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## ASSESSMENT OF QUALITY AND READABILITY OF INTERNET DIETARY INFORMATION ON IRRITABLE BOWEL SYNDROME

Ligia Alfaro Cruz, MD<sup>1,2</sup>, Isha Kaul, MD<sup>1</sup>, Yan Zhang, MD<sup>1</sup>, Robert Jay Shulman, MD<sup>1,2</sup>, and Bruno Pedro Chumpitazi, MD<sup>1</sup>

<sup>1</sup>Section of Pediatric Gastroenterology, Hepatology, and Nutrition, Department of Pediatrics, Baylor College of Medicine, Houston, TX, USA

<sup>2</sup>USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, TX, USA

### INTRODUCTION

Diet plays an important role for patients with irritable bowel syndrome (**IBS**). For medical conditions such as IBS, the Internet is a primary source of health information.<sup>1</sup> However, recent evidence suggests Internet health information may have several flaws including being: extremely discrepant, of poor quality, and inaccurate.<sup>2</sup> Therefore, our objectives were to evaluate both the quality and reading level of Internet dietary recommendations for both pediatric and adult IBS.

### METHODS

Two non-tracking search engines (DuckDuckGo and Ixquick) were used to identify the top 30 websites using the terms “IBS, diet, children” and “IBS, diet, adults.” This resulted in a total of 120 websites (60 for each search term). Website inclusion criteria included: (1) presentation of IBS-related dietary information; and (2) an English-language website, journal article, PDF document, or slide show.

Three different raters independently used the validated DISCERN instrument to rate the reliability, information quality, and overall quality of each website's information.<sup>3</sup> DISCERN ratings range from 1–5 with quality categories including: low (<3); moderate (3–<4); and high (4). Intraclass Correlation Coefficient (**ICC**) was used to assess

**Correspondence:** Bruno Chumpitazi, 6701 Fannin St, Suite 101000, Houston TX, 77030. chumpita@bcm.edu. Telephone number: 832-822-3627 Fax: 832-825-3633.

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#### Author's contributions

Study concept and design (LAC, BPC, RJS); acquisition of data (LAC, IK, YZ); analysis and interpretation of data (LAC, IK, RJS, BPC); drafting of the manuscript (LAC); critical revision of the manuscript and approval of the final version (all authors).

agreement among the raters. ICC interpretation parameters were:  $<0.50$  = poor;  $0.50-0.75$  = moderate;  $0.75-0.90$  = good; and  $>0.90$  = excellent.<sup>4</sup> Readability was assessed using the Flesch-Kincaid grade level (FKGL) measure.<sup>5</sup>

## RESULTS

Of the 120 initially identified websites, 70 (58%) were non-duplicates. Of these, 17(26%) were excluded for not meeting inclusion criteria; thus, 53 (74%) websites (24 focused on pediatric IBS and 29 focused on adult IBS) were included for further analysis.

Eighteen (75%) of the pediatric focused websites provided specific dietary recommendations with the remaining six acknowledging the importance of diet in treating IBS and referring the reader to a physician to obtain specific dietary recommendations. Of the websites providing recommendations, 8 different diets were suggested (Table 1). Of the 29 adult-focused websites, all provided specific IBS dietary recommendations. A high fiber diet was the most commonly recommended for both pediatric and adult websites (Table 1).

For Pediatric focused websites mean scores for reliability, information quality and overall quality were low (Table 1). For adult focused websites mean scores for reliability and overall quality were in the moderate range whereas information quality was low (Table 1). Raters had moderate to excellent mean agreement when evaluating the pediatric websites and fair to excellent agreement when evaluating the adult websites (Table 1).

Readability was rated difficult to read with FKGL grade scores of  $11 \pm 3.0$  and  $11.4 \pm 5.2$  for pediatric-focused and adult-focused websites, respectively.

## DISCUSSION

Given the increasing usage of the Internet for providing health information, evaluating the quality of websites for highly prevalent disorders such as IBS is important. We found that only a minority providing IBS-related dietary information were of high quality or easily readable; moreover, there was a wide range of disparate recommendations.

Our results parallel those reported not only for Internet information on other GI disorders such as inflammatory bowel disease but also for healthy diet information where the reliability and quality often are suboptimal.<sup>1, 6</sup> Given 3.5 billion people have access to the Internet, our results and other reports underscore the risk for the dissemination of inaccurate information and need for caution in directing patients to the Internet for dietary recommendations.<sup>7</sup>

Readability has been identified as an important aspect of health literacy. The National Institutes of Health recommend that the readability of health education material be no higher than 6<sup>th</sup> to 8<sup>th</sup> grade level.<sup>8</sup> Unfortunately, we found that the average reading level for both pediatric and adult Internet IBS dietary information was significantly higher than this guideline; potentially negatively impacting the ability of readers to understand the material.

There are limitations to this study. Only English language websites were evaluated which may limit generalizability. In addition, the DISCERN level of agreement among raters when evaluating adult focused websites was decreased compared to pediatric websites. We hypothesize this discordance relates, in part, to the adult information being more difficult to comprehend.

The study has a number of strengths. These include use of: the validated DISCERN instrument for measurement of health information quality; the validated FKGL to assess readability; and non-tracking search engines to prevent bias from previous searches affecting the identification of websites of interest.

In summary, only a minority of Internet based dietary recommendations for children and adults with IBS are of high quality and easily readable. Our results stress the need for Internet-based high quality, easily comprehensible dietary guidelines for children and adults with IBS.

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**Table 1**

Assessment of Health Information and Internet Dietary Recommendations for Children and Adults with Irritable Bowel Syndrome

<b>DISCERN Instrument<sup>a</sup></b>	<b>Mean (standard deviation)</b>	<b>Inter - Rater Agreement (95% CI)<sup>b</sup></b>
<b>Pediatrics (n=24)</b>		
Reliability	2.8 ± 0.62	0.78 (0.61–0.98)
Quality of information	2.2 ± 0.97	0.67 (0.50–0.84)
Overall quality	2.1 ± 0.98	0.93 (0.86–0.97)
<b>Adults (n=29)</b>		
Reliability	3.4 ± 0.41	0.62 (0.48–0.08)
Quality of information	2.7 ± 0.96	0.489 (0.27–0.71)
Overall Quality	3.0 ± 0.14	0.79 (0.61–0.89)
<b>Diet</b>	<b>Pediatric Websites (n=24)</b>	<b>Adult Websites (n=29)</b>
High fiber	16 (67%)	21 (72%)
Low FODMAP <sup>c</sup>	8 (33%)	19 (66%)
Caffeine and/or artificial sweeteners and/or alcohol intake reduction	8 (33%)	16 (55%)
Lactose free or Dairy free	7 (21%)	12 (41%)
Fructose and/or sorbitol reduction	1 (4%)	11 (38%)
Fat reduction	4 (17%)	10 (34%)
Refer to doctor	6 (25%)	-
High gas food elimination	-	7 (24%)
Starch intake reduction	-	6 (21%)
Gluten free	1 (4%)	4 (14%)
High carbohydrate	2 (8%)	-
Low fiber	-	3 (10%)
Strict elimination	-	1 (3%)

<sup>a</sup>The DISCERN instrument provides ratings ranging from 1–5 with categories including: low quality (<3); moderate quality ( 3–<4); and high quality ( 4).

<sup>b</sup>Mean (95% CI) for Intraclass Correlation Coefficient

<sup>c</sup>FODMAP = fermentable, oligosaccharides, disaccharides, monosaccharides, and polyols