Efficacy of a full management model in daytime surgery for gastrointestinal polyps based on WeChat: a study protocol for randomised controlled trials

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Research Article

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Abstract

**Objective:** To explore the feasibility and effectiveness of a full management model based on WeChat platform in patients undergoing daytime gastrointestinal polypectomy.

**Methods:** 593 patients were randomly divided into two groups: the control group was treated with traditional management methods, and the experimental group was treated with the whole-process management mode based on the WeChat platform. The WeChat platform-based full management model included establishing a day surgery management WeChat group, developing multidisciplinary, full-management protocols and processes for day surgery, establishing an information-based surgical scheduling system, and adopting diverse forms of day surgery education and continuity of care. This feature included illustrated brochures, vivid verbal presentations, WeChat public numbers, and Internet management platforms. The treatment time, hospitalization cost and patient satisfaction of the two groups were counted.

**Results:** In the experimental group, 408 patients were enrolled. The pre-operative waiting time and patients' length of stay was 3 days and 1 day. The medical and nursing intake time was 7 minutes. The procedure cancellation rate and post-operative complications rate was 0.07% and 0.02%. In the control group, 185 patients were enrolled in the study, The pre-operative waiting time and patients' length of stay was 7 days and 3 days. The medical and nursing intake time was 28 minutes. The procedure cancellation rate and post-operative complications rate was 0.13% and 0.05%. The hospitalization costs were reduced by an average of $140/person and the satisfaction scores were higher than control group.

**Conclusion:** Through the full management model based on WeChat, the preoperative waiting time, medical reception time, surgical cancellation rate, length of hospital stay, and hospitalization cost in the experimental group were less than those in the control group. Patient satisfaction scores were significantly higher than those in the control group and the difference was statistically significant.

1. Introduction

Gastrointestinal polyps are overgrown tissues protruding from the surface of the gastrointestinal mucosa, with hyperplasia, inflammation, malformation, and adenoma. Some polyps may become malignant; in particular, adenomatous polyps are prone to becoming cancerous (Li et al., 2017). In recent years, with the development of gastrointestinal endoscopy, endoscopic polypectomy has become a safe and effective treatment for gastrointestinal polyps. This minimally invasive procedure requires only a short hospital stay, making it suitable for day surgery (Chen et al., 2021). In day surgery, patients complete pre-operative examinations in the outpatient clinic. They make an appointment for surgery and are admitted, operated on, and observed. Subsequently, they recover and are discharged within 24 hours (Yang et al., 2020). Presently, day surgery is developing rapidly in China. In 2015, the National Circular on the Issuance of the Action Plan for Further Improvement of Medical Services proposed to "promote day surgery." The Guidance Opinions of the General Office of the State Council on Comprehensive Reform of Urban Public Hospitals proposed to "gradually expand the inclusion of day surgery paid for by medical insurance" (Medical Affairs Bureau, 2015; General Office of the State Council, 2015). In 2019, the percentage of day surgeries performed was included in the performance assessments for tertiary public hospitals. In 2020, gastroenterology polyp surgery was included in the first trial implementation batch of surgical operation specifications for day surgery conditions (General Office of the State Council, 2019; General Office of the National Health and Health Commission, 2020).
Despite its promise, there are still many concerns with our country's sustainable development and standard management of day surgery, the management standard of daytime endoscopic surgery is not perfect yet. One study has shown that cumbersome consultation processes, inadequate pre-operative and post-operative education, and guidance for day surgery patients increase the risk of post-operative complications (Zhang, Xin, Huang, & Xiong, 2018). Thus, some scholars suggest that digital information technology and other new media should be fully utilized to provide patients with various forms of health education, rehabilitation guidance, and remote follow-up to ensure they receive refined, scientific, and standardized medical services (Dong, Wang, & Sun, 2022). Some studies have demonstrated that information-based nursing interventions can improve the quality of ambulatory endoscopic procedures and increase patient satisfaction (Zheng, Xu, Zhang, Qian, & Yan, 2022; Huang et al., 2021). New media such as Wechat is the most popular social tool in China nowadays, which can transfer video, voice messages, pictures, and texts for free, supports group chat, and has a broad base of over 500 million users. Therefore, this study utilized the WeChat platform to comprehensively manage patients undergoing gastrointestinal endoscopic daytime surgery from 2020, providing a multi-disciplinary, multi-form, and full process management model for patients undergoing gastrointestinal polyp daytime surgery.

2. Methods

2.1 Research Objectives

A total of 593 patients requiring gastrointestinal polyp surgery from January to October 2021 were selected as the study objects. The inclusion criteria were as follows: (1) day surgery-eligible gastrointestinal polyps diagnosed via gastroscopic biopsy; (2) voluntary daytime gastrointestinal polypectomy; (3) no major comorbid diseases involving the heart, lung, kidney, or liver, and normal blood routine, liver, coagulation, and kidney function; (4) patients or family members who were proficient in the use of smartphones. The selected patients were randomly divided into control and experimental groups, with 185 cases in the control group and 408 cases in the experimental group. Written informed consent was obtained from all patients according to institutional guidelines. The study was approved by the Ethical Review Committee of Mianyang Central Hospital.

2.2 Research method

For the 185 patients in the control group, routine care was provided, complying with gastrointestinal polyp surgery guidelines in gastroenterology. Patients were admitted to the hospital and administered a pre-operative check-up by the attending physician in the corresponding examination rooms in the outpatient clinic. Then they went to the endoscopy center to make an appointment for their polyp procedures. The nurse in charge provided pre-operative and post-operative health education. The experimental group had daytime gastrointestinal polypectomy nursing using the WeChat platform-based full management model described below.

2.2.1 Establishment of a Multidisciplinary Management Team for Day Surgery

Established multidisciplinary management team for day surgery of gastrointestinal polyps comprised members from seven different disciplines, including gastroenterology managers, gastroenterologists, full-time nurses for day surgery in gastroenterology, medical staff from the digestive endoscopy center, anesthesiologists, auxiliary examination departments (including electrocardiogram [ECG] and radiology), and the information department. The Head of Gastroenterology and Head Nurse were responsible for quality supervision of day surgery management. The doctor in the gastroenterology ward was responsible for pre- and post-operative medical advice, surgical communication,
and medical record-keeping. A full-time nurse for day surgery in the Department of Gastroenterology was responsible for pre-operative examination, diet, and admission processes and post-operative diet, activity, condition experimental, rehabilitation guidance, discharge, and follow-up processes of all day surgery patients, as well as the management of the entire pre-operative and post-operative courses of the patients. The endoscopic medical staff was responsible for patient surgery and intraoperative management. The anesthesiologist was responsible for evaluating pre-operative anesthesia and implementing perioperative anesthesia. The ancillary departments were responsible for completing pre-operative ECGs, chest X-rays, and other pre-operative tests for patients. The information department set up a day surgery scheduling system with the help of the information technology (IT) department to implement unified management of day surgery patients and outpatients examined at the endoscopy center.

### 2.2.2 Standardizing Day Surgery Center

The original wards of the Department of Gastroenterology were rearranged, and a day surgery center was established, equipped with computers, printers, pre-operative blood collection tools, bowel preparation tools, and special beds and chairs for day surgery.

### 2.2.3 Pre-Admission Care

After a patient was diagnosed with a gastrointestinal polyp (polyp diameter ≤ 1 cm) via gastroscopy in the endoscopy center, the doctor at the endoscopy center issued the patient an electronic admission card and instructed the patient to access the WeChat public number of the Department of Gastroenterology of the hospital. Patients were then instructed to read the articles and watch the videos related to "daytime gastrointestinal polyp surgery" on the public number, understand the information about daytime surgery, and go to the hospital admission service center to be admitted. The full-time day surgery nurse scheduled surgery for the patient according to the patient's condition and the admission appointment time using the IT scheduling system. Inviting the patients to join the day surgery patient WeChat group, daily pre-operative guidance messages were sent by a dedicated day surgery nurse into the WeChat group, containing guidance on the medical process, including pre-operative exam appointment time, operation time, relevant materials to bring, location of the day ward of the Department of Gastroenterology, and precautions to be taken on the day of pre-operative examination, such as nucleic acid testing time, epidemic prevention and control requirements, and family accompaniment.

Patients were instructed to stop taking anti-platelet drugs such as aspirin and anticoagulant drugs such as warfarin one week before surgery (Zhang, 2021). They were also instructed to stop taking iron supplements and other foods that tend to make stool residues sticky and difficult to pass five days before surgery. Patients were instructed to avoid red foods such as tomatoes, dragon fruit, and animal blood for three days before the operation, as well as foods with high fiber content, whole grains, seaweed, kiwi, celery, black rice, kelp, and fungi. A semi-liquid diet, including foods such as fish, steamed eggs, and congee, was recommended to avoid interference with the endoscopic view of the mucosa. Patients were told to follow a liquid diet two days before the operation. Patients with intestinal polyps were told to avoid consuming gas-producing foods such as soy and milk. Finally, all patients were instructed to fast for 12 h and abstain from drinking water for 4 h before the operation.

On the day of the pre-operative examination, patients brought relevant materials to the day ward, where the full-time day surgery nurse received them and arranged for the doctor in charge to issue pre-operative examination medical orders. The full-time day surgery nurse then completed the pre-operative blood collection, distributed the pre-operative examination list, and arranged for special personnel to escort the patient to the corresponding auxiliary examination department for other pre-operative examinations. After the patient completed all the pre-operative examinations, the full-time nurse gave them instructions on bowel preparation, sent instructional videos in the WeChat group, and
issued an illustrated education booklet via the WeChat public number. The patient could consult in the group at any time with any questions. The attending physician and the full-time nurse were also available to answer questions and guide patients.

**Tips for pre-operative diet:**

1. Stop taking anti-platelet drugs such as aspirin and anticoagulant drugs such as warfarin one week before surgery (Zhang, 2021).

2. Stop taking iron supplements and other foods that tend to make stool residues sticky and difficult to pass five days before surgery.

3. Avoid red foods such as tomatoes, dragon fruit, and animal blood three days before the operation, as well as foods with high fiber content, whole grains, seaweeds, kiwi, celery, black rice, kelp, and fungi.

4. A semi-liquid diet such as fish, steamed eggs, and congee is recommended for three days before operation to avoid interference with the endoscopic view of the mucosa.

5. Follow a liquid diet and avoid gas-producing foods such as soy and milk two days before the operation.

6. Fasting except for consumption of water is required for 12 hours before the procedure, with water intake prohibited 4 hours before the operation.

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**Tips for the medical process:**
Follow the WeChat public number to read and watch articles and videos about "daytime gastrointestinal polyp surgery" on the public website.

Make an appointment for admission at the Hospital Admissions Service Center.

Return home and wait for the full-time day surgery nurse to inform you about the surgery schedule.

Join the day surgery WeChat group under the guidance of the dedicated day nurse and read the pre-operative guidance information care.

Complete nucleic acid testing the day before the pre-operative exam and wear a mask outside.

Bring gastroenterology report on the day of the pre-operative examination.

Report to the Day Surgery Center (4th floor of the 2nd inpatient building).

Accompanied by the dedicated day surgery nurse and arranged to meet the supervising physician and accept the prescription for pre-operative examination according to your condition.

Complete the pre-operative blood collection and accept the pre-operative checklist at the dedicated day surgery nurse.

Escorted to the appropriate ancillary departments for other preoperative.

Receive perioperative instructions and an illustrated educational booklet on bowel preparation from the dedicated day surgery nurse after completing all preoperative examinations.

Bring all the relevant materials which including ID card, medical insurance card, prior examination report and remember to ask your family to accompany you on the day of surgery.

2.2.4 Post-Admission Care

According to the doctor's order for bowel preparation, the full-time nurse used a special measuring cup to measure 2,000 mL of warm boiled water and mixed it with polyethylene glycol electrolyte. The nurse instructed the patient to take this mixture orally within 2 hours and mix dimethicone into 50 ml of warm water and drink it all at once after half an hour. And then instructed the patient to exercise moderately to promote intestinal peristalsis. The full-time nurse then supervised the patient's bowel preparation, and the indication for completion was the patient's final passed stool being clear, without any fecal residue. Patients were escorted to the endoscopy center according to the time of their procedure, managed by the endoscopy center medical staff during the procedure, and escorted back to the day ward after the procedure. Patients returned to the day ward to rest after surgery, and the full-time nurse was responsible for experimental. If patients showed any symptoms, such as abdominal distension and pain, the full-time nurse informed the doctor in charge and assisted the doctor in managing them accordingly. During the rest period,
the full-time nurse provided patients and their families health information regarding post-operative diet, activities, and follow-up examinations and issued a post-operative health guidance manual.

2.2.5 Post-Discharge Care

Patients were assessed by the supervising physician and full-time nurse according to the Post-Anesthetic Discharge Scale and were discharged if they had a score ≥ 9 points (Liu, Song, Wen, & Wang, 2010). On the first, seventh, and thirtieth day after discharge, patients were followed up by dedicated nurses through WeChat groups, telephone calls, and the Internet Nursing Chronic Disease Management Platform to record their post-operative conditions and remind them to follow-up regularly as required. Patients and their families could view post-operative health guidance articles and videos through the WeChat public website and have real-time consultations through the day surgery patient WeChat group.

2.3 Observed Indicators

Pre-operative waiting time (the time of appointment to the time of surgery), medical and nursing reception time (the time between the patient's arrival at the Gastroenterology Day Unit and the time when a medical order was assigned for the pre-operative examination), procedure cancellation rate (temporary cancellations because of failure to stop taking medication in advance, patient unaccompanied by a family member, and unsatisfactory bowel preparation), length of hospital stay (the time between the patient's formal admission and discharge), hospital costs (pre-operative tests, surgery, treatment, materials, care, beds, and other costs), and patient satisfaction were compared between groups. A questionnaire was used to measure satisfaction containing 10 dimensions (medical staff communication, medication communication, admission and discharge procedures, discharge notification, pain management, ward environment, signage, service attitude, demand response, and hospital diet), with 20 entries. Each measure was assigned a score of 1–5 based on the responses of “dissatisfied,” “less satisfied,” “average,” “more satisfied,” and “satisfied,” respectively, with a total score ≥ 90 being considered satisfactory.

2.4 Statistical Analysis

SPSS 27.0 (IBM SPSS® Statistics) was used for statistical analysis. Measurement data are expressed as (x ± s), and Student’s t-test was used to compare the two groups. Count data are expressed as rate n (%), and the χ² test was used to compare the groups. Differences were considered statistically significant at p < 0.05.

3. Results

3.1 Comparison of general information between the two groups of patients

There were no significant differences between the groups regarding age, sex, education level, and type of disease (p > 0.05, Table 1).
Table 1
Comparison of the patients’ general characteristics

<table>
<thead>
<tr>
<th>Group (n)</th>
<th>Sex (n)</th>
<th>Age (x ± s)</th>
<th>Education level (n)</th>
<th>Type of disease (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male/Female</td>
<td></td>
<td>≤ Primary school</td>
<td>Junior high school</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td>96</td>
<td>178</td>
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<td>44</td>
<td>83</td>
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<td></td>
<td></td>
<td>139</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54.04</td>
<td>19.11</td>
<td>6.59 ± 2.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>± 11.97</td>
<td>12.39</td>
<td>.098</td>
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</tbody>
</table>

χ² value 2.740
p-value .098

3.2 Comparison of the pre-operative waiting time, medical reception time, procedure cancellation rate, and post-operative complications between the two groups of patients

The pre-operative waiting time, medical and nursing reception time, surgery cancellation rate, and post-operative complication rate of patients in the experimental group were significantly lower than those in the control group (p < 0.05, Table 2). Pre-operative waiting time was reduced from 7 to 3 days, and medical and nursing intake time was reduced from 28 minutes to 7 minutes.

Table 2
Comparison of preoperative waiting time, medical and nursing reception time, procedure cancellation rate, and postoperative complications between the groups

<table>
<thead>
<tr>
<th>Group (n)</th>
<th>Preoperative waiting time (d)</th>
<th>Medical and nursing reception time (min)</th>
<th>Procedure cancellation rate (n [%])</th>
<th>Postoperative complications (n [%])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental (408)</td>
<td>2.96 ± 1.61</td>
<td>6.59 ± 2.67</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>Control (185)</td>
<td>6.99 ± 2.73</td>
<td>28.23 ± 13.14</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>t/χ² value</td>
<td>-22.489</td>
<td>-31.882</td>
<td>5.380</td>
<td>4.808</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt; .01</td>
<td>&lt; .01</td>
<td>.02</td>
<td>.028</td>
</tr>
</tbody>
</table>

3.3 Comparison of length of stay, hospitalization cost, and satisfaction between two groups of patients

The length of hospital stay and hospitalization costs of patients were significantly lower (p < 0.05, Table 3). In contrast, the satisfaction scores were significantly higher in the experimental group than in the control group (p < 0.05, Table 3). Patients’ length of stay is reduced by 2 days/person, and hospitalization costs are reduced by an average of $140/person.
Table 3
Comparison of length of hospital stay, hospitalization cost, and between-group satisfaction scores

<table>
<thead>
<tr>
<th>Group (n)</th>
<th>Length of hospital stay (d)</th>
<th>Hospitalization cost (CNY)</th>
<th>Satisfaction (x ± s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental (408)</td>
<td>1.08 ± 0.44</td>
<td>4038.73 ± 1085.68</td>
<td>91.40 ± 3.17</td>
</tr>
<tr>
<td>Control (185)</td>
<td>3.04 ± 3.03</td>
<td>5009.35 ± 2447.71</td>
<td>89.44 ± 0.21</td>
</tr>
<tr>
<td>( t ) value</td>
<td>-12.773</td>
<td>-6.693</td>
<td>7.145</td>
</tr>
<tr>
<td>( p ) value</td>
<td>&lt; .01</td>
<td>&lt; .01</td>
<td>&lt; .01</td>
</tr>
</tbody>
</table>

Note: CNY indicates China Yuan (1 CNY = 0.14 USD)

4. Discussion

4.1 Improving the Quality of Perioperative Care for Patients Undergoing Day Surgery for Gastrointestinal Polyps

In recent years, day surgery has been widely used in major medical institutions, significantly reducing the length of stay and hospitalization costs for patients and improving the efficiency of medical resources utilization (Zhuang, Duan, Shi, Song, & Tan, 2019). Although day surgery is rapidly gaining popularity in China, most medical institutions still adopt the traditional model for the management of day surgery, and there are no uniform standards in terms of service flow, patient assessment, and perioperative management (Zhu, Feng, Wang, Wang, & Liu, 2018). Day surgery may lead to inadequate communication between patients and medical staff owing to shorter hospital stays and faster turnaround, and traditional telephone follow-ups do not meet the needs of patients, leading to anxiety and dissatisfaction (Zhou, Zhang, Liu, & Zhuang, 2018; Zhao, Li, Dai, Fu, & Tang, 2018). Some studies have shown that patients have higher rates of complications, 30-day readmission rates, and mortality after day surgery, leading to increasingly prominent problems such as low efficiency of day surgery, poor quality of care, and low patient satisfaction (Liu, Ma, & Ye, 2017). Day surgery is characterized as “short, frequent, and fast.” One of its fundamental aspects is preparation in the perioperative period, which is key to ensuring smooth performance (Zheng, Xu, Zhang, Qian, & Yan, 2022). Patient admission procedures, pre-operative examination, pre-operative condition assessment, anesthesia evaluation, diet control, medication requirements, and other factors must be streamlined before the patient arrives at the hospital. Intestinal preparation on the day of surgery, post-operative diet, activity, and follow-up requirements must be guided by special personnel covering the entire course of disease and treatment. Traditional medical and nursing services struggle to meet the needs of modern medical services; thus, digital IT is needed to support the shift of medical and nursing services to ensure quality perioperative care. Studies have shown that information management has been effective in managing patients with stroke, central venous catheterization, and daytime gastrointestinal polyp surgery and that the full care model can ensure the safe and efficient operation of daytime gastrointestinal polyp surgery (Chen et al., 2021; Huang et al., 2021; Ma, Cheng, Ding, Li, & Wang, 2018).

WeChat is China’s most widespread social networking software and has been widely accepted and applied by many industries. In the medical industry, the advantages of WeChat are mainly in chronic disease management and patient health education. Through the WeChat public number and WeChat group, the traditional management mode of telephone and face-to-face visits is changed, saving labor and time costs, enabling real-time communication between doctors and patients, improving the effectiveness and timeliness of communication, and increasing patient satisfaction. At the same time, the WeChat platform can provide various forms of health education, such as videos.
and graphics, which are easy for patients to view in real-time, enhancing the convenience of information access and helping to improve patients’ awareness of diseases.

This study makes full use of the WeChat platform to integrate patients into the unified management upon arrival at the hospital, moving the key gates of patient admission, surgery appointment, examination appointment, anesthesia assessment, diet, and medication guidance forward, optimizing the consultation process, which can reduce the patient’s pre-operative waiting time and medical reception time, ensuring that the surgery is performed safely and as scheduled. Pre- and post-operative pictorial brochures and promotional videos are released through the WeChat public number and WeChat group to provide health guidance to patients undergoing daytime gastrointestinal polyp surgery. Patients can communicate with competent doctors and full-time nurses in real-time through the WeChat group to address post-operative care needs, effectively reduce the occurrence of patient anxiety and dissatisfaction due to poor or untimely communication, improve patient compliance, reduce the rate of temporary surgery cancellation and the incidence of post-operative complications, and comprehensively improve the quality of perioperative care.

4.2 Improve the Efficiency of Medical Resources Utilization and Enhance Patient Satisfaction

The results of this study show that the WeChat platform-based full management model can effectively reduce the length of hospital stay and hospitalization costs for patients. The average hospital stay of patients before implementation was three days, equivalent to the length of hospital stay of three patients using the model. The model helped speed up patient turnaround, improve the utilization rate of gastroenterology beds, and provide more medical resources to patients with acute and critical illnesses. Hospitalization costs were significantly lower, reducing the financial burden on patients’ families, lowering national health insurance payments, promoting high-quality hospital development, and maximizing the effectiveness of medical resources.

Nurse navigators have been widely used in various medical institutions in China in recent years and have achieved relatively significant results, which are important for promoting hospital development and improving management quality. The study showed that setting up navigation nurses in day surgery management can optimize the medical process, lead to regularization and standardization of day surgery management, significantly improve the efficiency of day surgery and enhance patient satisfaction (Wang, 2020). In this study, a dedicated day surgery nurse was set up to unify the management of patients with the help of the WeChat platform. The whole process of patient consultation, such as pre-operative examination, pre-operative preparation, bowel preparation, and surgical arrangement, was handled by the dedicated day surgery nurse, and the pre-operative and post-operative health guidance of patients was provided by the dedicated day nurse on a one-to-one basis. Regular and standardized management by daytime dedicated nurses can improve effective communication between doctors and patients, promote efficient cooperation between doctors and nurses, ensure effective implementation of pre-operative and post-operative tasks, avoid operational loopholes, guarantee smooth daytime surgery, and improve patient satisfaction.

4.3 Broadening the direction of nursing subspecialties and promoting the development of specialist nurses

Specialist nurses are clinical professionals who can provide high-quality care to patients. The National Nursing Career Development Plan (2016–2020) states that a specialist nurse workforce should be developed and that the level of specialist nursing should be improved to meet clinical nursing needs in accordance with the different areas
of clinical specialist nursing (Medical Affairs Bureau, 2016). This study achieved this by establishing a full-time day surgery nurse, clarifying their job responsibilities, and implementing integrated management of day surgery patients. This promoted the diversification of nurses' roles, broadened nurses' career paths, and facilitated the development of subspecialties of digestive nursing.

This study also had some limitations. If family members accompanying participants were not proficient in operating smartphones, notifications posted on WeChat could be ignored, leading to inadequate pre-operative preparation and surgery delay. In addition, this study was limited to our hospital, and the sample size should be expanded in a multicenter correlation study in tertiary hospitals in the region.

5. Conclusions

Through wechat group, wechat public account, intelligent surgery scheduling system, Internet and other information means and other platforms to achieve the whole process management of patients from outpatient endoscopy to postoperative home. Through the guidance and supervision of the entire process by specialized daytime surgical nurses, the patient's preoperative waiting time and the time required for medical care are effectively reduced. This whole process management mode based on wechat platform can effectively reduce the cancellation rate of temporary surgery and postoperative complications, and improve the efficiency of medical resource use and patient satisfaction. Broaden the career development path of nurses and enrich the digestive nursing sub-specialty. Therefore, the methodology adopted in this study is worthy of clinical promotion.

Declarations

The authors state there are no conflicts of interest to declare. All authors have approved the manuscript for submission.

The study was approved by the ethics committee of Mianyang Central Hospital, and all participants signed an informed consent form. This study was a randomised controlled trials study with a single-blind method to eliminate volunteer bias. All patient information in this study was internal to the hospital and encrypted and protected so that no one other than the investigator and the patient could access the patient's information. Among the authors in the list, Huaili Luo played a guiding role for the manuscript, Xin Zhou was mainly responsible for writing and researching, and Jiao Wu was involved in writing the main manuscript. Hong Li and Xin Zeng were responsible for collecting and organizing research materials. All authors reviewed the manuscript and agreed to the arrangement of names in this paper.

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