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Original Article

Effectiveness of a LINE Official Account-Based Intervention on Bowel Preparation Quality and Patient Satisfaction Prior to Colorectal Cancer Screening Colonoscopy

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Abstract

Objective: This study assessed the effectiveness of a LINE Official Account-based intervention in preparing people for colorectal cancer screening colonoscopy in terms of bowel preparation quality and participant satisfaction.

Material and Methods: A survey-based study involving 333 university staff aged 45–60 undergoing screening colonoscopy from March 27, 2024 to July 8, 2025. Bowel cleanliness was evaluated by endoscopists using the Boston Bowel Preparation Scale (BBPS). Participant satisfaction was assessed using a questionnaire and validated for content, with high internal consistency (Content Validity Index [CVI] = 1.0, Cronbach's alpha = 0.96). Analyses were performed with R version 4.3.1. Continuous variables were described as mean ± SD and categorical variables as frequencies and percentages.

Results: The majority of patients had excellent bowel preparation (BBPS scores of 9 in 91%, 8 in 7.8%, and 7 in 1.2% of cases). Mean BBPS scores by segment were 2.9 (standard deviation [SD] 0.3) right colon, 3.0 (SD 0.1) transverse colon, and 3.0 (SD 0.1) left colon; mean total score was 8.9 (SD 0.3). Satisfaction with the LINE OA–based preparation was very high overall: mean score 4.64 (SD 0.38).

Conclusion: A LINE Official Account is an effective digital tool that can enhance bowel preparation quality. It has achieved very high satisfaction scores in participants undergoing colorectal cancer screening colonoscopy and provided convenient access to preparation information and continuous communication support, indicating its potential as an efficient digital strategy for improving colorectal cancer screening quality in at-risk populations.

Keywords: bowel preparation quality, colonoscopy, LINE Official Account, patient satisfaction

Introduction

Presently, colorectal cancer is one of the three most common cancers in Thailand. Mortality from colorectal cancer has increased approximately 2.4-fold[1], with its incidence continuing to rise annually, making it a major public health concern. At present, approximately 16,000 new cases are reported each year, and an estimated 5,500 deaths annually[2].

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Colorectal cancer (CRC) is largely preventable through the detection and removal of premalignant lesions in asymptomatic individuals. The clinical gold standard for screening, a colonoscopy, enables early diagnosis before significant metastasis occurs, thereby reducing cancer-related mortality, improving treatment outcomes, and lowering overall healthcare costs[3].

The majority of colorectal malignancies develop from precancerous adenomatous polyps. Screening facilitates the early detection and excision of these lesions, effectively interrupting the progression to invasive cancer and reducing overall incidence[4]. Colonoscopy serves as a versatile diagnostic and therapeutic tool, allowing for comprehensive visualization of the colonic mucosa, tissue biopsy, and non-surgical polypectomy. These capabilities make it the definitive method for the early detection and management of colorectal pathologies[5].

Proper patient preparation prior to colonoscopy, necessary for optimal bowel cleanliness, enhances effectiveness. This is achieved by enabling clear visualization of polyps, lesions, or tumors, thereby improving diagnostic accuracy and maximizing benefits for colorectal cancer screening[6-8]. Inadequate bowel cleansing obstructs colonic visualization, significantly increasing the risk of missed neoplastic lesions. Consequently, an optimal preparation regimen must be thorough yet sufficiently simplified and time-efficient to maximize patient adherence, thus ensuring diagnostic accuracy.[9] Studies from other countries have reported that inadequate bowel preparation can lead to diagnostic errors in detecting colorectal neoplasms in up to 42% of cases, with missed diagnoses in approximately 27%.[10] Suboptimal bowel preparation further compromises procedural efficiency, escalates healthcare expenditures, and heightens the risk of clinical complications, such as colonic perforation.[11]

Recent international studies have integrated various educational tools, such as multimedia videos and illustrations, through digital communication channels to enhance patient adherence and instructions for bowel preparation.[12-16] The ability of nurses to provide education through such media, in combination with conventional instructions, enhances patients' confidence in healthcare services. This also improves both their knowledge and understanding of bowel preparation.[17]

Recent evidence underscores the efficacy of structured educational interventions in enhancing patient preparedness for endoscopic procedures. Specifically, a Thai study by Chariya, utilizing a QR code–based drama educational package for bronchoscopy, reported high patient satisfaction, citing its usability, visual clarity, and alignment with safety protocols as key strengths. [18] Similarly, Suwannachat and Prachit found that structured bowel preparation programs for

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colonoscopy significantly improve both the quality of colonic cleansing and patient satisfaction by providing comprehensive guidance and systematic support. These studies collectively underscore the importance of information clarity and procedural convenience in optimizing patient outcomes.[19]

Prince of Songkla University, Hat Yai Campus, has personnel, of whom 3,268 are aged 45-60 years, which is the age group recommended for colorectal cancer screening according to international standards.[20] Despite its clinical importance, screening uptake among healthcare personnel remains suboptimal due to administrative barriers, prolonged waiting times, and rigid multi-step protocols. Traditional preparation methods, relying on printed leaflets and time-restricted telephone consultations, often fail to provide the real-time support necessary for effective patient adherence. To mitigate these challenges, digital platforms, such as the LINE Official Account (LINE OA), offer a streamlined alternative. By integrating interactive multimedia content and facilitating real-time communication, LINE OA simplifies access, minimizes unnecessary clinical visits, and alleviates outpatient overcrowding, thereby aligning healthcare delivery with modern digital trends.

Objectives of the Study

1. To evaluate the effect of using the LINE Official Account application on the quality of bowel cleanliness during colonoscopy.

2. To evaluate the level of patient satisfaction with the use of the LINE Official Account application for pre-colonoscopy preparation.

Method of the Study

A prospective descriptive study

The population and sample size calculation included: at Prince of Songkla University, Hat Yai Campus, patients aged 45–60 years who intended to undergo colorectal cancer screening by colonoscopy. The study was conducted between March 27, 2024 and July 8, 2025. The sample size was calculated based on an estimated bowel preparation score, using a one-sample mean method, as shown below:[21-22]

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$$n = \frac{z_{\frac{\alpha}{2}}^2 \sigma^2}{d^2}$$

Alpha = 0.05, Z(0.975) = 1.96.

SD refers to the standard deviation of bowel cleanliness for colonoscopy preparation, using a telemedicine-based healthcare service program = 0.97.[23]

Δ (delta) = estimation error = 0.11.

The calculated sample size was 299.

Allowing for 10% incomplete data, the final required sample size was n = 333.

Data Collection

Inclusion criteria were as follows:

1. Aged 45–60 years.

2. Eligible participants included those with stable and well-controlled comorbidities, such as hypertension or hyperlipidemia.

3. Able to communicate and understand Thai.

4. Owning a smartphone and being able to register and complete the application.

Research Procedures

1. Approval for data collection was obtained from the Human Research Ethics Committee, Faculty of Medicine, Prince of Songkla University, under project code REC. 67-076-21-7. This study was funded by the Faculty of Medicine, Prince of Songkla University (Grant No 67-023-1).

2. The researcher publicized the research project via social media to invite university personnel who wished to undergo colorectal cancer screening by colonoscopy at Prince of Songkla University, Hat Yai Campus, Songkhla Province. Potential participants who met the inclusion criteria and expressed interest in the research project were identified. Eligible participants were then enrolled and received support through the LINE Official Account application program.

3. Interested participants registered by scanning the designated QR code. Participants were recruited via social media by scanning a QR code to add the LINE Official Account application for colorectal cancer screening. The LINE Official Account name was PSU Colorectal Cancer

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Screening or "คัดกรองมะเร็งลำไส้มอ" in Thai. The researcher explained the objectives of the study, the benefits of participation, and participant rights and protection. Written informed consent to participate in the research was obtained through an online system. The required information included: first name, surname, age, gender, occupation, education level, underlying diseases, use of anticoagulant medication, and medical benefit scheme/healthcare coverage. These variables were included as they are known to be clinical and late-stage predictors of bowel cleansing quality. Upon recruitment, the research team established rapport with participants and provided a comprehensive orientation on the LINE Official Account (OA) platform via online communication. This digital channel remained accessible throughout the study for real-time inquiries. Following registration, eligible participants received automated notifications via LINE OA to coordinate medication pickup, confirm colonoscopy schedules, and receive standardized bowel preparation guidance.

4. Schedule the colonoscopy: participants confirmed their registration and appointment date, scheduled medication pickup, and received instructions on colonoscopy preparation and medication intake via video. Both two days and one day prior to the colonoscopy, reminder messages regarding the appointment and preparation were sent. Participants could ask questions concerning colonoscopy through the message function 24 hours a day. The day before the colonoscopy, follow-up and problem-solving were provided via the LINE Official Account application to participants requiring individualized care**.**

5. On the morning of the colonoscopy, participants completed a satisfaction questionnaire regarding the LINE Official Account application. The questionnaire used a 5-point Likert scale (1 = very low, 2 = low, 3 = moderate, 4 = high, and 5 = very high). The interpretation of mean scores was categorized into five levels: 1.00–1.50 = very low; 1.51–2.50 = low; 2.51–3.50 = moderate; 3.51–4.50 = high; and 4.51–5.00 = very high. Bowel cleanliness was also assessed using the Boston Bowel Preparation Scale (BBPS).[24] The quality of bowel preparation was independently scored by two physicians, with consensus resolution of discrepancies, enhancing the reliability of bowel preparation evaluation while reducing potential observer-related bias. The total BBPS score was calculated by summing scores from the three colonic segments: the left-sided colon, transverse colon, and right-sided colon. Each segment was scored according to the BBPS criteria: score 3 =

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excellent (entire mucosa of the colon segment seen well, with no residual staining; small fragments of stool and/or opaque liquid may be present); score 2 = good (minor residual staining, small fragments of stool and/or opaque liquid; however, the mucosa of the colon segment is seen well); score 1 = poor (a portion of the mucosa of the colon segment is seen; however, other areas are not well seen, due to staining, residual stool, and/or opaque liquid); and score 0 = inadequate (unprepared colon segment with mucosa not seen, due to solid stool that cannot be cleared). The maximum total score is 9, and a total score of 7 was considered the minimum acceptable standard for colonoscopy.

Instrument Quality Assessment

1. The questionnaire for assessing satisfaction with the provision of information and instructions for colonoscopy preparation was developed by the researcher and underwent content validity evaluation using the Content Validity Index (CVI). The instrument was reviewed by three experts: two gastroenterologists specializing in internal medicine and one advanced practice nurse from the pre-procedural preparation unit for gastrointestinal endoscopy at Songklanagarind Hospital. The content validity index (CVI) was equal to 1.00.

2. The reliability of the satisfaction questionnaire regarding the use of the LINE Official Account application for pre-colonoscopy preparation was assessed by analyzing the internal consistency of the research instrument, which was evaluated using Cronbach's alpha coefficient, in a pilot study involving 30 participants. The analysis yielded a Cronbach's alpha coefficient of 0.96.

Figure 1. Examples of the LINE Official Account application interface (Thai version), demonstrating registration via QR code, appointment confirmation, medication pickup scheduling, bowel preparation instructions, communication features, protocol notifications, and contact information.

Instructions on bowel preparation

A standard bowel preparation regimen, using split-dose polyethylene glycol electrolyte solution, was employed. The preparation consisted of PEG-ELYTE, a hospital-prepared

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formulation containing 188 grams of polyethylene glycol 4000, 2.93 grams of sodium chloride, 3.37 grams of sodium bicarbonate, 11.37 grams of sodium sulfate, and 1.485 grams of potassium chloride. Each sachet was reconstituted with 2,000mL of sterile water prior to administration. The first dose was administered on the evening before the colonoscopy, during which participants were instructed to ingest the solution in 250-mL portions at 15-minute intervals until the full volume was consumed within approximately two hours. The second dose was scheduled for ingestion in the early morning on the day of the procedure. In addition, all participants were advised to follow a low-fiber diet for two days prior to colonoscopy, and were permitted to consume clear liquids until four hours before the procedure.

Data Analysis

Data were analyzed using R software, version 4.3.1. Bowel cleanliness and satisfaction with the use of the LINE Official Account application for colonoscopy are presented as mean and standard deviation (Mean ± SD). Categorical variables are presented as frequencies and percentages.

Figure 2. Flow of the study

Results

A total of 333 participants were included in the study. Most participants were aged 45–50 years (40.54%), followed by those aged 56–60 years (36.04%), then 51–55 years (23.42%). The majority were female (86.5%), with males accounting for 13.5%. Regarding educational level, most participants held a bachelor's degree (45.65%), followed by a master's degree or higher (31.53%), secondary education (21.02%), then primary education (1.8%).

In terms of occupation, the largest proportion was government-funded university employees (44.14%), followed by civil servants (26.73%), income-funded employees (22.82%), permanent employees (5.41%), and temporary employees (0.90%). Most participants had no underlying diseases (225 participants, 66.57%), used direct reimbursement healthcare coverage (201 participants, 60.40%), and had no history of anticoagulant use (324 participants, 97.3%), as shown in Table 1.

Table 1 Number and percentage of participants' personal characteristics (n = 333)

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Bowel preparation outcome

Overall bowel cleanliness was predominantly rated as excellent (BBPS score of 9), accounting for 91.0% of participants, followed by very good cleanliness (BBPS score of 8) at 7.8%. The lowest proportion was rated as good (BBPS score of 7), accounting for 1.2% of participants (Table 2).

Table 2 Overall bowel cleanliness based on the Boston Bowel Preparation Scale (BBPS)

Bowel cleanliness by colonic segment was assessed using mean and standard deviation. The mean (SD) BBPS score for the left-sided colon was 3.00 (0.05), for the transverse colon 2.99 (0.11), and for the right-sided colon 2.91 (0.28). The overall mean (SD) total BBPS score was 8.9 (0.3), as shown in Table 3.

Table 3 Mean and standard deviation of bowel cleanliness by colonic segment (n = 333)

Quality assessment outcomes

The overall level of satisfaction with the LINE Official Account application for colonoscopy was at the highest level, with a mean (SD) score of 4.64 (0.38). Satisfaction at the individual dimension level was also at the highest level in all dimensions, as follows:

Convenience of service access: The overall satisfaction level showed a mean (SD) of 4.67 (0.40). The application was easy to use, continuous, and easy to understand. Participants could conveniently contact healthcare staff, reducing the time required to access healthcare services and bowel preparation.

Information received: The overall satisfaction level showed a mean (SD) of 4.58 (0.44). The language and content were easy to understand and presented in a clear, step-by-step manner, enabling participants to correctly follow dietary and medication instructions for bowel preparation. This resulted in overall satisfaction with colonoscopy preparation.

Coordination: The overall satisfaction level showed a mean (SD) of 4.62 (0.45). Participants were able to access healthcare services continuously and appropriately when problems occurred, or when they needed to ask questions, with immediate assistance being available.

Service provider attitude: The satisfaction level showed a mean (SD) of 4.73 (0.45).

Quality of use: The overall satisfaction level showed a mean (SD) of 4.66 (0.44). The application was appropriate for facilitating access to healthcare services and bowel preparation.

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Cost: The satisfaction level showed a mean (SD) of 4.64 (0.52), reflecting reduced expenses related to accessing healthcare services.

Table 4 Level of satisfaction with the use of the LINE Official Account application for pre-colonoscopy colorectal cancer screening preparation, presented as mean and standard deviation (n = 333).

Discussion

This study found that most participants had excellent bowel preparation quality (BBPS ≥ 8), accounting for 98.8%. The mean bowel cleanliness score was at the optimal level, with a mean of 8.9 and an SD of 0.3. This may be attributed to the use of the LINE Official Account application, which allowed participants to access information at any time. The application provided an official communication channel that met participants' needs, as it enabled broadcast messaging, supported interactive communication, and allowed participants to ask questions regarding colonoscopy preparation at any time if problems occurred. The application facilitated two-way communication and provided selectable menus, including text messages, images, videos, and audio content, all of which enhanced understanding of colonoscopy preparation.

These findings are consistent with Pattarapuntakul T et al. (2024), who (conducted at the same institution) reported that the intervention group had significantly higher mean bowel cleanliness scores and a higher proportion of excellent bowel preparation (BBPS ≥ 8) compared with the control group. Bowel preparation using a smartphone application was also associated with improved adenoma detection rate (ADR). This is considered a key quality indicator of colonoscopy, because it is directly associated with the subsequent risk of colorectal cancer. [25]

The effect of smartphone applications on bowel preparation quality is also consistent with the study by van der Zander QEW et al. (2021), which found that the application group had significantly higher mean BBPS scores than the control group. [26] This may be explained by better adherence to dietary instructions and systematic bowel preparation methods among application users. The application provided educational images and videos as well as reminder messages, which helped improve bowel preparation quality compared with standard instructions. Hence, providing bowel preparation education through applications can significantly improve bowel cleanliness quality and patient adherence compared with standard methods.

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These findings are also consistent with Kantawong T et al. (2022), who reported that a telemedicine-based service program resulted in optimal bowel cleanliness in 86.1% of participants, with a mean bowel preparation score at the optimal level ($\bar{x}$ = 8.33, SD = 0.97).[23]

Regarding satisfaction, this study found that satisfaction with the use of the LINE Official Account application for pre-colonoscopy preparation was at the highest level in all dimensions. The overall mean satisfaction score was $\bar{x}$ = 4.64, SD = 0.38. This may be due to participants being able to immediately access information after registering through the QR code system. Participants were able to review information related to colonoscopy, the importance of colorectal cancer screening, confirm appointments, and reschedule appointments through the developed platform. Continuous communication and inquiry were available at all times.

In addition, participants in this study did not need to visit the hospital prior to colonoscopy. This reduced time and eliminated multiple procedural steps required in conventional preparation methods. Traditional preparation requires in-person counseling, which is time-consuming. Furthermore, patients were unable to ask questions afterwards without contacting the responsible unit by telephone through multiple steps, often resulting in inconvenience. Moreover, loss of printed instruction materials could lead to incorrect preparation. In contrast, the LINE Official Account application allowed participants to access information at any time. It also provided reminder notifications for appointments and bowel preparation, both 2 days and 1 day prior to colonoscopy. The findings of this study suggest that integrating a LINE Official Account–based communication platform into routine colorectal cancer screening services can enhance nursing practices by improving the consistency of bowel preparation education and patient engagement. Nurses can utilize this digital platform to deliver standardized, multimedia preparation instructions, provide timely reminders, and respond to patient inquiries, thereby reducing misunderstandings and enhancing adherence to bowel preparation protocols. The high level of patient satisfaction observed indicates that such an approach may also improve patient experience and reduce anxiety prior to colonoscopy. Moreover, the use of a widely accessible and familiar digital platform supports efficient workflow integration without substantially increasing nursing workload. This model may be readily adapted to other endoscopic procedures and preventive screening programs, supporting the expansion of digital nursing interventions in real-world clinical practice.

Hence, developing and disseminating information regarding colorectal cancer screening through the LINE Official Account application enhances access to healthcare services, reduces

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procedural steps, saves time, and lowers costs. These findings are consistent with Phamornpon S et al. (2025), who reported that the most important facilitating factor for accessing colorectal cancer screening was receiving information. The odds of accessing colorectal cancer screening increased 4.23 times with each one-unit increase in information score ($p < 0.001$). Awareness was identified as a key factor driving the intention to undergo screening. [27]

Additionally, these findings are also consistent with Wongpanich et al. (2025), who reported that using a LINE Official Account as a medium for pre-colonoscopy preparation significantly increased patient knowledge and reduced anxiety. Patients reported high satisfaction with the preparation media. [28] Similarly, Şengör K, Keskin M, and Akyüz N. (2025) also supported these findings, demonstrating that mobile application–based bowel preparation improved patient adherence to instructions, resulted in cleaner bowel preparation, and reduced patient anxiety compared with the standard preparation methods. [29]

These findings highlight the important role of digital health media, such as the LINE Official Account, not only in improving the technical quality of bowel preparation but also in addressing psychological factors among patients undergoing colonoscopy, for example, anxiety. Overall, the results indicate that digital platforms can provide comprehensive benefits to patients, both in terms of the technical quality of colonoscopy preparation and the overall patient experience.

This study has several limitations that should be acknowledged. First, it was conducted at a single university hospital, and the study population comprised university personnel who may have had greater access to digital technology, higher educational attainment, and higher socioeconomic status. Additionally, they may have had greater interest in colorectal cancer screening than the general population. Second, the LINE Official Account application was implemented exclusively at our institution and available only in Thai. This may limit the generalizability and broader applicability of the findings. While the LINE OA intervention proved effective within an institutional setting, its broader scalability is constrained by the digital divide, notably varying literacy levels and device accessibility among the elderly. To sustain the high adherence observed in this study across the general population, future implementations should adopt a stratified approach with digital content tailored to diverse literacy levels. Nevertheless, the results indicate that a LINE Official Account–based intervention can support colonoscopy appointment coordination and bowel preparation by providing patient support without requiring an in-person physician visit. Despite these limitations, the study provides

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valuable real-world evidence supporting the feasibility and potential benefits of using a LINE Official Account as a digital tool for pre-colonoscopy preparation.

Conclusion

The use of the LINE Official Account application for pre-colonoscopy colorectal cancer screening preparation among personnel of Prince of Songkla University resulted in a very high level of bowel preparation quality and the highest level of overall satisfaction across all dimensions. This study demonstrates that the LINE Official Account is an effective digital tool for facilitating access to healthcare services, reducing procedural steps, saving time, reducing service congestion, and promoting adherence to colonoscopy preparation instructions.

Recommendations

While the current study demonstrates the potential of the LINE OA platform, the lack of a concurrent control group and the use of a healthcare-affiliated cohort, who may possess higher baseline health literacy, represent notable limitations. To mitigate these biases and confirm broader clinical efficacy, future research should employ a randomized controlled trial (RCT) involving diverse demographic groups. Furthermore, the successful implementation observed here justifies expanding this digital intervention to other gastrointestinal and hepatological procedures. Extending such service systems to the general population will be a critical step in enhancing equitable access to diagnostic services and optimizing colorectal cancer screening outcomes.

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Figure 1. Examples of the LINE Official Account application interface (Thai version), demonstrating registration via QR code, appointment confirmation, medication pickup scheduling, bowel preparation instructions, communication features, protocol notifications, and contact information.



Figure 2. Flow of the study

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Table 1 Number and percentage of participants' personal characteristics (n = 333)

Personal characteristics		
Gender	Number (n)	Percentage (%)
Male	45	13.50
Female	288	86.50
Age (years)	Number (n)	Percentage (%)
45-50	135	40.54
51-55	78	23.42
56-60	120	36.04
Body mass index (BMI, kg/m²)	Number (n)	Percentage (%)
< 18.5	7	2.1
18.5-22.9	133	39.9
23-24.9	70	21
25-29.9	107	32.1
>30	16	4.8
Occupation	Number (n)	Percentage (%)
Civil servant	89	26.73
Permanent employee	18	5.14
Government-funded university employee	147	44.14
Revenue-funded employee	76	22.82
Temporary employee	3	0.90
Educational level	Number (n)	Percentage (%)
Primary education	6	1.80
Secondary education	70	21.02
Bachelor's degree	152	45.65
Master's degree or higher	105	31.53

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Personal characteristics		
Underlying disease	Number (n)	Percentage (%)
No	225	66.57
Yes	108	32.43
Health insurance coverage	Number (n)	Percentage (%)
Direct payment (cashless system)	201	60.4
Social Security Scheme	132	39.6
History of anticoagulant use	Number (n)	Percentage (%)
No	324	97.3
Yes	9	2.7

Table 2 Overall bowel cleanliness based on the Boston Bowel Preparation Scale (BBPS)

Bowel preparation score	Number (n)	Percentage (%)	Level
7	4	1.2	Good
8	26	7.8	Very good
9	303	91.0	Excellent

Table 3 Mean and standard deviation of bowel cleanliness by colonic segment (n = 333)

Colonic segment	BBPS score	Number (n)	Percentage (%)	Mean (SD)
Right colon	0–1	0	0.0	2.91 (0.28)
	2	29	8.7	
	3	304	91.3	

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Colonic segment	BBPS score	Number (n)	Percentage (%)	Mean (SD)
Transverse colon	0–1	0	0.0	2.99 (0.11)
	2	4	1.2	
	3	329	98.8	
Left colon	0–1	0	0.0	3.00 (0.05)
	2	1	0.3	
	3	332	99.7	

Table 4 Level of satisfaction with the use of the LINE Official Account application for pre-colonoscopy colorectal cancer screening preparation, presented as mean and standard deviation (n = 333)

Satisfaction items	Mean	SD	Level of satisfaction
1. Convenience of service access	4.67	0.40	Highest
1.1 Easy and convenient access to healthcare services	4.71	0.46	Highest
1.2 Easy to use, continuous and easy to understand	4.63	0.48	Highest
1.3 Able to conveniently contact staff when questions arose	4.67	0.47	Highest
1.4 Reduced time required to access healthcare services and bowel preparation	4.68	0.49	Highest
2. Information received	4.58	0.44	Highest
2.1 Language and content were easy to understand and presented in a clear, step-by-step manner	4.58	0.51	Highest

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Satisfaction items	Mean	SD	Level of satisfaction
2.2 Understanding dietary and medication instructions for bowel preparation correctly	4.54	0.52	Highest
2.3 Ability to correctly follow dietary and medication instructions for bowel preparation	4.59	0.51	Highest
2.4 Overall satisfaction with colonoscopy preparation	4.59	0.52	Highest
3. Coordination	4.62	0.45	Highest
3.1 Continuous and appropriate access to healthcare services	4.63	0.49	Highest
3.2 Ability to receive immediate assistance from the research team when problems or questions occurred	4.61	0.50	Highest
4. Service provider attitude	4.73	0.40	Highest
5. Quality of use	4.66	0.44	Highest
5.1 Appropriateness in facilitating access to healthcare services and bowel preparation	4.66	0.47	Highest
5.2 Willingness to choose this LINE Official Account–based guidance for future colonoscopy	4.65	0.50	Highest
6. Cost	4.64	0.52	Highest
Saving expenses related to accessing healthcare services	4.64	0.52	Highest
Overall satisfaction with the use of the LINE Official Account application for colonoscopy	4.64	0.38	Highest

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