

ORIGINAL ARTICLE

국내 유튜브 영상으로 배포된 변비 완화 운동 콘텐츠의 의료진에 의한 평가

이태희¹, 김성은², 박경식³, 신정은⁴, 박선영⁵, 류한승⁶, 김정옥⁷, 이유진³, 조영신⁸, 박수연⁹,
대한소화기기능성질환·운동학회 변비연구회

순천향대학교 부속 서울병원 소화기내과¹, 이화여자대학교 의과대학 내과학교실², 계명대학교 의과대학 내과학교실³, 단국대학교 의과대학 내과학교실⁴, 전남대학교병원 소화기내과⁵, 원광대학교 의과대학 내과학교실⁶, 경희대학교 의과대학 내과학교실⁷, 순천향대학교 부속 천안병원 소화기내과⁸, 순천향대학교 부속 서울병원 의학통계학교실⁹

Medical Professionals' Review of YouTube Videos Pertaining to Exercises for the Constipation Relief

Tae Hee Lee¹, Seong-Eun Kim², Kyung Sik Park³, Jeong Eun Shin⁴, Seon-Young Park⁵, Han Seung Ryu⁶, Jung-Wook Kim⁷, Yoo Jin Lee³, Young Sin Cho⁸, Suyeon Park⁹ and Constipation Research Group of The Korean Society of Neurogastroenterology and Motility

Institute for Digestive Research, Soonchunhyang University Seoul Hospital¹, Department of Internal Medicine, Ewha Medical Research Institute, Ewha Womans University College of Medicine², Seoul; Department of Internal Medicine, Keimyung University School of Medicine³, Daegu; Department of Internal Medicine, Dankook University College of Medicine⁴, Cheonan; Department of Internal Medicine, Chonnam National University Hospital⁵, Gwangju; Department of Internal Medicine, Wonkwang University School of Medicine⁶, Iksan; Division of Gastroenterology, Department of Internal Medicine, Kyung Hee University School of Medicine⁷, Seoul; Department of Internal Medicine, Soonchunhyang University College of Medicine, Cheonan Hospital⁸, Cheonan; Department of Biostatistics, Soonchunhyang University Seoul Hospital⁹, Seoul, Korea

Background/Aims: The primary aims of this study were to evaluate the content quality of YouTube videos on exercises to help relieve constipation and to assess whether the video source, exercise types, and popularity affected their quality.

Methods: Eight gastroenterologists independently evaluated the exercises presented in the constipation YouTube videos for seven items: image quality, usefulness in relieving constipation (quality 1), usefulness for general physical health (quality 2), difficulty in following, activity intensity, fun, and overall quality. Raters were asked open-ended questions to evaluate the strengths and weaknesses of the videos. Five-point ordinal scales were used to score each item aforementioned, with the exception of image quality and overall quality that used a six-point Likert scale.

Results: The 20 videos had a mean length of 268 seconds and a mean viewership of 32,694. The most common video source was commercial (n=10), and the most common type of physical activity was yoga (n=11). The median values of image quality, quality 1, quality 2, difficulty in following, activity intensity, fun, and overall quality were 3, 2, 2, 2, 2, 2, and 2, respectively. Yoga videos had significantly higher median quality 1 values (3) compared with massage videos (2, adjusted p=0.006) and 'others' videos (2, adjusted p<0.001). A lack of medical evidence was the most common answer to open-ended questions about the weaknesses of each video.

Conclusions: Overall, YouTube exercise videos presented a low-quality content. This study highlights the need for evidence-based comprehensive educational videos addressing exercises for treating constipation. (Korean J Gastroenterol 2018;72:295-303)

Key Words: Constipation; Exercise; YouTube

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교신저자: 김성은, 07985, 서울시 양천구 안양천로 1071, 이화여자대학교 의과대학 내과학교실

Correspondence to: Seong-Eun Kim, Department of Internal Medicine, Ewha Medical Research Institute, Ewha Womans University College of Medicine, 1071 Anyangcheon-ro, Yangcheon-gu, Seoul 07985, Korea. Tel: +82-2-710-3084, Fax: +82-2-709-9696, E-mail: kimse@ewha.ac.kr, ORCID: <https://orcid.org/0000-0002-6310-5366>

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INTRODUCTION

Constipation is a very common and heterogeneous condition characterized by unsatisfying defecation associated with infrequent stools, difficult stool passage, or both.¹ In the general population, it has a prevalence of 14%, and is known to present a significant impact on the patient's quality of life,^{2,3} work productivity,⁴ and use of healthcare resources.⁴⁻⁶

Chronic constipation has been associated with a low level of physical activity, together with identified risk factors, including female sex, older age, poor socioeconomic status, insufficient consumption of fruits and vegetables, and psychological problems.⁷ Although data regarding the effectiveness of physical activity for alleviating constipation may vary,^{8,9} risk of constipation depends mostly on the level of activity, particularly in elderly individuals.¹⁰ Regular physical activity is optimal for the prevention of many chronic diseases (e.g., cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, and osteoporosis) as well as premature death.¹¹

Therefore, medical professionals have the responsibility to promote regular physical activity, both for constipated patients and patients with chronic disease. Barriers to treating lifestyle-related diseases, such as exercise, include patients' unwillingness to change their habits and their insufficient knowledge.¹² YouTube is a video-sharing website that was founded on February 2005.⁶ The role of YouTube in medical education has long been reported. South Korea has a highly developed digital infrastructure that enable nationwide adoption of broadband Internet. There were around 45 million Internet users in South Korea by 2016.¹³ Increasing number of people has been obtaining and sharing a wide variety of information and knowledge from the Internet.

Previous studies have reported on the quality of information on YouTube about gallstone disease,¹⁴ Crohn's dis-

ease,¹⁵ and anal cancer.¹⁶ However, no study has assessed the quality of information on YouTube pertaining to physical activity to combat constipation. YouTube has the potential as a powerful platform for disseminating information about the use of physical activity to relieve constipation. However, its unregulated nature and the characteristics of user-generated content pose challenges for quality and accuracy control. Concerns about the indiscriminate production of unproven and inaccurate information have been constantly raised in clinical practice.

The primary aims of this study were (a) to evaluate the content quality of YouTube videos for constipated patients from the viewpoint of medical professionals and (b) to assess whether the video sources, exercise types, and popularity affected video quality.

SUBJECTS AND METHODS

The following keywords – in Korean – were searched on YouTube on June 10, 2017: exercise, massage, yoga, gymnastics, physical activity, and constipation. A video was excluded for the following reasons: number of views was <3,000, language of narration was not Korean, or content of the video pertained to constipation in infants and children. The approval of the institutional review board of the study institution was not required for this study.

YouTube videos were evaluated independently by eight gastroenterologists. All raters worked at tertiary hospitals and had 10 years of experience in the diagnosis and management of constipation. Seven items were evaluated: image quality, usefulness to relieve constipation, usefulness for general physical health, difficulty in following, activity intensity, fun, and overall quality. Table 1 shows each question item used to assess the quality of the selected YouTube videos. Raters

Table 1. Each Question Item Used in the Study to Assess the Quality of YouTube Videos

Each item	Question	Likert scale	Lowest response	Highest response
Image	How good is its image quality?	6	Worst	Best
Quality 1	How useful is it in constipation?	5	Strongly disagree	Strongly agree
Quality 2	How useful is it in general physical health?	5	Strongly disagree	Strongly agree
Difficulty to follow	How difficult is it to follow for relatively healthy 50's constipated women?	5	Very easy	Very difficult
Activity intensity	How intense is it?	5	None	Severe
Fun	How interesting is it?	5	Very boring	Very interesting
Overall quality	How good is the overall quality of its content?	6	Worst	Best

were also asked open-ended questions to evaluate the strengths and weaknesses of each video.

Each upload source was categorized as commercial, media, or individual. The types of physical activity were classified as yoga, abdominal massage, and others. To assess whether popularity was related to the quality of YouTube videos, we compared the quality between the top five most-viewed videos (Nos. 6, 4, 5, 1, and 2) and the bottom five least-viewed videos (Nos. 17, 19, 15, 3, and 16).

1. Statistical methods

We compared the differences in scores for each question item 1) between the groups based on upload source, 2) between groups based on the exercise type, and 3) between the top five and bottom five videos using the Kruskal–Wallis and Mann–Whitney U-tests. A post-hoc test was performed using the Mann–Whitney U-test, and p-values were adjusted by the Bonferroni correction method. The intra-class correlation coefficient (ICC) was used to investigate the agreement among the answers. The ICC values can be interpreted as the percentage of variability between the ratings due to the differences between the items, and not due to observer error.¹⁷ The two-way ICC (2,1) was computed for the interobserver ICC to

reflect the use of a sample of patients and a sample of raters. An ICC score of greater than 0.7 was considered good; and an ICC score of greater than 0.8 was considered excellent, with observer error having a negligible effect on the observed correlations between two (sets of) measurements.¹⁸ All analyses were performed using the R statistical software package (version 3.0.1,¹⁹ with use of the 'IRR' package [version 0.83],²⁰ to calculate the ICC's, kappa values, and absolute agreement). All reliability and agreement measures are presented as the values for the eight observers. We also analyzed the qualitative, open-ended questions (What are the strengths and weaknesses of the video?) using word clouds ('wordcloud' package).²¹ Word clouds are graphical representations of word frequency that provides a greater prominence to words that appear more frequently in a source text.

RESULTS

In total, 23 YouTube videos were identified. Of these, three were excluded because they were removed from YouTube during the evaluation period; finally, 20 videos were analyzed (Table 2). The mean length of the videos was 268 seconds (range, 65-785 seconds), and each video was viewed an aver-

Table 2. Characteristics of Selected YouTube Videos in This Study

Video number	Address	Hit number	Video source	Activity type	Video length (seconds)	Uploaded date
1	https://www.youtube.com/watch?v=mYKcxYSXWzg	38,773	Commercial	Yoga	294	2015.09.10
2	https://www.youtube.com/watch?v=HUX1_TL2XNY	37,062	Media	Yoga	494	2012.01.16
3	https://www.youtube.com/watch?v=9sVmgnJMqyo	3,823	Commercial	Yoga	75	2016.11.19
4	https://www.youtube.com/watch?v=S10CNM_2-g8	72,001	Media	Other	241	2014.01.26
5	https://www.youtube.com/watch?v=IxK-IP8aI_E	50,539	Media	Massage	530	2014.11.12
6	https://www.youtube.com/watch?v=4a99fhSOB8I	316,581	Commercial	Yoga	197	2013.02.18
8	https://www.youtube.com/watch?v=fsfBlu2xj2E	18,092	Media	Yoga	87	2017.05.14
10	https://www.youtube.com/watch?v=OQRokOD5ar4	12,265	Commercial	Other	65	2016.01.11
11	https://www.youtube.com/watch?v=fAfdxv5NKPg	12,209	Media	Massage	72	2012.08.25
12	https://www.youtube.com/watch?v=Uy2O57RNKiU	9,973	Commercial	Other	221	2015.01.19
14	https://www.youtube.com/watch?v=S8uS1x_XTzl	8,739	Individual	Massage	219	2013.11.16
15	https://www.youtube.com/watch?v=FVZMX0c0ruc	3,675	Commercial	Yoga	102	2013.03.27
16	https://www.youtube.com/watch?v=5-QI-UQE_j4	4,708	Media	Massage	163	2016.03.16
17	https://www.youtube.com/watch?v=27r-bfJW8ak	3,329	Commercial	Other	186	2009.08.03
18	https://www.youtube.com/watch?v=kWFatjZGTr8	7,067	Commercial	Other	200	2014.03.14
19	https://www.youtube.com/watch?v=2fZH0VNwZSQ	3,402	Commercial	Yoga	595	2015.09.10
20	https://www.youtube.com/watch?v=pD5vqgsQXSxk	6,929	Commercial	Yoga	205	2016.03.14
21	https://www.youtube.com/watch?v=b_W-u0a3_xY	4,735	Individual	Yoga	216	2009.05.19
22	https://www.youtube.com/watch?v=rQ2onMjAYJo	6,020	Media	Yoga	407	2013.03.26
23	https://www.youtube.com/watch?v=RvnkKM5quOk	33,955	Individual	Yoga	785	2016.06.15

age of 32,694 times (range, 3,329-316,581 times). The greatest number of videos was uploaded by commercial websites (10 videos, 50%), followed by media (7, 35%) and individuals (3, 15%). The most common type of physical activity considered in the videos was yoga (n=11), followed by others (n=5) and massage (n=4). Other physical activities included stretching exercises (n=2), acupoint pressure massage (n=2), and gymnastics (n=1). None of the videos scored greater than 4 (i.e., “good to best”) with respect to “overall quality.” All videos had score a score of less than 3 (i.e., “strongly disagree to unknown”) for the quality 1 item (usefulness to relieve constipation). Only video number 2 had a “agree to strongly agree” response for the quality 2 item. Fig. 1 shows item scores based on video source, type of physical activity, and popularity.

1. How good was video image quality?

The median value (interquartile range [IQR]) of the image quality of all videos was 3 (2-4). A significant difference in image quality was observed among the video sources. Image quality was significantly lower in videos uploaded by individuals 2 (1-3) compared with those uploaded by commercial entities [3 (2-4); adjusted p=0.001] and those uploaded by the media [3 (2-4); adjusted p=0.002]. A significant difference in the image quality was identified between the groups based on the type of physical activity. Massage videos had significantly lower image quality [3 (2-3)] compared with the videos categorized as ‘other’ [3 (2-4); adjusted p=0.035]. No significant difference in image quality was observed between the top five and bottom five videos.

2. How useful was the video to relieve constipation?

The median quality 1 value (IQR) for all videos was 2 (2-3).

No significant difference in quality 1 was detected among the video sources. A significant difference in quality 1 was found between the groups based on the type of physical activity. Yoga videos had significantly higher quality 1 values [3 (2-3)] compared with massage videos [2 (1-3); adjusted p=0.006] and ‘other’ videos [2 (1-2); adjusted p<0.001]. A significant difference in quality 1 was observed between the top five and bottom five videos [3 (2-4) vs. 3 (2-3); p=0.006].

3. How useful was the video for general physical health?

The median quality 2 value (IQR) of all videos was 2 (1-3). A significant difference in quality 2 was detected among the video sources. The mean quality 2 value of commercial videos [2 (2-3)] was significantly higher than that of individual videos [1 (1-2); adjusted p=0.014]. A significant difference in quality 2 was found between the groups based on the type of physical activity. The quality 2 values for yoga videos [2 (1.75-3)] were significantly higher than those of massage videos [2 (1-2); adjusted p=0.001], but not higher than those of ‘others’ videos [2 (1-2); adjusted p=0.147]. No significant difference in quality 2 was detected between the top five and bottom five videos.

4. How difficult was the video to follow for relatively healthy constipated women in their 50s?

The median value (IQR) of ‘difficulty to follow’ of all videos was 2 (1-3). A significant difference in the level of difficulty was observed among the video sources. The median was significantly higher (more difficult to follow) for videos from commercial sources [3 (1-3)] than those uploaded by the media [1 (1-2); adjusted p<0.001], but not compared with those uploaded by individuals [2 (1-3); adjusted p=0.594]. A significant difference in the level was found between the groups

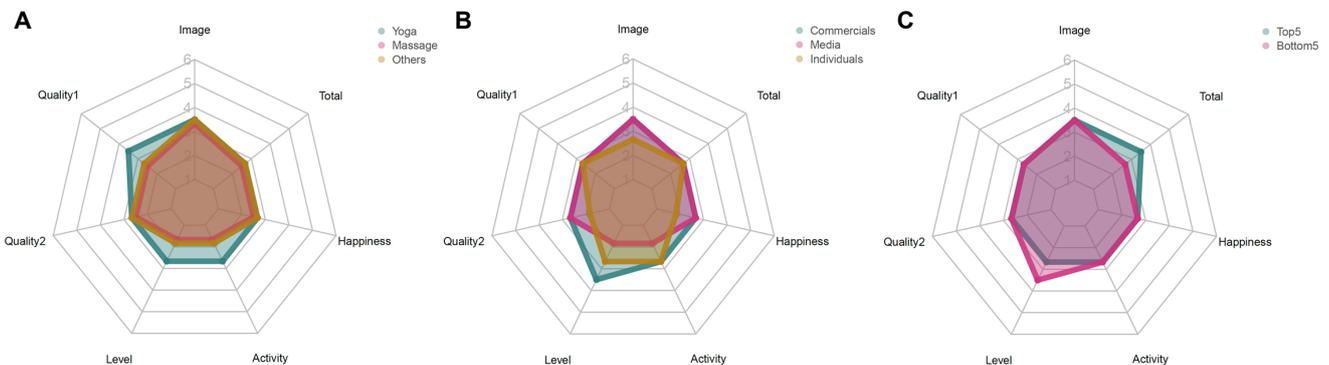


Fig. 1. Spider charts of each item based on video source (A), type of physical activity (B), and popularity (C).

based on the type of physical activity. Yoga videos had significantly higher values [2 (2-3)] compared with massage videos [1 (1-1); adjusted $p < 0.001$] and 'others' videos [1 (0.25-2); adjusted $p < 0.001$]. No significant difference was observed in the level between the top five and bottom five videos.

5. How intense was the activity in the video?

The median value (IQR) of activity in all videos was 2 (1-2). A significant difference in the activity intensity was detected among the video sources. The median activity intensity value was significantly higher in videos from commercial sources [2 (1-3)] than those from the media [1 (0.75-2); adjusted $p < 0.001$], but not compared with those uploaded by individuals [2 (1-2); adjusted $p = 0.286$]. A significant difference in activity was found between the groups based on the type of physical activity. Yoga videos had significantly higher values [2 (1.75-3)] than massage videos [1 (0-1); adjusted $p < 0.001$] and 'others' videos [1 (0-2); adjusted $p < 0.001$]. No significant differences in activity were observed between massage and 'others' videos. No significant difference in activity was detected between the top five and bottom five videos.

6. How fun was the video?

The median happiness value (IQR) of all videos was 2 (1-2). No significant difference in the fun score was observed among the video sources. No significant difference was found between the groups based on the exercise type. No significant difference was detected between the top five and bottom five videos.

7. How good was the overall quality of the video's content?

Fig. 2 shows the overall quality of each video. The median value (IQR) of overall quality of all videos was 2 (2-3). A significant difference in overall quality was observed among the video sources. The median overall quality value was significantly lower in the videos uploaded by individuals [2 (1-2)] than in those uploaded by the media [2 (2-3), adjusted $p = 0.001$] and commercial sources [2 (2-3), adjusted $p = 0.005$]. A significant difference in the overall quality was found between the groups based on the type of physical activity. However, a post-hoc analysis did not reveal differences in the overall quality among the subgroups. A significant difference in the overall quality was observed between the top five and bottom five videos [3 (2-4)] vs. [2 (2-3); $p = 0.003$].

8. Advantage and disadvantage

Word clouds revealed the advantages and disadvantages of each video from the open-ended questions (Fig. 3). The most common factor that the evaluators considered as an advantage was that people who exercised would have an easier bowel movement than those who did not exercise. Moreover, the following were also considered as advantages: benefits of physical activity for constipated patients with respect to weakened pelvic floor muscles, video focused on exercises to stimulate bowel movement, and the video composition was concrete. The most common disadvantage was the lack of medical evidence (i.e., the effect of exercise on the symptoms of constipation is questionable). The following were considered as disadvantages: difficulty to follow along with the exercise in the video, inadequate explanation on how to

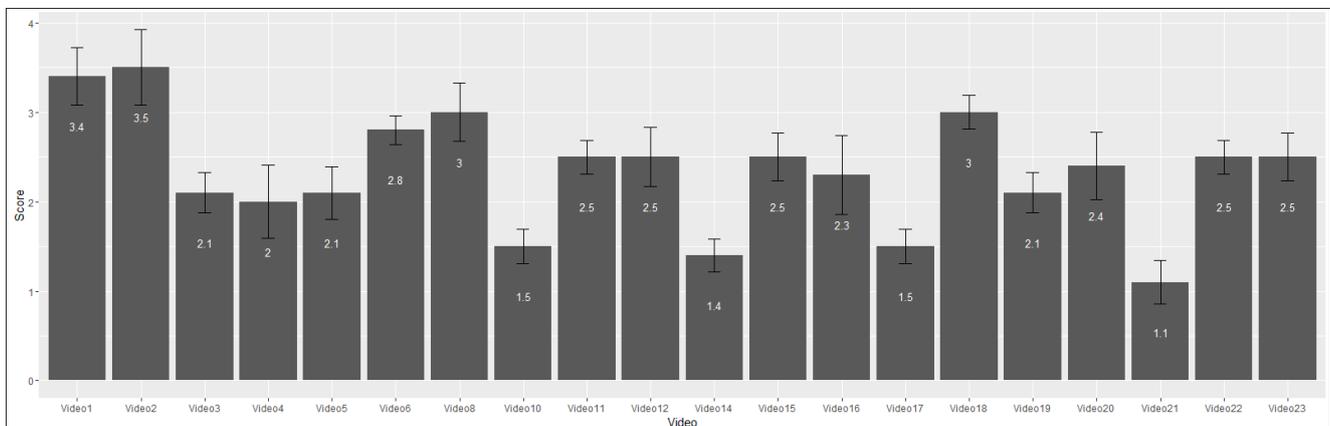


Fig. 2. Overall quality scores of each YouTube video selected as an information source for physical activity by constipated patients.

different domains of constipation patients' assessment of quality of life, such as reduced scores for physical discomfort (61.25%), psychological discomfort (59.21%), worries and concerns (55.92%), and satisfaction (44%) after a 1-week intervention and an integrated yoga therapy approach.

Moreover, this study also showed that none of the YouTube massage videos presented an accurate description of the massage type, adverse events, and contraindications. A systematic review that included only four controlled clinical trials indicated that abdominal massage was a promising approach for treating chronic constipation.²⁵ The type of massage used in the studies included in the systematic review was heterogeneous. Abdominal massage therapy is not totally devoid of risk. A case series reported several adverse events, such as ruptured uterus, displacement of ureteral stent, hepatic hematoma, colon rupture, and cranial hemorrhage of fetus.²⁶ Although the method, efficacy, and safety profile of abdominal massage for the relief of constipation remains unclear, the general lack of this information is of particular concern because constipated patients can develop complications. Contraindications for abdominal massage include a known or suspected abdominal obstruction, abdominal mass, recent history of radiotherapy to the abdomen, <6 weeks post-abdominal surgery, strangulated hernia, and not wanted by the patient.²⁷ In addition, many massage videos had misleading information. For example, "self-massage to Cannon's point is helpful for a bowel movement because this point is the starting point of colon peristalsis". However, Cannon's point, encountered during a barium enema, is a transient segment that narrows at a discrete point in the transverse colon.²⁸ It is thought to be the junction of the innervation between the mid-gut and hind-gut. There is no clinical significance to the Cannon's point and no proven effect from massaging this area.

Complementary and alternative medicine (CAM) is widely used in South Korea.²⁹ It is not surprising to see videos of acupoint pressure massage on YouTube, despite the lack of scientific evidence regarding the effectiveness of this approach. In fact, both yoga and massage are part of CAM. The reasons for the increased use of CAM include increased availability of information on the Internet, the perception that CAM is easier to understand, safer, and less expensive than conventional medications, and distrust and frustration with the healthcare system.³⁰ One European survey reported that

about 30% of constipated patients are dissatisfied with their treatment, and such dissatisfied patients were more likely to be interested in other treatments.³¹

In one study that investigated the relationship between Korean consumer characteristics and utilization of health information on the Internet, the utilization rates were higher for consumers who were young, educated, working in an office setting, had a higher income, wanted health information, and were able to use the Internet.³² A better understanding of the characteristics of Internet utilization by Korean consumers for health information will help to develop YouTube contents that are effective regarding the use of exercise to relieve constipation.

We were unable to search for any videos pertaining to aerobic exercise. The effect of aerobic exercise on healthy subjects or trained athletes has been questioned based on the mouth-to-cecum transit time.^{33,34} In contrast, a few studies involving healthy subjects have shown that colonic transit time decreases with physical activity.³⁵⁻³⁹ Physical exercise in untrained subjects increases colonic propagating activity, which may enhance colonic propulsion.⁴⁰ There is increasing evidence suggesting that exercise may alter the gut microbiome in animal models.⁴¹⁻⁴⁴ In a human study, exercise was related to gut microbial diversity.⁴⁵ In a study involving middle-aged inactive patients with constipation, stool consistency, other constipation symptoms, and colon transit time improved in response to moderate physical activity of 30-60 min/day (e.g., brisk walking).⁹ Furthermore, YouTube videos regarding the effects of aerobic exercise on constipation should be uploaded and/or monitored by medical professionals.

Pelvic floor physiotherapy has been utilized extensively over the past decades for the treatment of pelvic floor dysfunctions.⁴⁶ There is accumulating evidence that a combination of pelvic physiotherapy and laxatives are more effective in relieving constipation.^{47,48} The core of this therapy is diaphragmatic breathing, which strengthens the abdominal muscle contraction, improves coordination between abdominal muscle and pelvic floor muscle, and enhances the colonic propulsion. Further evidence-based YouTube videos should be introduced for constipated patients, in which the physiology of abdominal breathing applied and its correct technique would be comprehensively explained.

A few limitations are inherent in our study. There is no robust evidence regarding the effect of exercise on constipation

symptoms. It remains unclear what kinds of exercise are effective for improving constipation symptoms. Gastroenterologists participating in this study were unable to suggest any exercise that would be helpful for bowel motility. However, we were able to identify the videos for relieving constipation that had no exercise effect at all or non-scientific contents. Second, no validated, objective tools exist to evaluate the quality of YouTube videos. As such, the assessment was subjective. However, the quality evaluation is unlikely to have been flawed given the high level of expertise and high interobserver agreement. Third, our study design focused on Korean YouTube videos; hence, our results may not be broadly generalizable to other countries. Given the limitations and poor quality of YouTube videos reported in other studies,²² the results of video studies in other languages are unlikely to differ much from our results. Finally, our study design was cross-sectional and was able to capture only a single snapshot of the information available on YouTube. The information available on the website changes with time.

In conclusion, Koreans searching YouTube videos pertaining to useful exercises for constipation relief are presented with low quality content. Although the content quality differed statistically among video sources, the type of physical activity, and popularity, none of the videos was appropriate for constipated patients. Constipated patients, in particular, rely increasingly on internet-based resources, such as YouTube videos, to manage their condition. As such, physicians need to recognize the potential influence of YouTube videos on patients' perceptions of their condition and the effect on the physician-patient dialogue. This study highlights the need for both evidence-based comprehensive educational videos addressing exercises for coping with constipation and well-designed research to evaluate various types of exercise (including CAM) to relieve constipation.

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