

## Critical Appraisal of “Association between Diet and Lifestyle Habits and Irritable Bowel Syndrome: A Case-Control Study”

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### *To the Editor:*

At the time of publication, there was a limited number of population-based studies conducted within Chinese populations.<sup>1</sup> Moreover, few studies considered both diet and lifestyle factors as potential mechanisms for the onset of irritable bowel syndrome (IBS).<sup>1</sup> Since the publication of this study, additional research has been completed in this area, which, in part, contradicts the findings of this study.<sup>2</sup> The authors aimed to determine an association between diet and lifestyle habits and IBS using a population-based, case-control design. Several results were significant; however, overall, there were many limitations to the study design that reduced the strength of the findings. The first limitation was a very small sample size, which restricted the generalizability of the results and increased the risk of random error.<sup>3</sup> A suggestion to mitigate these issues would be to increase the number of participants in the study. A larger sample size would reduce the probability of random error and enable greater generalizability because there would be increased variance in the participant characteristics. There were also many different sources of bias that stemmed from the study design. The authors addressed two different types within their discussion, including memory bias and volunteer bias. To mitigate the effect of memory bias, the authors limited the onset of symptoms to 1 year prior to hospitalization. This time frame may have been further shortened for a more substantial reduction in memory bias. The authors also discussed volunteer bias as a potential reason for the increased prevalence of IBS in older individuals. The authors did not control for this type of bias; therefore, it would have been pertinent to increase the sample size to reduce the effect of volunteer bias on the results. The authors failed to discuss selection bias because they chose only participants who were admitted to a particular hospital. This approach creates issues in terms of generalizability. For example, the participants who visit this hospital may do so because they live nearby;

therefore, the participants may experience the same socio-economic status or environmental pollutant, which is unique to the area and may therefore influence the results. There may also have been information bias because the diet and lifestyle information was based on self-reported values. The participants were asked to report their food intake, eating habits, exercise levels and other lifestyle practices for the six months prior to the onset of their first IBS symptom. This approach generates significant memory and information bias because participants are asked to recall past behaviors. This issue could have been rectified if the study was prospective and behaviors were recorded at the time of occurrence. The statistical analysis in this study was performed correctly, and the authors based their results on calculated odds ratios. The data presented justified the authors' conclusions; however, the conclusions were based on only associations, which reduced the power of the results. The authors concluded that specific diet and lifestyle habits may cause IBS; however, in reality, the directionality of the findings was not clear. The results may be misleading to readers because of the correlational nature of the findings. The findings may also be perceived in the other direction, such that IBS may have been the cause of specific diet and lifestyle habits as a result of the nature of the disease. The authors did not attempt to discuss the alternate directionality of the results; rather, they chose to write them in a way that supported their hypothesis. It is important to highlight that a case-control study cannot determine causation,<sup>4</sup> particularly considering that the authors deliver their results such that specific diet and lifestyle factors “may cause” IBS. This terminology may become confusing to readers; therefore, it is important to use the term association in the future. The current literature is divided with many studies that support, to some extent, the findings within this paper,<sup>5,6</sup> whereas other studies have not supported all the authors' conclusions.<sup>7</sup> According to Hill's criteria for causation, the strength of the association for

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specific lifestyle and diet factors would be considered high (odds ratio greater than 3); however, the directionality of this association is undetermined. This research also has a level of biological plausibility and coherence, which is supported by other findings.<sup>8</sup> Moving forward, researchers should aim to determine a causative relationship between diet and lifestyle factors and IBS by conducting a prospective, randomized control trial or a cohort study. Overall, the quality of the evidence in this paper is poor in terms of attempting to demonstrate causation; however, the study does present relatively strong associations between specific lifestyle and diet factors and IBS, which merit further investigation.

### CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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