



## Letter to the Editor

# Obesity in Children and Functional Gastrointestinal Disorders: Is It Time to Demonstrate the Causal Link?



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Childhood obesity represents a current health emergency, due to the growing spread of this phenomenon and the complications associated with this condition. According to data from the World Health Organization (WHO), 18% of children aged between 5 and 19 are overweight or obese.<sup>1</sup> At the same time, the so-called functional gastrointestinal disorders (FGIDs) are also frequent in children and adolescents. These conditions are a broad spectrum of disorders, that manifest themselves with symptoms starting from the gastrointestinal tract, which cannot be explained by biochemical or structural abnormalities.<sup>2</sup> Their origin is based on the close connections between the gastrointestinal tract and the brain.<sup>2</sup> The brain-gut axis is the neuroanatomic substrate of this connection that allows communication from emotional and cognitive centers in the central nervous system to the peripheral centers of the gastrointestinal tract and vice versa.<sup>2</sup> Psychosocial factors such as psychological stress and mood disorders act on this substrate affecting sensory, motor, immune, and inflammatory functions of the digestive system. At the same time, nutrition and microbiota composition affect not only visceral motility and inflammation but also ascending visceral pathways leading to altered mental functioning and psychological disorders.<sup>2</sup>

To date, some studies have highlighted the association between a high body mass index (BMI) and FGIDs in childhood. A meta-analysis of 18 studies involving 33,410 children showed a statistically significant relationship between functional constipation and both overweight and obesity (OR = 1.75).<sup>3</sup> Furthermore, a recently published meta-analysis has confirmed the significant association between obesity and constipation in children in developed countries.<sup>4</sup> Interestingly, it seems that in developing countries children do not have an higher risk of having constipation if they are obese; however, the reason for this geographical difference is not yet clear.<sup>4</sup> Moreover, an Italian epidemiologic study that enrolled 103 obese/overweight children has shown a higher prevalence of functional dyspepsia in obese/overweight children than in the normal-weight controls (22.3% vs 6.9%, P = 0.0016).<sup>5</sup> Finally, a retrospective study that aimed to define the association between

obesity and functional abdominal pain (FAP) disorders found that adolescents with FAP disorders had a significantly higher prevalence of overweight/obesity compared to controls (39.5% vs. 30%, respectively, p = 0.04).<sup>6</sup>

In view of these findings, a question arises spontaneously: is it a casual association, that is, without any causal connection, or is there something more?

Psycho-social aspects, nutrition, and the microbiome play an active role in the pathogenesis of FGIDs.<sup>2</sup> These aspects are often affected by an increased BMI. In fact, overweight and obesity are associated with low self-esteem and, furthermore, with various forms of anxiety and depression, which are well-known associated conditions to FGIDs.<sup>2,7,8</sup> In addition, a diet rich in fats and proteins and low in vegetables, which typically increases caloric intake, inevitably has a negative effect on gastrointestinal tract motility, with consequences such as dyspepsia and constipation.<sup>4,5</sup> As for nutrition, even a diet rich in carbohydrates including fermentable oligos and monosaccharides and polyols, known as FODMAPs, can lead in predisposed subjects to the development of irritable bowel syndrome (IBS), which often seems to be associated with obesity.<sup>9</sup> Finally, it has been hypothesized that visceral fat may play a direct role in the onset of functional dyspepsia, not only due to mechanical effects, but also because it acts as a metabolically active organ, capable of producing pro-inflammatory adipokines.<sup>10</sup>

Consequently, given the pathogenetic mechanisms of functional disorders known to date, it seems that an obesogenic lifestyle could be considered a potential risk factor for the onset of FGIDs. Hence, we encourage researchers to demonstrate a causal link between increased BMI and FGIDs. If this were demonstrated, it would lead to significant changes in medical practice. In addition to contributing to a better understanding of the pathogenesis of FGIDs, weight loss would also be considered a first-line therapy for patients with functional disorders (an indication currently not present in the most recent international guidelines). While awaiting such evidence, we want to point out that only one third of obese patients with FGIDs seek medical attention for their symptoms.<sup>3</sup> Therefore, we also think that pediatricians should pay more attention to the gastrointestinal symptoms present in children with an increased BMI.

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**Abbreviations:** BMI, body mass index; FGIDs, functional gastrointestinal disorders.

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### Author contributions

Contributed to study concept and design (CM, MC, FM), acquisition of the data (MC, FM), assay performance and data analysis (MC, FM), drafting of the manuscript (CM, MC, FM), critical revision of the manuscript (CM, MC, FM), supervision (CM).

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