sarasa Muñoz<sup>1</sup>, MD, PhD; Alina Artiles Santana<sup>1</sup>, MD; Xiomara Morales Molina<sup>2</sup>, MD, PhD; and Gilberto Cairo Sáez<sup>1</sup>, MD, PhD

<sup>1</sup>University of Medical Sciences of Villa Clara. Villa Clara, Cuba.

<sup>2</sup>University of Medical Sciences of Sancti Spiritus. Sancti Spíritus, Cuba.

*Este artículo también está disponible en español*

#### ARTICLE INFORMATION

Received: September 20, 2017

Accepted: November 9, 2017

**Key words:** *Pregnancy, Body weight, Obesity, Adiposity, Body Mass Index*

**Palabras clave:** *Embarazo, Peso corporal, Obesidad, Adiposidad, Índice de masa corporal*

#### To the Editor:

In a professional activity in which basic biomedical research is integrated with prenatal care from the nutritional surveillance consultations of pregnant women in community scenarios, a central practical dilemma arises: What to assess in a healthy pregnant with adequate weight at the beginning of pregnancy: body mass index or body adiposity? A context in which the quality of medical care for pregnant women and its preventive projection of noncommunicable chronic diseases may be at stake, with a particular recognized impact on the onset of cardiovascular diseases in the short, medium and long terms. It is in this respect that it is considered opportune to share the following reflections with the scientific

community.

Overcome the conception of the adipose tissue as a homogeneous deposition of adipocytes linked to the energy reserves of the body, it is now recognized as an endocrine organ that produces a large number of inflammatory markers such as the C reactive protein and adipocytokines, among which, the most important components are: leptin, adiponectin, resistin, interleukins and tumor necrosis factor alpha (TNF- $\alpha$ )<sup>1</sup>. These attributes represent a potential threat to all segments of the population, including women in reproductive age.

One of the first references for the nutritional evaluation of the pregnant woman, at the time of the first consultation, is the calculation of the body mass index (BMI) from the relationship between body weight in kilograms and height, standing, in square meters; this procedure determines a category that is supposed to reflect the nutritional status of the woman and which guides the possible recommendations for an adequate weight gain during pregnancy.

In general, the BMI is recognized as an useful in-

✉ C Orozco Muñoz  
Calle Cuarta N° 161, e/ C y D. Reparto Vigía.  
Santa Clara 50200. Villa Clara, Cuba.  
E-mail address: calixtoom@infomed.sld.cu

indicator in studies of morbidity and mortality associated to adiposity levels (overweight and obesity); however, this indicator by itself does not discriminate the proportions of body weight corresponding to muscles, bones and adipose tissue, and even less, the regional and/or topographic predominance of the latter; this feature limits its diagnostic credibility, when it comes to people with excess adipose tissue or body fat, classified as normal weight by the weight/height index values.

There is evidence of peculiar types of obesity in people of normal weight with hyperinsulinemia, greater risk of suffering type 2 diabetes, hypertriglyceridemia, insulin resistance and predisposition to cardiovascular diseases; also, high percentage of body fat, poor lean tissue or sum of the subscapularis and triceps skin fold thicknesses above 90 percentiles; these are all elements which are more expected in overweight or obese people according to the BMI<sup>2</sup>.

Any of these situations could be present in a pregnant with proper weight at the time of the first consultation and go unnoticed, risking the weight gain recommendations similar to those of other pregnant women who do not present them, if the only reference is the BMI value.

If we take into account that in the Cuban population the prevalence of excess weight (overweight and obesity) has increased with an annual growth of approximately 0.3%, results that translate into high levels of adiposity –situation in which women in reproductive age would be included–, and that it has been postulated that obesity should be classified according to the proportions of the adipose tissue and its body distribution, rather than by the BMI, these researchers consider advisable to seek other opportunities for application in primary health care, as part of the prenatal care to pregnant women, since the nutritional assessment only by BMI can lead to limited interpretations<sup>3,4</sup>.

In this way, it would be opportune to work in the search for other more comprehensive references about the true nutritional status of the pregnant woman with adequate weight, such as the assessment of the body adiposity at the beginning of pregnancy; not only to recommend the proper weight gain during pregnancy, but also to take other early medical actions, if necessary.

The body adiposity, considered as excessive accumulation of fat in the body, is a term that, although sometimes used as a synonym for obesity, only becomes this when passing certain BMI values rec-

ognized by the World Health Organization (WHO). It can be primary when it is fundamentally associated with inheritance, or secondary, when it is related to excessive caloric intakes or unhealthy lifestyles. However, the resulting obesity, by either pathway, is a complex disease in which the interaction of genetic, nutritional, metabolic and cultural factors is manifested.

Assessing the degree of adiposity, both for clinical and epidemiological purposes, is possible with the use of simple techniques of physical, economic and bloodless anthropometry; which, in general, are available to everyone from primary care.

Body measurements such as: weight, height, skin folds and combinations of body dimensions for indicators, such as waist/hip (WW/HH) index and waist/height index (WW/height) index, allow to know the presence of adiposity and the possible accompanying risk.

Other indices, such as conicity and the protein energy, together with measuring the circumferences and areas of muscle and fat in the body, also provide useful information for specific purposes.

If the anthropometric results suggest it, they can be enriched with ultrasonographic measurements of some fat deposits in specific regions and planes, and laboratory studies, to acquire a deeper knowledge about the amount and distribution of adipose tissue in the body.

It is important to note that when the measurement of subcutaneous adipose tissue in different regions of the body through skin folds allows to precise the location of the major adipose accumulations, it is also true that the subcutaneous fat can store a limited amount of energy, thus, the needs of energy reserves above certain limits can cause the deposition of adipose tissue in ectopic locations, such as the liver and skeletal muscle; an obesity that could cause metabolic disorders in these organs, because it is known that the increase in intrahepatic fat is strongly associated with dyslipidemia and liver insulin resistance and increased intramyocellular fat is associated with insulin resistance in skeletal muscle<sup>5</sup>.

While it is true that this problem of body adiposity and obesity as a recognized health problem is of a general nature, its analysis, from the perspective of pregnancy, requires particular considerations and assessments for obvious reasons, including healthy pregnant women with adequate weight. The vulnerability of these women to the cardiometabolic risk generated from the excessive accumulation of adi-

pose tissue in certain body regions is not sufficiently known.

It would be a mistake to study adiposity in a pregnant woman only in terms of quantity, although this, itself, is very important, the research must go further, get to the regional and topographic distribution of the adipose tissue, to determine the predominant type and with it, its own pathophysiology.

## CONFLICTS OF INTERESTS

None

## REFERENCES

1. Lecube A, Monereo S, Rubio MÁ, Martínez-de-Icaya P, Martí A, Salvador J, *et al.* Prevención, diagnóstico y tratamiento de la obesidad. Posicionamiento de la Sociedad Española para el Estudio de la Obesidad de 2016. *Endocrinol Diabetes Nutr.* 2017;64(Suppl 1):15-22.
2. Madeira FB, Silva AA, Veloso HF, Goldani MZ, Kac G, Cardoso VC, *et al.* Normal weight obesity is associated with metabolic syndrome and insulin resistance in young adults from a middle-income country. *PLoS One* [Internet]. 2013 [citado 15 Jul 2017];8(13):e60673. Disponible en: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3610876/pdf/pone.0060673.pdf>
3. Jiménez Acosta SM, Rodríguez Suárez A, Díaz Sánchez ME. La obesidad en Cuba. Una mirada a su evolución en diferentes grupos poblacionales. *Rev Cubana Aliment Nutr* [Internet]. 2013 [citado 15 Jul 2017];23(2):297-308. Disponible en: <http://www.revalnutricion.sld.cu/index.php/rcan/article/view/299/289>
4. De Lorenzo A, Soldati L, Sarlo F, Calvani M, Di Lorenzo N, Di Renzo L. New obesity classification criteria as a tool for bariatric surgery indication. *World J Gastroenterol.* 2016;22(2):681-703.
5. Pecanha AS, Monteiro A, Gazolla FM, Bordallo MA, Madeira IR, Miranda CN, *et al.* Relationship among internal-abdominal adiposity and subcutaneous-abdominal adipose tissues using ultrasound in eutrophic, overweight and obese prepubertal children [Poster N° C-0583]. *European Congress of Radiology 2014.* Vienna, Austria; March 6-10, 2014. Disponible en: [http://postereng.netkey.at/esr/viewing/index.php?module=viewing\\_poster&doi=10.1594/ecr2014/C-0583](http://postereng.netkey.at/esr/viewing/index.php?module=viewing_poster&doi=10.1594/ecr2014/C-0583)