

World Journal of *Gastroenterology*

World J Gastroenterol 2024 January 21; 30(3): 199-285



Contents

Weekly Volume 30 Number 3 January 21, 2024

EDITORIAL

- 199 Toward less invasive coloproctology: The future is out there
Emile SH, Ragheb J

OPINION REVIEW

- 204 Garg incontinence scores: New scoring system on the horizon to evaluate fecal incontinence. Will it make a difference?
Tsarkov P, Tulina I, Sheikh P, Shlyk DD, Garg P

REVIEW

- 211 Why is early detection of colon cancer still not possible in 2023?
Tonini V, Zanni M
- 225 Relationship among Parkinson's disease, constipation, microbes, and microbiological therapy
Yuan XY, Chen YS, Liu Z

ORIGINAL ARTICLE

Retrospective Cohort Study

- 238 Effectiveness of antibiotic prophylaxis for acute esophageal variceal bleeding in patients with band ligation: A large observational study
Ichita C, Shimizu S, Goto T, Haruki U, Itoh N, Iwagami M, Sasaki A

Basic Study

- 252 SLC6A14 promotes ulcerative colitis progression by facilitating NLRP3 inflammasome-mediated pyroptosis
Gu Q, Xia H, Song YQ, Duan J, Chen Y, Zhang Y, Chen HP, Zhang L
- 268 Calcium/calcimimetic *via* calcium-sensing receptor ameliorates cholera toxin-induced secretory diarrhea in mice
Tang LQ, Fraebel J, Jin S, Winesett SP, Harrell J, Chang WH, Cheng SX

LETTER TO THE EDITOR

- 280 Use of curcumin and its nanopreparations in the treatment of inflammatory bowel disease
Meng ZW, Chang B, Sang LX
- 283 Cholecystokinin and cholecystokinin-A receptor: An attractive treatment strategy for biliary dyskinesia?
Chang J, Liu Y, Jiang TC, Zhao L, Liu JW

ABOUT COVER

Editorial Board Member of *World Journal of Gastroenterology*, Fernando J Corrales, PhD, Professor, Functional Proteomics Laboratory, National Biotechnology Center (CNB-CSIC), Madrid 28049, Spain. fcorrales@cnb.csic.es

AIMS AND SCOPE

The primary aim of *World Journal of Gastroenterology* (WJG, *World J Gastroenterol*) is to provide scholars and readers from various fields of gastroenterology and hepatology with a platform to publish high-quality basic and clinical research articles and communicate their research findings online. WJG mainly publishes articles reporting research results and findings obtained in the field of gastroenterology and hepatology and covering a wide range of topics including gastroenterology, hepatology, gastrointestinal endoscopy, gastrointestinal surgery, gastrointestinal oncology, and pediatric gastroenterology.

INDEXING/ABSTRACTING

The WJG is now abstracted and indexed in Science Citation Index Expanded (SCIE), MEDLINE, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database. The 2023 edition of Journal Citation Reports® cites the 2022 impact factor (IF) for WJG as 4.3; Quartile category: Q2. The WJG's CiteScore for 2021 is 8.3.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Yi-Xuan Cai; Production Department Director: Xu Guo; Editorial Office Director: Jia-Ru Fan.

NAME OF JOURNAL

World Journal of Gastroenterology

ISSN

ISSN 1007-9327 (print) ISSN 2219-2840 (online)

LAUNCH DATE

October 1, 1995

FREQUENCY

Weekly

EDITORS-IN-CHIEF

Andrzej S Tarnawski

EXECUTIVE ASSOCIATE EDITORS-IN-CHIEF

Xian-Jun Yu (Pancreatic Oncology), Jian-Gao Fan (Chronic Liver Disease), Hou-Bao Liu (Biliary Tract Disease)

EDITORIAL BOARD MEMBERS

<http://www.wjgnet.com/1007-9327/editorialboard.htm>

PUBLICATION DATE

January 21, 2024

COPYRIGHT

© 2024 Baishideng Publishing Group Inc

PUBLISHING PARTNER

Shanghai Pancreatic Cancer Institute and Pancreatic Cancer Institute, Fudan University
Biliary Tract Disease Institute, Fudan University

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

POLICY OF CO-AUTHORS

<https://www.wjgnet.com/bpg/GerInfo/310>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

PUBLISHING PARTNER's OFFICIAL WEBSITE

<https://www.shca.org.cn>
<https://www.zs-hospital.sh.cn>



Garg incontinence scores: New scoring system on the horizon to evaluate fecal incontinence. Will it make a difference?

Petr Tsarkov, Inna Tulina, Parvez Sheikh, Darya D Shlyk, Pankaj Garg

Specialty type: Gastroenterology and hepatology

Provenance and peer review: Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): A
Grade B (Very good): B
Grade C (Good): C
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Pintar T, Slovenia;
Teng X, China

Received: October 7, 2023

Peer-review started: October 7, 2023

First decision: December 4, 2023

Revised: December 6, 2023

Accepted: December 22, 2023

Article in press: December 22, 2023

Published online: January 21, 2024



Petr Tsarkov, Darya D Shlyk, Department of Colorectal Surgery, Sechenov First Moscow State Medical University, Moscow 119991, Russia

Inna Tulina, Department of Oncologic Colorectal Surgery, Sechenov First Moscow State Medical University, Moscow 119991, Russia

Parvez Sheikh, Department of Colorectal Surgery, Saif Hospital, Mumbai 400004, Maharashtra, India

Pankaj Garg, Department of Colorectal Surgery, Garg Fistula Research Institute, Panchkula 134113, Haryana, India

Corresponding author: Pankaj Garg, MS, CEO, Surgeon, Department of Colorectal Surgery, Garg Fistula Research Institute, 1042, Sector-15, Panchkula 134113, Haryana, India.
drgargpankaj@gmail.com

Abstract

The main aim of this opinion review is to comment on the recent article published by Garg *et al* in the *World Journal of Gastroenterology* 2023; 29: 4593–4603. The authors in the published article developed a new scoring system, Garg incontinence scores (GIS), for fecal incontinence (FI). FI is a chronic debilitating disease that has a severe negative impact on the quality of life of the patients. Rome IV criteria define FI as multiple episodes of solid or liquid stool passed into the clothes at least twice a month. The associated social stigmatization often leads to significant under-reporting of the condition, which further impairs management. An important point is that the complexity and vagueness of the disease make it difficult for the patients to properly define and report the magnitude of the problem to their physicians. Due to this, the management becomes even more difficult. This issue is resolved up to a considerable extent by a scoring questionnaire. There were several scoring systems in use for the last three decades. The prominent of them were the Cleveland Clinic scoring system or the Wexner scoring system, St. Marks Hospital or Vaizey's scores, and the FI severity index. However, there were several shortcomings in these scoring systems. In the opinion review, we tried to analyze the strength of GIS and compare it to the existing scoring systems. The main pitfalls in the existing scoring systems were that most of them gave equal weightage to different types of FI (solid, liquid, flatus, *etc.*), were not comprehensive, and took only the surgeon's perception of FI into view. In GIS, almost all shortcomings of previous scoring systems had been addressed: different weights were assigned to different types of FI by a robust

statistical methodology; the scoring system was made comprehensive by including all types of FI that were previously omitted (urge, stress and mucus FI) and gave priority to patients' rather than the physicians' perceptions while developing the scoring system. Due to this, GIS indeed looked like a paradigm shift in the evaluation of FI. However, it is too early to conclude this, as GIS needs to be validated for accuracy and simplicity in future studies.

Key Words: Fecal incontinence; Scoring system; Urge; Stress; Flatus

©The Author(s) 2024. Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: Several scoring systems were used to assess fecal incontinence (FI), among which the most commonly used were Wexner's, Vaizey's, and FI Severity Index scoring systems. However, there are major lacunae and shortcomings in these scoring systems. A new scoring system, Garg incontinence scores (GIS), attempted to sort out the lacunae in the existing scoring systems. In the commentary, we analyzed the GIS while comparing it to the existing scoring systems. GIS seemed to be a major improvement over the existing scoring systems as almost all shortcomings of previous scoring systems have been addressed. However, this needs to be validated in further studies.

Citation: Tsarkov P, Tulina I, Sheikh P, Shlyk DD, Garg P. Garg incontinence scores: New scoring system on the horizon to evaluate fecal incontinence. Will it make a difference? *World J Gastroenterol* 2024; 30(3): 204-210

URL: <https://www.wjgnet.com/1007-9327/full/v30/i3/204.htm>

DOI: <https://dx.doi.org/10.3748/wjg.v30.i3.204>

INTRODUCTION

A common definition of fecal incontinence (FI) is "involuntary expulsion of rectal contents (liquid or solid feces or flatus) through the anus and the inability to defer a bowel movement for at least 15 minutes". The symptoms should have been present for a duration of ≥ 1 mo, and the patient's age should be ≥ 4 years, with previously achieved control[1]. In 2006, the Rome Foundation laid down diagnostic criteria for FI, and these were called Rome III criteria. These were subsequently revised in 2016 and were then known as Rome IV criteria[2]. In both these criteria, FI is defined as the accidental passage of liquid or stool into the clothes on several occasions. Incidentally, the involuntary or loss of control over flatus was not made a part of these criteria[2]. For Rome III criteria, at least one FI event per month is required for definition of FI, but for Rome IV, it was modified to at least two episodes of FI per month.

FI is a common problem, and it is estimated that this problem afflicts 1%–15% of the population worldwide[2–8]. The common causes are tears/trauma to the perineal region after difficult and problematic deliveries, after colorectal surgery, especially anal fistula surgery, after radiotherapy to the lower abdomen, etc.

The prevalence of FI in inflammatory bowel disease (IBD) is high, as recent studies have shown that FI can occur in up to 21% (as per Rome IV criteria) of patients with ulcerative colitis[2]. The incontinence rates remained high even when the patients were in remission, and understandably, this has led to a lot of anxiety, psychological disturbances, increases in symptoms, and poorer quality of life[2]. The incontinence rates in IBD are about 12 times higher than the prevalence rates in the wider population[9]. The risk of FI increases significantly in parous women with IBD[10].

FI due to gynecological trauma (traumatic vaginal birth) can occur in up to 8% of women[8]. The perineal tears involving the external anal sphincter (EAS) (3rd degree) and the tears extending through the EAS (4th degree) are one of the commonest risk factors for FI[11]. The risk of incontinence is also high (1.5 times higher) for instrument-assisted deliveries[12]. Incidentally, the symptoms often do not manifest until several years after the injury, and various factors such as hormonal changes during menopause, accelerated aging of traumatically damaged sphincter muscles, or decompensation of compensatory mechanisms probably contribute to this delay[1]. In primiparous women, it is possible to prove occult or at least minimal sphincter injuries in ~35% of cases[8,13]. The delivery with utilization of forceps, the occipital-posterior position of the child, and prolonged delivery represent independent risk factors for subsequent FI[8,13]. It is estimated that ~13% of women experience varying degrees of incontinence or stool urgency after first delivery[14]. As these are mostly young women, the impact of incontinence on their quality of life is substantial[15].

Loose stools are commonly ignored but pose a major risk of FI[16]. In this type of FI, the stoppage of drugs such as laxatives can be curative. In some patients, special diets such as low fructose or lactose can also decrease the frequency of loose stools and help to maintain normal stool form. Psyllium husk has been shown to improve FI in clinical trials; a feat that no other fiber supplements like carboxymethylcellulose or gum arabic can achieve[17]. Medications can also cause or aggravate FI. These drugs are laxatives, such as lactulose, docusate, or bisacodyl; cancer medications, such as cyclophosphamide, 5-fluorouracil, or paclitaxel; antibiotics, such as cephalosporins, penicillins, macrolides or Amphotericin B-liposomal; antacids that contain magnesium, arsenic trioxide, orlistat, quetiapine, rivastigmine, donepezil, sweeteners and caffeine[18].

Understandably, FI leads to profound physical, emotional and mental issues and even social isolation in many patients. Incidentally, the clinical objective evaluation and satisfactory management of FI have not been developed so far, and a significant amount of work still needs to be done in this difficult field.

The individual indices should be compared with functional tests to demonstrate FI. There are various tests that can help in the evaluation of FI.

Anorectal manometry helps in anorectal physiology testing, which can give insight and objectively document pelvic floor function[19]. The manometry can be inconsistent with physical examination and is incapable of predicting the response to the therapy, but the manometric evaluation can be of significant help in guiding the therapy[19]. It is not necessary that the anal tone is low in incontinence patients. In some patients with FI, the anal tone may be high or normal; for example, when an incomplete evacuation or anismus is present[19]. In FI patients with constipation, the rectum may be hyposensitive[20], whereas, in FI patients with IBS, post-radiation, diarrhea, and urgency, the rectum may be hypersensitive. In diseases such as IBD, autoimmune disorders like scleroderma, or post-radiation, rectal compliance may be decreased[20].

Endoanal ultrasound (EAUS) is helpful for assessing the integrity of both the sphincters objectively and can help detect their injuries[21]. The EAUS is economical, available easily to surgeons, and demonstrates the sphincters well, especially the internal sphincter. Magnetic resonance imaging (MRI) is a good alternative method for imaging the deeper parts of the sphincter complex and assessing associated rectal and pelvic prolapse[21].

The testing of the neurophysiology of the anorectum can be done with electromyography (EMG) and pudendal nerve terminal motor latency (PNTML) testing[21]. EMG can help to identify the defects in the anal sphincters and associated nerve injury[21]. The evaluation and assessment of neuromuscular integrity between the anal sphincter and the pudendal nerve can be done through PNTML. However, as both these techniques are invasive, they are not commonly used[21].

Defecography, with or without fluoroscopy or MRI, can help in the assessment of defecation in a dynamic motion. In incontinence patients, this test helps in confirming the inability to hold stool, which can give insight into the severity of the problem, and further recognize malfunctioning evacuation and/or associated prolapse of pelvic organs contributing to FI[21].

Last but not least, the lower gastrointestinal endoscopy (colonoscopy or sigmoidoscopy) may be indicated in patients with FI who have suggestive symptoms. Endoscopy can help to rule out diseases like IBD and malignancy in FI patients [21].

In spite of all the diagnostic tests available, the clinical assessment of FI is the initial step in the management. As FI can be of several types like solid stool FI, flatus (gas), liquid, urge, *etc.*, it is pertinent to clinically evaluate the disease with maximum objectivity. To achieve this goal, many scoring systems have been published in the last 35 years[22-24]. The first scoring system that was published and subsequently became popular was the Cleveland Clinic or Wexner scoring system[22]. It was published in 1993 by Jorge and Wexner[22] (Table 1). Subsequently, the next one was published in 1999 by Vaizey *et al*[23], and it was widely cited as St. Marks Hospital or Vaizey's[23] scores (Table 2). After this, a few more scoring methods were published, but none of them became popular. The only one among them that was more relevant was the FI Severity Index (FISI) published by Rockwood *et al*[24] in 1999 (Table 3)[24]. After a gap of two decades, a new scoring system to assess FI has been recently published by Garg *et al*[25] and Armstrong *et al*[26] (Table 4).

The Wexner scores were developed and published in 1993 and became popular. Even after the development of simple, easy-to-use scores, why was a need felt for the development of other scoring systems, such as Vaizey and FISI[22]? Moreover, the Vaizey scores also rose in popularity to almost the same magnitude as the Wexner scores. The reasons could be that there were shortcomings in the Wexner scoring system that the Vaizey scores attempted to improve upon. So that brings us to the question: when Wexner and Vaizey scores were popular, was a new score, GIS, really needed now? If yes, has GIS added substantially to the clinical evaluation of FI?

Wexner's scores included three types of FI, solid, liquid and flatus[22], and Vaizey's scores added another type of incontinence which was urge FI (inability to defer bowel motion/defecation for at least 15 min). This addition was a valuable enhancement as urge FI is a different type of FI and is distinct from solid, liquid or flatus incontinence, and is known to occur in isolation in several patients. Along with this, Vaizey scores also included a column of "need to take constipating medicines"; it was not present in the Wexner scoring system[23]. Apart from this, Vaizey's scores were similar to Wexner's. The Vaizey and Wexner scoring systems have been widely cited and have become popular in recent decades[27]. The strong points of both scoring systems have been the ease of use and understanding[27]. However, there were a few lacunae in both these scores, which have been pointed out and highlighted by Garg *et al*[25] and perhaps corrected too. Both these scores give equal weighting (hence scores) to different types of FI (solid, liquid, flatus and urge) [22,23]. Expectedly, this was done for the sake of simplicity, but from the statistical point of view, this was a gross error. The different types of FI are a full spectrum, and it would be unscientific to give equal weighting to all types. We are in agreement with Garg *et al*[25] that ease-of-use is an important ingredient of a scoring system, but it should not be at the cost of scientific accuracy. An optimum balance has to be maintained between the two. The systems should be easy to use and convenient, but the scientific quotient and statistical accuracy cannot be sacrificed. FISI score perhaps failed to become popular as it was on the opposite extreme[24]. It became too complicated to be utilized by practicing physicians as it tried to assign different weights to different types of incontinence[24]. Moreover, this scoring system had shortcomings in its research methodology. The sample size was too small, the questionnaire was not filled by the respondents physically but was sent to them by email, filling the same scores in different cells was not permitted while assigning weights, *etc.*[24].

Therefore, to summarize, on one extreme are scoring systems (like Wexner and Vaizey) that are easy to use but not scientifically sound, and on the other extreme is a scoring system (FISI) that lost its simplicity while upgrading scientific and statistical soundness[24]. For this matter, GIS manages to strike the balance of scientific accuracy and simplicity[25]. Garg *et al*[25] utilized robust statistical techniques, such as the interviewee and interviewer were both blinded, the sample

Table 1 Wexner scoring[25]

	Never	Rarely	Sometimes	Usually	Always
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Wears a pad	0	1	2	3	4
Lifestyle alteration	0	1	2	3	4

Rarely: < 1/mo; sometimes: < 1/wk to ≥ 1/mo; usually: < 1/d to ≥ 1/wk; always: ≥ 1/d. Citation: Garg P, Sudol-Szopinska I, Kolodziejczak M, Bhattacharya K, Kaur G. New objective scoring system to clinically assess fecal incontinence. *World J Gastroenterol* 2023; 29: 4593-4603. Copyright ©The Authors 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

Table 2 Vaizey's scoring[25]

	Never	Rarely	Sometimes	Weekly	Daily
Solid stool incontinence	0	1	2	3	4
Liquid stool incontinence	0	1	2	3	4
Gas incontinence	0	1	2	3	4
Alteration in lifestyle	0	1	2	3	4
	No	Yes			
Need to wear a pad or plug	0	2			
Constipating medication	0	2			
Lack of ability to defer defecation for 15 min	0	4			

Never: No episodes in last 4 wk; rarely: 1 episode in last 4 wk; sometimes: ≥ 1 in last 4 wk but < 1/wk; weekly: ≥ 1/wk to < 1/d; always: ≥ 1/d. Citation: Garg P, Sudol-Szopinska I, Kolodziejczak M, Bhattacharya K, Kaur G. New objective scoring system to clinically assess fecal incontinence. *World J Gastroenterol* 2023; 29: 4593-4603. Copyright ©The Authors 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

Table 3 Fecal incontinence severity index scoring[25]

	≥ 2 times/d (patient/surgeon scores)	Once/d (patient/surgeon scores)	≥ 2 times/wk (patient/surgeon scores)	Once/wk (patient/surgeon)	1-3 times/mo (patient/surgeon scores)
Gas	12/9	11/8	8/6	6/4	4/2
Mucous	12/11	10/9	7/7	5/7	3/5
Liquid	19/18	17/16	13/14	10/13	8/10
Solid	18/19	16/17	13/16	10/14	8/11

Citation: Garg P, Sudol-Szopinska I, Kolodziejczak M, Bhattacharya K, Kaur G. New objective scoring system to clinically assess fecal incontinence. *World J Gastroenterol* 2023; 29: 4593-4603. Copyright ©The Authors 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

size was bigger, an upgraded EuroQol (EQ-5D+) descriptive system-4D3L was utilized, all the proforma were filled by the same interviewer physically (not through email or telephone), *etc*[25]. The weight calculation was also done by an appropriate statistical method[25].

The GIS has another improvement over the earlier scoring systems like Wexner's and Vaizey's. Unlike them, the GIS gave importance to the patients' and laypersons' perceptions rather than the surgeons' perceptions[25]. It is a significant improvement because the scoring system has to be from the patients' point of view when it is being developed for them. It is possible that the earlier scoring systems (Vaizey's and Wexner's) presumed that the patients' and surgeons' perceptions would be similar. However, Garg *et al*[25] and other studies[24] clearly demonstrated that there could be significant differences between the patients' and surgeons' perceptions regarding the different types of incontinence.

Table 4 Garg incontinence scores[25]

Incontinence type	Weight	Frequency			Maximum score
		Never (points)	Occasional (points) (≤ 1 episode/wk)	Common (points) (> 1 episode/wk)	
Solid	8	0	1	2	16
Liquid	8	0	1	2	16
Urge	7	0	1	2	14
Flatus	6	0	1	2	12
Mucus	6	0	1	2	12
Stress	5	0	1	2	10
Total					80

Score in a cell = Weight for that incontinence type \times frequency points. For example, a person with occasional liquid incontinence would have an $8 \times 1 = 8$ score. Maximum possible score = 80 (total incontinence), minimum score possible = 0 (no incontinence). Citation: Garg P, Sudol-Szopinska I, Kolodziejczak M, Bhattacharya K, Kaur G. New objective scoring system to clinically assess fecal incontinence. *World J Gastroenterol* 2023; 29: 4593-4603. Copyright ©The Authors 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

Table 5 Comparison of existing scoring systems with new scoring system[25]

	Wexner	Vaizey	FISI	GIS
Comprehensive	No	No	No	Yes
FI type included: Urge FI	No	Yes	No	Yes
FI type included: Mucous FI	No	No	Yes	Yes
Presence of confounding parameters like "Need to wear a pad", "Need to take constipating medicine", and "Alteration of lifestyle"	Yes	Yes	No	No
Assigning weights to each FI by an objective method	No	No	No	Yes
Inclusion of patient perceptions (<i>n</i>)	0	0	34	50
Inclusion of laypersons' perceptions (<i>n</i>)	0	0	0	50
Simple and easy to use	+++++	+++++	+	+++++
Detailed structured definitions	No	No	No	Yes
In-depth disability scores based on an objective description system	No	No	No	4D3L [modified EQ-5D+ (EuroQol)] used

FI: Fecal incontinence; FISI: Fecal Incontinence Severity Index; NSS: New scoring system. Citation: Garg P, Sudol-Szopinska I, Kolodziejczak M, Bhattacharya K, Kaur G. New objective scoring system to clinically assess fecal incontinence. *World J Gastroenterol* 2023; 29: 4593-4603. Copyright ©The Authors 2020. Published by Baishideng Publishing Group Inc. All rights reserved.

Therefore, basing the scoring system on laypersons' and patients' perceptions added to the scientific quotient of GIS.

Last but not least, the GIS is the most comprehensive as it includes the incontinence types such as mucus, urge, and stress FI, which were omitted by all previous scoring systems. The authors of the published study compared different scoring systems (Wexner's, Vaizey's and Garg's) in a table that is being reproduced here (Table 5).

CONCLUSION

So, it seems that the GIS is a major improvement over the existing scoring systems, as almost all shortcomings of previous scores have been addressed. Due to this, GIS indeed looks like a paradigm shift. However, it is too early to conclude this. GIS has not been validated in a published study[25], which the authors stated that they would do in the next phase[25]. Only when this new scoring system is utilized, validated, and its efficacy corroborated by clinicians across the world will it be considered a benchmark in objective clinical assessment of FI.

ACKNOWLEDGMENTS

We want to thank Sattyadeep and Khushhreet for their input in helping with the software management and revising the manuscript.

FOOTNOTES

Author contributions: Tsarkov PV conceived and designed the study, collected and analyzed the data, revised the data, and finally approved and submitted the manuscript; Tulina I collected and analyzed the data, revised the data, finally approved and submitted the manuscript; Shaikh P critically analyzed the data, reviewed and edited the manuscript, finally approved and submitted the manuscript; Shlyk DD analyzed the data, revised the data, finally approved and submitted the manuscript; Garg P analyzed the data, revised the data, and finally approved and submitted the manuscript (Guarantor of the study).

Conflict-of-interest statement: No conflict of interest for any of the authors.

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

Country/Territory of origin: India

ORCID number: Petr Tsarkov 0000-0002-7134-6821; Inna Tulina 0000-0002-6404-389X; Parvez Sheikh 0000-0003-2153-2930; Darya D Shlyk 0000-0002-9232-6520; Pankaj Garg 0000-0002-0800-3578.

Corresponding Author's Membership in Professional Societies: American Society of Colon Rectum Surgeons (ASCRS); Society of Gastrointestinal Endoscopic Surgeons (SAGES); Endoscopic and Laparoscopic Surgeons of Asia (ELSA); International Society of Coloproctology (ISCP).

S-Editor: Fan JR

L-Editor: Kerr C

P-Editor: Zhao S

REFERENCES

- 1 Saldana Ruiz N, Kaiser AM. Fecal incontinence - Challenges and solutions. *World J Gastroenterol* 2017; **23**: 11-24 [PMID: 28104977 DOI: 10.3748/wjg.v23.i1.11]
- 2 Vasant DH, Nigam GB, Bate S, Hamdy S, Limdi JK. The prevalence and burden of Rome IV faecal incontinence in ulcerative colitis: A cross-sectional study. *Aliment Pharmacol Ther* 2023; **58**: 26-34 [PMID: 37012703 DOI: 10.1111/apt.17502]
- 3 Sun G, Trzpis M, Ding H, Gao X, Zhang W, Broens PMA. Validation of the Chinese DeFeC questionnaire: a comprehensive screening tool for symptoms and causes of constipation and incontinence. *Ann Palliat Med* 2023; **12**: 507-515 [PMID: 37038059 DOI: 10.21037/apm-22-1009]
- 4 Goodoory VC, Ng CE, Black CJ, Ford AC. Prevalence and impact of faecal incontinence among individuals with Rome IV irritable bowel syndrome. *Aliment Pharmacol Ther* 2023; **57**: 1083-1092 [PMID: 36914979 DOI: 10.1111/apt.17465]
- 5 Cuinas K, Ferreri L, Igbedioh C, Solanki D, Williams A, Schizas A, Hainsworth A. Pelvic floor investigations for anal incontinence: Are they useful to predict outcomes from conservative treatment? *Neurourol Urodyn* 2023; **42**: 1122-1131 [PMID: 37010063 DOI: 10.1002/nau.25182]
- 6 Whitehead WE, Simren M, Busby-Whitehead J, Heymen S, van Tilburg MAL, Sperber AD, Palsson OS. Fecal Incontinence Diagnosed by the Rome IV Criteria in the United States, Canada, and the United Kingdom. *Clin Gastroenterol Hepatol* 2020; **18**: 385-391 [PMID: 31154029 DOI: 10.1016/j.cgh.2019.05.040]
- 7 Menees SB, Almario CV, Spiegel BMR, Chey WD. Prevalence of and Factors Associated With Fecal Incontinence: Results From a Population-Based Survey. *Gastroenterology* 2018; **154**: 1672-1681.e3 [PMID: 29408460 DOI: 10.1053/j.gastro.2018.01.062]
- 8 Rao SS, Bharucha AE, Chiarioni G, Felt-Bersma R, Knowles C, Malcolm A, Wald A. Functional Anorectal Disorders. *Gastroenterology* 2016 [PMID: 27144630 DOI: 10.1053/j.gastro.2016.02.009]
- 9 Sperber AD, Bangdiwala SI, Drossman DA, Ghoshal UC, Simren M, Tack J, Whitehead WE, Dumitrascu DL, Fang X, Fukudo S, Kellow J, Okeke E, Quigley EMM, Schmulson M, Whorwell P, Archampong T, Adibi P, Andresen V, Benninga MA, Bonaz B, Bor S, Fernandez LB, Choi SC, Corazzini ES, Francisconi C, Hani A, Lazebnik L, Lee YY, Mulak A, Rahman MM, Santos J, Setshedi M, Syam AF, Vanner S, Wong RK, Lopez-Colombo A, Costa V, Dickman R, Kanazawa M, Keshteli AH, Khatun R, Maleki I, Poitras P, Pratap N, Stefanyuk O, Thomson S, Zeevenhooven J, Palsson OS. Worldwide Prevalence and Burden of Functional Gastrointestinal Disorders, Results of Rome Foundation Global Study. *Gastroenterology* 2021; **160**: 99-114.e3 [PMID: 32294476 DOI: 10.1053/j.gastro.2020.04.014]
- 10 Ong JP, Edwards GJ, Allison MC. Mode of delivery and risk of fecal incontinence in women with or without inflammatory bowel disease: questionnaire survey. *Inflamm Bowel Dis* 2007; **13**: 1391-1394 [PMID: 17576117 DOI: 10.1002/ibd.20208]
- 11 Bols EM, Hendriks EJ, Berghmans BC, Baeten CG, Nijhuis JG, de Bie RA. A systematic review of etiological factors for postpartum fecal incontinence. *Acta Obstet Gynecol Scand* 2010; **89**: 302-314 [PMID: 20199348 DOI: 10.3109/00016340903576004]
- 12 Pretlove SJ, Thompson PJ, Toozs-Hobson PM, Radley S, Khan KS. Does the mode of delivery predispose women to anal incontinence in the first year postpartum? A comparative systematic review. *BJOG* 2008; **115**: 421-434 [PMID: 18271879 DOI: 10.1111/j.1471-0528.2007.01553.x]

- 13 **Rao SS**; American College of Gastroenterology Practice Parameters Committee. Diagnosis and management of fecal incontinence. American College of Gastroenterology Practice Parameters Committee. *Am J Gastroenterol* 2004; **99**: 1585-1604 [PMID: [15307881](#) DOI: [10.1111/j.1572-0241.2004.40105.x](#)]
- 14 **Sultan AH**, Kamm MA, Hudson CN, Thomas JM, Bartram CI. Anal-sphincter disruption during vaginal delivery. *N Engl J Med* 1993; **329**: 1905-1911 [PMID: [8247054](#) DOI: [10.1056/NEJM199312233292601](#)]
- 15 **Meyer I**, Blanchard CT, Markland AD, Gibson EG, Richter HE. Fecal Incontinence Symptoms and Impact in Older Versus Younger Women Seeking Care. *Dis Colon Rectum* 2019; **62**: 733-738 [PMID: [31094960](#) DOI: [10.1097/DCR.0000000000001353](#)]
- 16 **Bharucha AE**, Fletcher JG, Melton LJ 3rd, Zinsmeister AR. Obstetric trauma, pelvic floor injury and fecal incontinence: a population-based case-control study. *Am J Gastroenterol* 2012; **107**: 902-911 [PMID: [22415196](#) DOI: [10.1038/ajg.2012.45](#)]
- 17 **Bliss DZ**, Savik K, Jung HJ, Whitebird R, Lowry A, Sheng X. Dietary fiber supplementation for fecal incontinence: a randomized clinical trial. *Res Nurs Health* 2014; **37**: 367-378 [PMID: [25155992](#) DOI: [10.1002/nur.21616](#)]
- 18 **Lisi DM**. Fecal incontinence: possible role for drug-induced etiology. *J Am Geriatr Soc* 2011; **59**: 161-2; author reply 162 [PMID: [21226687](#) DOI: [10.1111/j.1532-5415.2010.03211.x](#)]
- 19 **Quezada Y**, Whiteside JL, Rice T, Karram M, Rafferty JF, Paquette IM. Does preoperative anal physiology testing or ultrasonography predict clinical outcome with sacral neuromodulation for fecal incontinence? *Int Urogynecol J* 2015; **26**: 1613-1617 [PMID: [26017894](#) DOI: [10.1007/s00192-015-2746-1](#)]
- 20 **Burgell RE**, Bhan C, Lunniss PJ, Scott SM. Fecal incontinence in men: coexistent constipation and impact of rectal hyposensitivity. *Dis Colon Rectum* 2012; **55**: 18-25 [PMID: [22156863](#) DOI: [10.1097/DCR.0b013e318237f37d](#)]
- 21 **Paquette IM**, Varma MG, Kaiser AM, Steele SR, Rafferty JF. The American Society of Colon and Rectal Surgeons' Clinical Practice Guideline for the Treatment of Fecal Incontinence. *Dis Colon Rectum* 2015; **58**: 623-636 [PMID: [26200676](#) DOI: [10.1097/DCR.0000000000000397](#)]
- 22 **Jorge JM**, Wexner SD. Etiology and management of fecal incontinence. *Dis Colon Rectum* 1993; **36**: 77-97 [PMID: [8416784](#) DOI: [10.1007/BF02050307](#)]
- 23 **Vaizey CJ**, Carapeti E, Cahill JA, Kamm MA. Prospective comparison of faecal incontinence grading systems. *Gut* 1999; **44**: 77-80 [PMID: [9862829](#) DOI: [10.1136/gut.44.1.77](#)]
- 24 **Rockwood TH**, Church JM, Fleshman JW, Kane RL, Mavrantonis C, Thorson AG, Wexner SD, Bliss D, Lowry AC. Patient and surgeon ranking of the severity of symptoms associated with fecal incontinence: the fecal incontinence severity index. *Dis Colon Rectum* 1999; **42**: 1525-1532 [PMID: [10613469](#) DOI: [10.1007/BF02236199](#)]
- 25 **Garg P**, Sudol-Szopinska I, Kolodziejczak M, Bhattacharya K, Kaur G. New objective scoring system to clinically assess fecal incontinence. *World J Gastroenterol* 2023; **29**: 4593-4603 [PMID: [37621752](#) DOI: [10.3748/wjg.v29.i29.4593](#)]
- 26 **Armstrong DN**, Sudol-Szopinska I, de Parades V, Litta F, Limbert M, KC J. Pankaj Garg: A Community Doctor to a Master Innovator to a Global Icon Glob J Med Pharm Biomed Update. *Medical Innovator* 2023; **18**: 16-23 [DOI: [10.25259/gjmbu_59_2023](#)]
- 27 **Wexner SD**. Further validation of the Wexner Incontinence Score: A note of appreciation and gratitude. *Surgery* 2021; **170**: 53-54 [PMID: [33863582](#) DOI: [10.1016/j.surg.2021.02.039](#)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: office@baishideng.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

