

## EDITORIAL

## Does Gluten Decrease (or Increase) Metabolic Syndrome Risk?

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*Editorial referring to the article: Does a Gluten-free Diet Improve Metabolic Syndrome Parameters? A Systematic Review*

Overall, weight gain and obesity are consequences of chronic energy imbalance, in which energy intake exceeds energy expenditure and leads to excessive energy (fat) storage. If gluten is a causative factor for weight gain, the underlying mechanisms remain unknown, and studies on non-coeliac individuals are scarce. Over recent years, gluten free diet (GFD) has become popular as books and social media have suggested that gluten consumption causes overweight and metabolic syndrome (MS) parameters. However, data supporting such statement are often feeble and questionable.<sup>1</sup>

Firstly, due to its gluten content, wheat has likely been one of the most maligned foods over the past years. Nonetheless, whole wheat products are held as a good source of indigestible dietary fiber and other bioactive components. Avoiding wheat consumption could thus be associated with decreasing fiber and other beneficial constituents in the diet, and increasing glycemic index. Currently, three conditions require treatment with GFD: wheat allergy, non-coeliac gluten-sensitivity, and coeliac disease (CD).<sup>2,3</sup>

Secondly, most people adopting GFD tend to follow eating processed food, which are rich in salt, fat and sugar, and commonly less healthy than unprocessed or minimally processed foods. Also, an additional nutritional risk should be considered, that is, the overconsumption of low-fiber, micronutrient-poor food.<sup>4</sup>

In addition, one randomized clinical trial, by Ehteshami M et al.,<sup>5</sup> describing the possible benefits of GFD on MS had only 45 participants. The paper listed its own limitations, including the lack of screening the population for gluten sensitivity disorders and adoption of clear guidelines to

analyze GFD, and fact that the results were based on short term effects only. The authors also found a lower intake of fiber and a non-significant weight loss in the GFD group compared with controls.<sup>5</sup>

The article by Orange et al.,<sup>6</sup> in this issue of the Journal is a secondary analysis of data compiled from four studies fulfilling the inclusion criteria for the qualitative synthesis and systematic review. This study used one of the largest data sets in the field to elucidate the relationship between GFD and MS parameters.<sup>6</sup> The study highlighted the lack of effects or evidence of this diet in the general population. Furthermore, the GFD seemed not to promote weight gain, and had controversial effects on MS parameters. The most recent surveys on the nutritional quality of gluten free products, currently available on the market, have shown key inadequacies – a low protein content and a high fat and salt content – compared to their equivalent gluten-containing products. It means that adhering to a GFD could lead to changes in eating, promoting a more obesogenic environment.<sup>7</sup>

A cross-over study such as that by Silva et al.,<sup>8</sup> unfortunately allows for associations that cannot be directly translated into the general population, due to selection and other biases. The authors investigated the obesogenic and inflammatory effects of gluten and its association with the haptoglobin genotype, pointing out zonulin as the mediator of the obesogenic and inflammatory effects of gluten in CD patients. However, although this polymorphism is frequent in these patients, it is not in the general population, which may in part explain different outcomes in the other studies.<sup>8</sup>

Stefoska-Needham et al.,<sup>9</sup> conducted a study only on female individuals and found no effects of gluten restriction. The same results were found by Johnston et al.<sup>10</sup> On the other hand, Ehteshami et al.,<sup>5</sup> found reduced fasting blood glucose, waist circumference and serum triglyceride concentrations, but only in participants with MS. Orange et al.,<sup>6</sup> concluded,

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in their systematic review, that gluten restriction had no beneficial effects on MS parameters.<sup>5,9,10</sup> and seemed not to promote weight loss in individuals without CD, which often contrasts with marketing and media information.

Millions of people worldwide follow a GFD despite the lack of a clear indication. The important clinical question of how this diet affects the risk of MS in the general

population may be answered in a prospective randomized controlled trial. However, diet clinical trials are difficult to control due to obstacles such as blinding and compliance to the study. This points out the need for systematic review of published literature.

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