Original Article

Perceptions of and Practices for the Management of Constipation: Results of a Korean National Survey

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Background/Aims: Although guidelines exist regarding the evaluation and management of patients with chronic constipation (CC), little is known about real-world clinical practice patterns. This study aimed to evaluate the various practices used to manage CC patients in various clinical settings in South Korea.

Methods: A nationwide web-based survey was conducted, randomly selecting gastroenterologists and non-gastroenterologists. The 25-item questionnaire included physicians' perceptions and practices regarding the available options for diagnosing and managing CC patients in Korea.

Results: The study participants comprised 193 physicians (86 gastroenterologists, 44.6%) involved in the clinical management of CC patients. The mean clinical experience was 12 years. Only 21 of 193 respondents (10.9%) used the Rome criteria when diagnosing CC. The Bristol Stool Form Scale was used by 29% of the respondents (56/193), while the digital rectal examination was performed by 11.9% of the respondents (23/193). Laboratory testing and colonoscopies were performed more frequently by gastroenterologists than by non-gastroenterologists (both p=0.001). Physiologic testing was used more frequently by gastroenterologists (p=0.046), physicians at teaching hospitals, and physicians with clinical experience ≤10 years (both p<0.05). There were also significant differences in the preference for laxatives depending on the type of hospital.

Conclusions: There were discrepancies in the diagnosis and management of CC patients depending on the clinical setting. The utilization rates of the Bristol Stool Form Scale and digital rectal examination by physicians are low in real-world clinical practice. These results imply the need for better and more practical training of physicians in the assessment and management of CC. **(Gut Liver, Published online July 17, 2023)**

Key Words: Constipation; Surveys and questionnaires; Physicians; Therapeutics

INTRODUCTION

Chronic constipation (CC) is one of the most common digestive diseases encountered in clinical practice. The prevalence of CC is 14% worldwide and 16.5% in South Korea.[1,2] CC adversely affects the quality of life, with 70% of patients reporting that it causes detrimental effects on their work, social, and personal lives.[3] Furthermore, treating constipation is a major drain on health budgets.[4] Therefore, the proper diagnosis and treatment of CC will provide significant socioeconomic benefits as well as improve CC patients' quality of life.

Although clinical guidelines for the diagnosis and management of CC patients have been developed,[5-7] physicians still have difficulty managing CC patients. Reasons for this include a scarcity of physicians' interest on constipation per se in patients with comorbid diseases, a poor understanding of the individualized pathomechanisms of constipation, a lack of diagnostic modalities, and either an insufficient or over-reliance on laxatives. Furthermore, Carter et al.[8] showed that awareness of possible treatment options and the recommended order of treatments for constipation differed markedly between gastroenterologists and general physicians. The Korean Society of Neurogastroenterology and Motility published guidelines for CC in 2016, and revisions are currently in progress.[9] In order to practically implement and apply these revised guidelines to real-world clinical practice, it is necessary to know the current situation regarding physicians' practice patterns in real-world clinical practice and whether these practices depend on whether they are gastroenterologists or non-gastroenterologists. In this study, we aimed to evaluate physicians' practice patterns when managing CC patients and compare management strategies in various clinical settings in South Korea.

MATERIALS AND METHODS

1. Study population

We conducted a web-based survey of members of the Korean Society of Neurogastroenterology and Motility and Korean physicians involved in the clinical management of patients with constipation. We investigated whether there was a difference in constipation management in various clinical settings. For this study, the members of the Korean Society of Gastroenterology were considered gastroenterologists, and other medical staff with at least three years of medical experience were considered non-gastroenterologists. According to Korea's medical delivery system, primary medical institutions are defined as having fewer than 30 beds, while tertiary medical institutions are defined as university hospitals or medical institutions with more than 700 beds. The participants completed an anonymous survey through a dedicated website linked to an e-mail. A total of 300 individuals were contacted, and 193 responded, resulting in a response rate of 64%.

2. Development and contents of the questionnaire

The study questionnaire was developed as a three-section, 25-item questionnaire by expert members of the Korean Society of Neurogastroenterology and Motility Constipation Group. The first section consisted of demographics and other basic characteristics, such as age, sex, specialty, practice setting (university hospital, general hospital, private practice, etc.), province, and the number of patients with constipation who had weekly consultations. The second section comprised questions regarding the tools used in the diagnostic approach in CC patients. The most important diagnostic modalities for constipation were the Bristol Stool Form Scale (BSFS), laboratory examination, colonoscopy, digital rectal examination (DRE), physiologic testing such as anorectal function test and colon transit time. The frequency of selecting a diagnostic tool was always (100%), often (85%), sometimes (50%), rarely (25%), and never (0%). The third section surveyed lifestyle modifications in the treatment of CC patients, such as the selection of laxatives and their selection criteria, treatment strategies, and treatment goals and limitations (Supplementary Material).

3. Statistical analysis

Statistical analyses were performed with SPSS 17.0 for Windows (SPSS Inc., Chicago, IL, USA). The frequencies and percentages for each questionnaire item were described, and continuous variables were expressed as mean±standard deviation. Any significant differences were determined using the chi-square test. Statistical significance was set at $p < 0.05$.

RESULTS

1. Characteristics of the survey respondents

Table 1 summarizes the respondents' demographic

Table 1. Baseline Characteristics of the Respondents in This Survey

Characteristic	Value (n=193)
Age, yr	40.4±5.5
Male sex	135 (69.9)
Hospital	
Teaching hospital	102 (52.8)
Non-teaching hospital	40 (20.7)
Primary clinic	51 (26.4)
Medical board status	
Internal medicine	167 (86.5)
Other	26 (13.5)
Specialty	
Gastroenterologist	86 (44.5)
Non-gastroenterologist	107 (55.5)
Clinical experience	12.3±5.7
≤10 yr	89 (46.1)
>10 yr	104 (53.9)
No. of constipation patients treated per wk	9.9±8.8

Data are presented as mean±SD or number (%).

characteristics. A total of 193 physicians participated in this survey. The mean age of the respondents was 40.4 years, and 69.9% were male. Overall, 52.8% of the respondents (102/193) worked in a teaching hospital, 20.7% (40/193) in a non-teaching hospital, and 26.4% (51/193) in a primary clinic. Most of the respondents (167/193, 86.5%) were internal medicine professionals, and 44.5% (86/193) were gastroenterologists. The mean clinical experience was 12 years, and the mean number of constipation patients treated was 9.9 per week.

2. Physician attitudes toward diagnosing constipation

Only 21 of 193 respondents (10.9%) used the Rome criteria when diagnosing CC patients. Among the 172 respondents who did not use the Rome criteria, 76 (44%) were unaware of it, 35 (21%) found it too complicated to use, 29 (17%) did not have enough time to use it, and 28 (16%) regarded it had no clinical significance (Fig. 1).

The main symptoms used to diagnose constipation are illustrated in Fig. 2. In this study, 48.7% (94/193) of the respondents considered "stool frequency" as the most important symptom, 16.6% (32/193) of respondents con-

sidered "incomplete evacuation," and 15.0% (29/193) of respondents considered "hard stools." Gastroenterologists considered the most important symptom used for diagnosing constipation, to be "stool frequency" (51.2%, 44/86) and "hard stools" (18.6%, 16/86), while non-gastroenterologists mentioned "stool frequency" (46.7%, 50/107) and "incomplete evacuation" (18.7%, 20/107). There were no significant differences regarding the most important symptoms for diagnosing constipation according to the specialty of physicians, duration of physicians' clinical experience, and type of hospital.

3. Diagnostic assessment of CC

The questionnaire also assessed which diagnostic modalities were used to evaluate CC patients in clinical situations. While BSFS was used by 29.0% (56/193) of the respondents and 11.9% (23/193) performed a DRE, 45.6% (88/193) of the respondents utilized laboratory tests and 71% (137/193) performed a colonoscopy. Physiologic testing was performed by 59.6% (115/193) of the respondents; 49.2% (95/193) performed a balloon expulsion test, 51.8% (100/193) performed an anorectal manometry, 53.9% (104/193) performed a defecography, and 49.2% (95/193) performed a colon transit time. Table 2 shows the patterns of diagnostic tools used for evaluating CC patients in different clinical settings. The BSFS was more frequently used by physicians at teaching hospitals, gastroenterologists, and physicians with clinical experiences ≤10 years than by physicians at non-teaching hospitals and primary clinics, non-gastroenterologists, and physicians with clinical experience >10 years (all p<0.05). There was no significant difference in DRE use depending on hospital type, physician specialty, or clinical experience. Laboratory testing and colonoscopies were used more frequently by gastroenterologists than by non-gastroenterologists (both p=0.001). Physiologic testing was used more frequently by gastroenterologists (p=0.046), physicians at academic hospitals, and physicians with clinical experience ≤10 years (both p<0.05) than by non-gastroenterologists, physicians at non-teaching hospitals and primary clinics, and physicians with clinical experience >10 years (Table 2).

4. Management style of CC

Altogether, 127 (65.8%) of the 193 respondents recommended lifestyle modifications and increased dietary fiber intake when prescribing laxatives, while 56 (29%) recommended them before starting laxatives and 10 (5.2%) did not mention any management strategies.

Magnesium salt (78.8%, 152/193) was the most preferred laxative, followed by nonabsorbable carbohydrates (59.1%, 114/193), bulking agents (42.5%, 82/193), stimu-
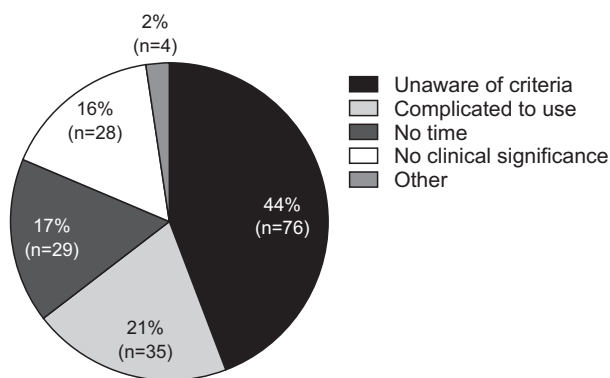

Fig. 1. Reasons for not utilizing the Rome criteria (n=172).

- Unaware of criteria
- Complicated to use
- No time
- No clinical significance
- Other

2% (n=4)
16% (n=28)
17% (n=29)
44% (n=76)
21% (n=35)

Other 8.8 (n=17)
Straining 10.9% (n=21)
Hard stools 15.0% (n=29)
Incomplete evacuation 16.6% (n=32)
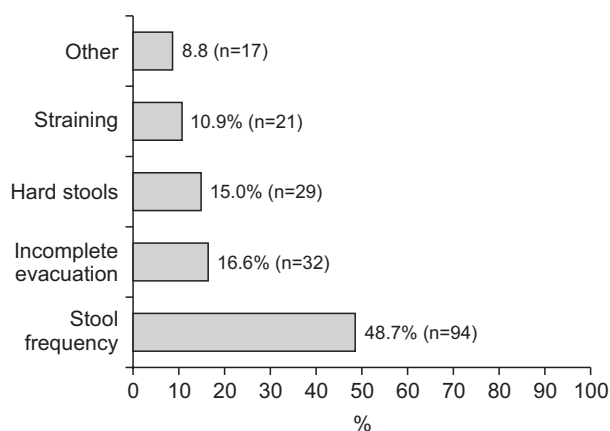Stool frequency 48.7% (n=94)

Fig. 2. Respondents' perceptions of the most important symptoms for diagnosing chronic constipation (n=193).

Table 2. Use of Diagnostic Modalities for Assessments of Patients with Chronic Constipation

Variable	Level of hospital			Specialty			Clinical experience		
	Non-teaching hospitals and primary clinics [n=91]	Teaching hospitals [n=102]	p-value	Non-gastroenterologists [n=107]	Gastroenterologist [n=86]	p-value	≤10 yr [n=89]	>10 yr [n=104]	p-value
BSFS (n=56)	19 (20.9)	37 (26.3)	0.019	19 (17.8)	37 (43.0)	0.001	33 (37.1)	23 (22.1)	0.022
DRE (n=23)	8 (8.8)	15 (14.7)	0.206	14 (13.1)	9 (10.5)	0.577	10 (11.2)	13 (12.5)	0.787
Laboratory tests (n=88)	39 (42.9)	49 (48.0)	0.471	37 (34.6)	51 (59.3)	0.001	38 (42.7)	50 (48.1)	0.454
Colonoscopy (n=137)	62 (68.1)	75 (73.5)	0.431	80 (74.8)	85 (98.8)	0.001	68 (76.4)	73 (66.3)	0.125
Physiologic testing (n=115)	38 (41.8)	77 (67.0)	0.001	57 (53.3)	58 (67.4)	0.046	62 (69.7)	53 (51.0)	0.008

Data are presented as number (%).
BSFS, Bristol Stool Form Scale; DRE, digital rectal examination.

lant laxatives (13.0%, 25/193), polyethylene glycol (12.4%, 24/193), prucalopride (22/193, 11.4%), and enemas and suppositories (10.9%, 21/193). In addition, probiotics were prescribed by 71.5% (138/193) of the respondents. There was a significant difference in the prescribing preference of laxatives between physicians at teaching hospitals and physicians at non-teaching hospitals and primary clinics. Nonabsorbable carbohydrates, stimulant laxatives, and enema suppositories were preferred by physicians at teaching hospitals (all p<0.05) (Fig. 3A). Enema suppositories were preferred by physicians with clinical experience ≤10 years (p=0.045) (Fig. 3B). However, there was no significant difference in the prescribing preference of laxatives depending on physicians' specialty (Fig. 3C).

In cases of insufficient response to a particular laxative, 58% (112/193) of respondents prescribed an additional laxative (112/193, 58%), and 31.1% (60/193) of respondents prescribed an alternative laxative. The most important factor for choosing laxatives included symptom improvement (50.3%, 97/193), the safety profile (45.1%, 87/193), and the physician's clinical experience with the particular laxative (44.6%, 86/193).

The limitations of laxatives treatment included chronic prescriptions (38.6%, 88/193), lack of treatment options (32.6%, 63/193), compliance issues (28.5%, 65/193), and lack of clinical experience (24.1%, 55/193).

When the gastroenterologists and non-gastroenterologists were classified and compared, the main symptom was considered the most important parameter about the laxatives selection for CC patients by the gastroenterologists, while non-gastroenterologists considered physicians' experience to be the most important factor.

DISCUSSION

This survey demonstrated the practice patterns when managing CC patients in real-world clinical situations in South Korea. In this study, approximately 11% of the respondents used the Rome IV criteria when diagnosing CC. Additionally, even though there were significant differences in the choice of diagnostic modalities for CC patients depending on the clinical settings, the utilization rates of both BSFS and DRE were relatively low. The study also showed a significant difference in laxative preference depending on the type of hospital.

The Rome criteria consist of a set of clinical symptoms (infrequent bowel movements, hard or lumpy stools, excessive straining, a sensation of incomplete evacuation or blockage, and the use of manual maneuvers to facilitate evacuation) that are internationally accepted as the gold

A

B

C
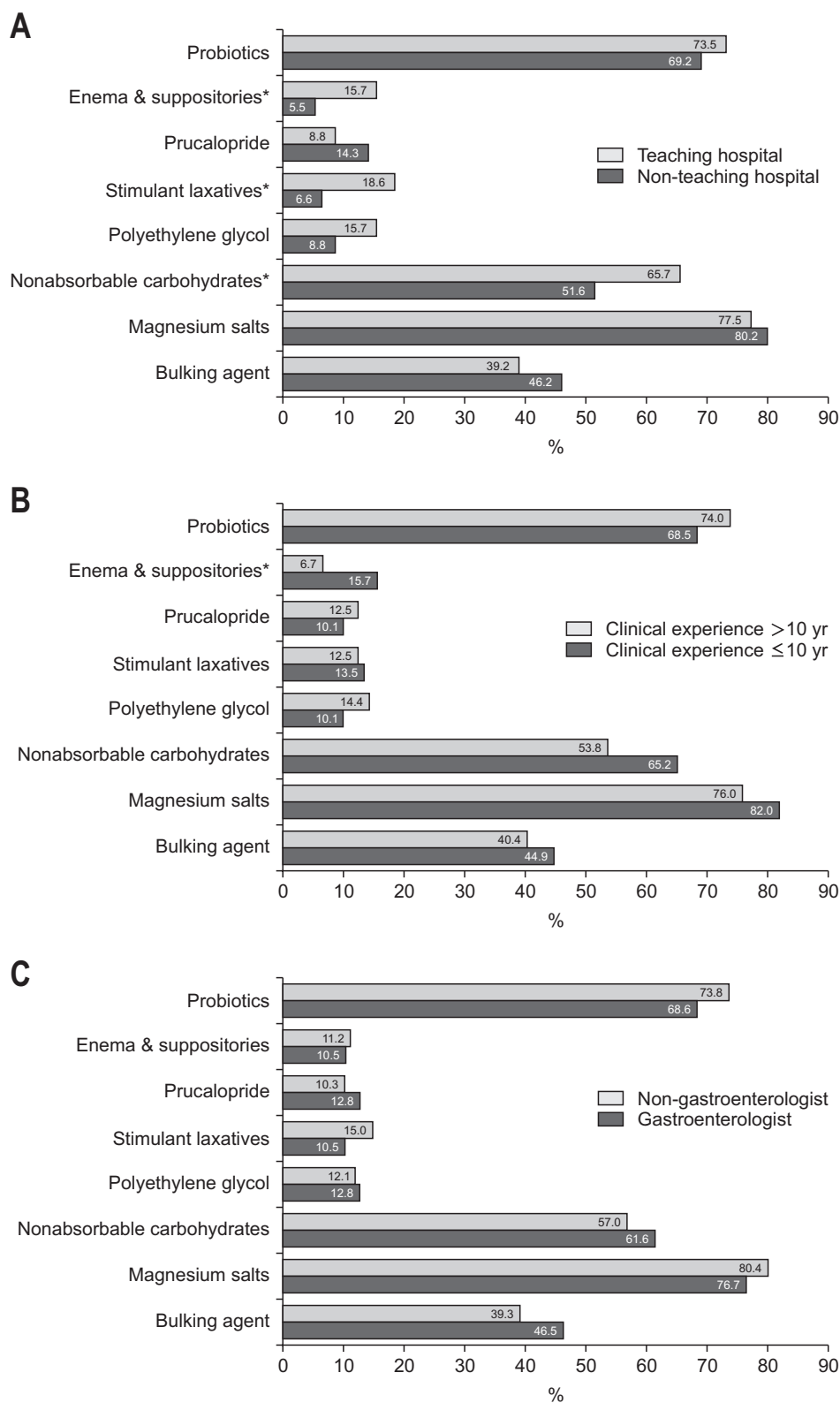
Fig. 3. Difference in the prescribing preference for chronic constipation (A) Choice of drug treatment based on the participants' workplace. (B) Choice of drug treatment based on the participants' experience. (C) Choice of drug treatment based on the participants' specialty. *p<0.05.

standard when diagnosing CC.[10] In the Rome IV criteria revised in 2016, functional constipation and irritable bowel syndrome with predominant constipation are presented as a continuous spectrum, but the two diseases are classified according to abdominal pain.[11] In this study, a questionnaire was conducted on functional constipation. However, it is often difficult to use the Rome criteria because there is a lack of a single symptom to diagnose constipation and

a lack of consensus among the public and physicians as to what constitutes CC. In this study, 11% of respondents used the Rome criteria to diagnose patients with constipation. There are several potential factors as to why the usage is so low. The most common reason for not using the Rome criteria, according to the results of this study, was a lack of awareness. Additionally, the relatively stringent and complex diagnostic criteria make it difficult to use in clinical practice. The Rome III criteria indicated a sensitivity of 86% and low specificity of 73% when compared with patient self-reporting in a study conducted in Asia for patients with constipation.[12] In this survey, 54% of respondents did not use the Rome criteria because of its complexity, time constraints, or low clinical usefulness.

In a cross-sectional survey conducted in the United Kingdom,[13] gastrointestinal specialists suggested that infrequent bowel movements were an important factor in the diagnosis of constipation; in contrast, patients believed that straining was more important. Additionally, this survey showed some differences in perception regarding important constipation symptoms depending on the specialty of the respondents. While gastroenterologists reported "stool frequency" and "hard stools" as the most important constipation symptoms, non-gastroenterologists reported "stool frequency" and "incomplete evacuation" as the most important symptoms.

In the guidelines for CC,[5-7] BSFS, colonoscopy, DRE, anorectal manometry, defecography, and colon transit time are recommended for the evaluation of CC. Therefore, our questionnaire also aimed to evaluate which assessment tools were used for diagnosis of CC. It was found that 71% of respondents performed a colonoscopy to assess the evaluation of CC, which was higher than 46% of screening rates in a population-based study conducted in the United States.[14] Colonoscopy is reported to be a cost-effective evaluation process for CC. Pepin and Ladabaum[15] reported that cancer was diagnosed in 1.4% of patients who underwent an endoscopy due to constipation symptoms and revealed no significant difference from asymptomatic subjects undergoing colorectal cancer screening. The BSFS is a visual descriptor of stool forms that are rated on a 7-point scale and reflects colon transit time. The BSFS types 1 and 2 can be used to predict slow-transit constipation.[16] It may be useful in clinical practices when the bowel movement frequency and stool hardness do not match.[17] Medical professionals can use the BSFS to help assess the condition of the bowel and measure the effectiveness of certain treatments for CC patients. However, despite this, our survey showed that only 29.0% (56/193) of the respondents used the BSFS. Gastroenterologists and physicians with clinical experience ≤10 years used the BSFS more frequently than non-gastroenterologists and physicians with clinical experience >10 years in our survey. An abnormal finding of DRE by an experienced examiner may lead to the suspicion of a defecatory disorder, which may warrant an anorectal test.[18] Nevertheless, only about 10% of respondents performed DRE, which may be because of lack of education and training programs and relatively short consultation time in South Korea. Therefore, appropriate education and training regarding the usefulness of DRE and the BSFS could be useful for physicians, particularly those in primary clinics.

To date, relatively few head-to-head studies have been conducted on the effects of laxatives, and a previous network meta-analysis did not suggest which laxatives were more effective in relieving symptoms.[19] Previous guidelines did not prioritize the use of specific laxatives to achieve optimal patient outcomes. Therefore, laxative preference varies depending on accessibility and reimbursement of medical insurance in locoregional areas.[14,20] Physicians in this study preferred osmotic laxatives for treating CC patients. Among osmotic laxatives, magnesium salts were preferred because they are inexpensive and easy to use. Compared to nonabsorbable carbohydrates, polyethylene glycol has fewer side effects, such as abdominal discomfort and excessive wind, and is reported to be relatively safe for long-term use.[21] However, the preference for polyethylene glycol in South Korea was 12.4%, which was low compared with other osmotic laxatives. This is likely because medical insurance does not cover polyethylene glycol, thereby limiting its long-term prescription. Likewise, the preference for the prescription of prucalopride was not high in this survey, again because of insurance. At the time of the survey, presecretory agents, such as lubiprostone or linaclotide, were not available in South Korea. Nonabsorbable carbohydrates, stimulant laxatives, and enema suppositories were preferred by physicians at teaching hospitals than physicians at non-teaching hospitals. This difference can be explained by the characteristics of patients. Patients in teaching hospitals may be transferred due to combined comorbid diseases and inadequate treatment response to first line therapy for constipation including bulking agents and magnesium salts. Therefore, it is necessary to combine the laxatives with different mechanism or switch to second line regimens for those patients at teaching hospitals.

This study had several limitations. First, since this was a cross-sectional study using a self-reported questionnaire, recall bias was a potential issue. Although the respondents in this study were anonymized, prospective cohort studies will be needed in the future to more accurately reflect the reality of actual constipation management. Second, it can be argued that this study may not reflect the overall reality

in South Korea since the response rate was only just over 50% and it is biased toward medical staff in tertiary hospitals. However, considering that there are no actual data on constipation treatment in South Korea, this study can facilitate future studies. Third, over-the-counter laxatives could not be considered in this survey. Considering that a significant percentage of CC patients also depend on over-the-counter medicines, further research on the current status of over-the-counter medicines in CC patients is necessary.

This study confirmed that there is a gap between clinical practice and the Rome IV criteria for the diagnosis of constipation and that there are discrepancies in the diagnosis and management of constipation depending on the clinical setting. The utilization rates of BSFS and DRE by physicians in real-world clinical settings are low, despite previous guidelines recommending their use. Our results suggest the need for practical education when diagnosing and managing CC patients.

CONFLICTS OF INTEREST

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SUPPLEMENTARY MATERIALS

REFERENCES

1. Suares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. Am J Gastroenterol 2011;106:1582-1591.

2. Jun DW, Park HY, Lee OY, et al. A population-based study on bowel habits in a Korean community: prevalence of functional constipation and self-reported constipation. Dig Dis Sci 2006;51:1471-1477.

3. Johanson JF, Kralstein J. Chronic constipation: a survey of the patient perspective. Aliment Pharmacol Ther 2007;25:599-608.

4. Leung L, Riutta T, Kotecha J, Rosser W. Chronic constipation: an evidence-based review. J Am Board Fam Med 2011;24:436-451.

5. Serra J, Mascort-Roca J, Marzo-Castillejo M, et al. Clinical practice guidelines for the management of constipation in adults. Part 2: Diagnosis and treatment. Gastroenterol Hepatol 2017;40:303-316.

6. Ford AC, Moayyedi P, Lacy BE, et al. American College of Gastroenterology monograph on the management of irritable bowel syndrome and chronic idiopathic constipation. Am J Gastroenterol 2014;109 Suppl 1:S2-S26.

7. Serra J, Pohl D, Azpiroz F, et al. European society of neurogastroenterology and motility guidelines on functional constipation in adults. Neurogastroenterol Motil 2020;32:e13762.

8. Carter D, Bardan E, Dickman R. Comparison of strategies and goals for treatment of chronic constipation among gastroenterologists and general practitioners. Ann Gastroenterol 2018;31:71-76.

9. Shin JE, Jung HK, Lee TH, et al. Guidelines for the diagnosis and treatment of chronic functional constipation in Korea, 2015 revised edition. J Neurogastroenterol Motil 2016;22:383-411.

10. Werth BL, Williams KA, Fisher MJ, Pont LG. Defining constipation to estimate its prevalence in the community: results from a national survey. BMC Gastroenterol 2019;19:75.

11. Lacy BE, Mearin F, Chang L, et al. Bowel disorders. Gastro-enterology 2016;150:1393-1407.

12. Gwee KA, Bergmans P, Kim J, et al. Assessment of the Asian Neurogastroenterology and Motility Association chronic constipation criteria: an Asian multicenter cross-sectional study. J Neurogastroenterol Motil 2017;23:262-272.

13. Dimidi E, Cox C, Grant R, Scott SM, Whelan K. Perceptions of constipation among the general public and people with constipation differ strikingly from those of general and specialist doctors and the Rome IV criteria. Am J Gastroenterol 2019;114:1116-1129.

14. Oh SJ, Fuller G, Patel D, et al. Chronic constipation in the United States: results from a population-based survey assessing healthcare seeking and use of pharmacotherapy. Am J Gastroenterol 2020;115:895-905.

15. Pepin C, Ladabaum U. The yield of lower endoscopy in patients with constipation: survey of a university hospital, a public county hospital, and a Veterans Administration medical center. Gastrointest Endosc 2002;56:325-332.

16. Saad RJ, Rao SS, Koch KL, et al. Do stool form and frequency correlate with whole-gut and colonic transit? Results from a multicenter study in constipated individuals and healthy controls. Am J Gastroenterol 2010;105:403-411.

17. Jaruvongvanich V, Patcharatrakul T, Gonlachanvit S. Prediction of delayed colonic transit using Bristol stool form and stool frequency in eastern constipated patients: a difference from the West. J Neurogastroenterol Motil 2017;23:561-568.

18. Tantiphlachiva K, Rao P, Attaluri A, Rao SS. Digital rectal examination is a useful tool for identifying patients with dyssynergia. Clin Gastroenterol Hepatol 2010;8:955-960.

19. Nelson AD, Camilleri M, Chirapongsathorn S, et al. Comparison of efficacy of pharmacological treatments for chronic idiopathic constipation: a systematic review and network meta-analysis. Gut 2017;66:1611-1622.

20. Müller-Lissner S, Tack J, Feng Y, Schenck F, Specht Gryp R. Levels of satisfaction with current chronic constipation treatment options in Europe: an internet survey. Aliment Pharmacol Ther 2013;37:137-145.

21. Belsey JD, Geraint M, Dixon TA. Systematic review and meta analysis: polyethylene glycol in adults with non-organic constipation. Int J Clin Pract 2010;64:944-955.