



## Correspondence

### The growing global interest in the gluten free diet as reflected by Google searches



Dear Editor,

We read with interest the article by Trovato et al. [1]. In this article, tweets for celiac disease (CD) were noted to be less common than several other conditions, such as cancer. However, 'gluten' and 'free' were the most commonly co-cited words with celiac disease. In addition to social media, we believe that other online platforms are a key information source for patients. We sought to assess the popularity of Google searches for 'gluten-free diet'.

Diet-related search terms, based on how people search for diets, were identified by contacting Google ( $n=44$  terms); these terms included specific diets (e.g. Mediterranean diet) as well as dietary practices (e.g. veganism). Subsequent to this, Google Trends data were obtained globally for these terms, searched annually between 2010 and 2018. The number of countries with data available varied annually, between 47 and 110 countries. Out of these, 36 countries had data on all 44-diet related search terms for each year between 2010 and 2018 and these were analysed.

The proportion of countries which had 'gluten-free diet' in their top 3 dietary search terms increased on an annual basis, from 2010 to 2018 (Table 1), with a significantly higher proportion of countries with 'gluten-free diet' as their top 3 dietary search term in 2018 compared to 2010 ( $p<0.01$ ).

These findings highlight the increasing interest in the search for gluten-free diet (GFD) globally. This may in part be due to the media impact on the public with regards to the GFD, as highlighted by Trovato et al. [1]. It is likely that individuals are searching for a GFD outside the diagnosis of CD, which may in part explain the discrepancy seen between low number of tweets for CD, but large Google search interest in the GFD. There has been a significant increase in the consumption of gluten-free foods, with more than 15.5 billion dollars being spent in the United States in 2016 [2]. It is possible that individuals are interested in using these diets as a 'lifestyle' choice, which has no evidence base, as we have recently demonstrated [3]. In addition to this, it is also possible that some of these individuals are also using a GFD for non-celiac gluten sensitivity or irritable bowel syndrome (IBS), with evidence for use in these settings [4].

The large interest in Google searches for a GFD may also be partly explained by a lack of dietetic resources available for individuals who need this diet. A study in the United Kingdom highlighted that dietetic provision for CD was only one-third of what is required [5]. In addition to this, only 21% of gastroenterologists commonly refer IBS patients to registered dietitians [6], despite this being advocated in the literature [7]. As a result of this, it is likely that many individuals are undertaking the GFD without the expert input of a dietitian, potentially leading to the risk of nutritional deficiencies, such as folate, magnesium and calcium deficiencies [8,9]. A self-initiated GFD may also lead to difficulties in diagnosing CD.

**Table 1**

Number of countries with 'gluten-free diet' within top 3 dietary search term.

Year	Number of countries with 'gluten-free diet' in top 3 dietary search term					Worldwide Proportion	Mean rank of 'gluten-free diet' when in top 3 dietary search term
	Region						
	Africa ( $n=2$ )	Asia ( $n=10$ )	Europe ( $n=19$ )	North America ( $n=3$ )	Oceania ( $n=2$ )		
2010	0	0	1	2	2	13.9% ( $n=5$ )	1.4
2011	0	1	1	2	2	16.7% ( $n=6$ )	1.7
2012	0	2	3	2	2	25.0% ( $n=9$ )	1.3
2013	0	3	4	2	2	30.6% ( $n=11$ )	1.6
2014	1	6	4	2	2	41.7% ( $n=15$ )	2.0
2015	0	7	5	2	2	44.4% ( $n=16$ )	2.3
2016	1	5	6	2	2	44.4% ( $n=16$ )	2.3
2017	2	3	7	2	2	44.4% ( $n=16$ )	2.5
2018	1	5	7	3	2	50.0% ( $n=18$ )	2.8

\*\*Countries included were Australia, Austria, Bulgaria, Canada, Croatia, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Ireland, Israel, Italy, Latvia, Malaysia, Mexico, Netherlands, New Zealand, Pakistan, Philippines, Poland, Romania, Russia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States.

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There are some limitations with the Google Trends data presented. Google Trends data was unavailable for every country in the world. However, a wide selection of countries from different continents were included in the analysis. In addition, searching for a 'gluten-free diet' does not equate to consumption but rather interest.

To summarize, data from Google Trends highlights the growing popularity of the search term 'gluten-free diet', highlighting the need for an effective approach to manage patients requiring a GFD effectively, ideally via specialist dietetic input.

#### Declaration of Competing Interest

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#### Financial Disclosure

None

#### References

- [1] Trovato CM, Montuori M, Oliva S, et al. Assessment of public perceptions and concerns of celiac disease: a Twitter-based sentiment analysis study. *Dig Liver Dis* 2020;52(4):464–6.
- [2] Niland B, Cash BD. Health Benefits and Adverse Effects of a Gluten-Free Diet in Non-Celiac Disease Patients. *Gastroenterol Hepatol (N Y)* 2018;14(2):82–91.
- [3] Croall ID, Aziz I, Trott N, et al. Gluten does not induce gastrointestinal symptoms in healthy volunteers: a double-blind randomized placebo trial. *Gastroenterology* 2019;157(3):881–3.
- [4] Rej A, Sanders DS. The overlap of irritable bowel syndrome and noncoeliac gluten sensitivity. *Curr Opin Gastroenterol* 2019;35(3):199–205.
- [5] Nelson M, Mendoza N, McGough N. A survey of provision of dietetic services for coeliac disease in the UK. *J Hum Nutr Diet* 2007;20(5):403–11.
- [6] Lenhart A, Ferch C, Shaw M, et al. Use of Dietary Management in Irritable Bowel Syndrome: results of a Survey of Over 1500 United States Gastroenterologists. *J Neurogastroenterol Motil* 2018;24(3):437–51.
- [7] Rej A, Avery A, Ford AC, et al. Clinical application of dietary therapies in irritable bowel syndrome. *J Gastrointest Liver Dis* 2018;27(3):307–16.
- [8] Shepherd SJ, Gibson PR. Nutritional inadequacies of the gluten-free diet in both recently-diagnosed and long-term patients with coeliac disease. *J Hum Nutr Diet* 2013;26(4):349–58.
- [9] Marsilio I, Savarino EV, Barberio B, et al. A Survey on Nutritional Knowledge in Coeliac Disease Compared to Inflammatory Bowel Diseases Patients and Healthy Subjects. *Nutrients* 2020;12(4):E1110.

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