Development and implementation of an “Internet+” management plan for cancer patients with wounds/stomas during the coronavirus disease 2019 pandemic

Niu Niu1 | Xiaoxu Zhi2 | Liuliu Zhang1 | Meixiang Wang1 | Yun Zhao1 | Lifang Yang3 | Bing Wu2 | Ping Zhu2 | Na Wang3 | Maomao Zhang2 | Bainv Wu2 | Yinan Zhang1 | Aifeng Meng2

1Department of General Surgery, Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research & The Affiliated Cancer Hospital of Nanjing Medical University, Nanjing, China
2Nursing Department, Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research & The Affiliated Cancer Hospital of Nanjing Medical University, Nanjing, China
3Outpatient Department, Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research & The Affiliated Cancer Hospital of Nanjing Medical University, Nanjing, China

Correspondence
Yinan Zhang, Department of General Surgery, Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research & The Affiliated Cancer Hospital of Nanjing Medical University, Nanjing, Jiangsu 210009, China. Email: 547207870@qq.com
Aifeng Meng, Nursing Department, Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research & The Affiliated Cancer Hospital of Nanjing Medical University, Nanjing, Jiangsu 210009, China. Email: 846122032@qq.com

Funding information
the Science and Technology Planning Project of Jiangsu Province, Grant/Award Number: BE2019757; the Hospital Management Innovation Project of Jiangsu Province, Grant/Award Number: JSYGY-3-2020-478; the Advantageous discipline project in Colleges and Universities of Jiangsu Province, Grant/Award Number: NYZLKF-1-202108

Abstract
To explore the practical application and effect of the management plan for cancer patients with wounds/stomas based on the “Internet+” model during the coronavirus disease 2019 (COVID-19) pandemic. Based on the specific situation during the COVID-19 pandemic, we established the “Internet+” management team for cancer patients with wounds/stomas. After systematical literature search and brainstorming analysis, we developed a management plan for cancer patients with wounds/stomas based on the “Internet+” model. Then, we included cancer patients with wounds/stomas who needed follow-up visits or consultations at Jiangsu Cancer Hospital from January 25 to April 30, 2020. A total of 304 patients were participated in the study. The effects of the plan were evaluated including patient satisfaction, the proportion of patients who did not need to go to the hospital for treatment, the proportion of patients with improved symptoms and the rate of the patients or nurses contracted COVID-19. After the implementation of the plan, 56.3% of the patients mastered the relevant self-care methods under the guidance of specialist nurses and did not need to go to the hospital for treatment. A total of 89.5% of the patients showed improvement in symptoms, and 99.4% of the patients were satisfied with the online treatment. None of the patients or nurses contracted COVID-19. The “Internet+” management plan for cancer patients with wounds/stomas during the COVID-19 pandemic had supported epidemic prevention and control in medical institutions and reduced the risk of cross infection. In addition, this type of plan effectively improved disease symptoms in the patients, and their level of satisfaction was high.

KEYWORDS
cancer patients, COVID-19, Internet+, management, stomas, wounds
1 | INTRODUCTION

At the end of December 2019, coronavirus disease 2019 (COVID-19) was first reported in Wuhan, which is the capital of Hubei Province in China.\(^1\) COVID-19 is highly infectious and spreads rapidly; in addition, the entire population is susceptible.\(^2,3\) On January 20, 2020, the National Health Commission of the People’s Republic of China included COVID-19 on the list of second-class infectious diseases and mandated that it should be managed in accordance with the prevention and control measures for first-class infectious diseases.\(^4\) On January 30, 2020, the World Health Organization declared that COVID-19 was a public health emergency of international concern (PHEIC) and rated the risk level of the epidemic as “very high,” which is the highest possible level.\(^5\)

Hospitals are public places with dense populations and high population mobility,\(^6\) and patients generally have poor immunity, especially for cancer patients. These factors all increase the risk of cross-infection among patients in hospitals.\(^7,8\) Therefore, it is particularly important to efficiently manage patients and avoid non-urgent visits during the COVID-19 pandemic. For cancer patients with wound or stoma complications, the failure to receive treatment in time can lead to the deterioration of their condition and even threaten their lives, imposing substantial physiological and psychological burdens. Currently, telemedicine, a novel modality of public health care that combines the Internet, software, electronic equipment, and medical care, may represent a good choice for both patients and health care providers.\(^9,10\) Through virtual visits, patients and medical professionals not only avoid unnecessary contact during the pandemic but also ensure the timeliness of medical treatment.

Therefore, to provide the medical treatment needed by patients, relieve patient anxiety, and avoid cross-infection, the nursing department of our hospital rapidly developed an “Internet+” management team for cancer patients with wounds/stomas and implemented a series of management strategies. In this retrospective study, we analyzed the outcomes and effects of the “Internet+” management plan for cancer patients with wounds/stomas, hoping to provide a reference for other health care workers during the COVID-19 pandemic.

2 | METHODS

2.1 | Patients

In this retrospective study, we included cancer patients with wounds/stomas who needed follow-up visits or consultations at Jiangsu Cancer Hospital from January 25 to April 30, 2020. The study was conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the Jiangsu Cancer Hospital ethics committee (reference number: 2019–007). In addition, we have obtained the informed consent from participants in this study.

2.2 | Establishment of the “Internet+” management team for cancer patients with wounds/stomas during the COVID-19 pandemic

An “Internet+” management team for cancer patients with wounds/stomas was established under the purview of the hospital’s nursing department. The team consisted of 10 members, with 3 enterostomal therapists, 2 wound stoma specialist nurses, 2 scientific research nurses and 3 network engineers. The head of the hospital wound, stoma and incontinence nursing group was appointed as the management team leader and was responsible for the overall plan, personnel training process and management supervision. The other nurses were responsible for the retrieval of the relevant literature, management plan formulation and implementation, and coordination with the network engineers. The network engineers were responsible for the design of the “online nursing clinic” application, the design of module on the Internet platform, the management of the information, and the collection of user feedback.

2.3 | Development of management plan

The management team first performed a preliminary statistical analysis on patients with wounds or stomas who needed follow-up visits or consultations at Jiangsu Cancer Hospital. Then, we conducted a literature search systematically, including the COVID-19-related diagnosis and treatment plan and prevention and control guidelines issued by the National Health Commission of the People’s Republic of China,\(^11,12\) studies on the “Internet+ nursing” service model\(^13–15\) and other related studies. After considering the existing “Internet+ nursing” platform and other resources, such as the official accounts of patients with wounds or stomas and WeChat groups in our hospital, the team used brainstorming method to discuss and formulate the “Internet+” management plan for cancer patients with wounds/stomas during the epidemic. In addition, to adapt to changes in the epidemic, the performance of the plan and feedback, the team implemented timely adjustments and improvements to the plan (Table 1).

2.4 | Organization and implementation

Before the implementation of the management plan, we organized online training for the team members. The training mainly consisted of (1) the outline of the “Internet+” management plan for cancer patients with wounds/stomas and related network operation exercises; (2) COVID-19-related diagnostic programs, prevention and control guidelines, personal protection and other related information; and (3) psychological counseling training. Team members were encouraged to increase their confidence in providing these care services during the epidemic.

In addition, to reduce the movement of personnel and avoid cross-infection, we gave detailed assignments to specific team
TABLE 1  “Internet+” management plan for cancer patients with wounds/stoma during the COVID-19 pandemic

| Categories | Main points |
|------------|-------------|
| For patients who need follow-up in our hospital | 1. We contact the patients or their family members through official accounts, WeChat groups, the telephone, etc. To avoid cross-infection and reduce the flow of personnel, it is recommended to attempt online medical treatment first.  
2. Patients register and log in to the online wound stoma specialist clinic, describe their situation, upload disease-related pictures, and make an appointment for treatment.  
3. The specialist nurses then receive the request for consultation. After learning about the patient’s existing nursing problems and needs through video calls, texts and pictures, they provide personalized answers, guidance and health education to the patient.  
4. Specialist nurses provide appropriate treatment suggestions based on the classification standards for various types of wounds and the classification standards for stoma complications, with consideration given to the patient's comorbidities.  
Patients with wounds  
① When the specialist nurses treat patients with mild symptoms, they teach patients and their families online how to master the relevant nursing methods and arrange follow-up visits with the patients.  
② When the specialist nurses treat patients with moderate symptoms who are at moderate risk of complications, they teach patients and their families online about the relevant issues, and advise them to go to the nearest community hospital for treatment in a timely manner.  
③ When the specialist nurses treat patients with severe symptoms who are at high risk of complications, they teach patients and their families online about the relevant issues. Nonlocal patients are advised to go to the specialist outpatient clinic of their nearest hospital in a timely manner to receive treatment. When necessary, we discuss the specific nursing plans with specialist nurses in the patient's closest hospital. Local patients are advised to go to the specialist nursing clinic of our hospital for treatment.  
5. After the online consultation, the patients fill out the satisfaction survey and provide feedback.  
6. If the patient needs additional wound-related dressings or ostomy care supplies, the specialist nurse submits the order to the Medical Equipment Department after review. After the patient pays the related fees, the Medical Equipment Department delivers the items via contactless express delivery. |
| Patients with stoma | ① When the specialist nurses treat patients with mild stoma complications, they teach patients and their families online how to master the relevant nursing methods and arrange follow-up visits with the patients.  
② When the specialist nurses treat patients with complicated illnesses and serious complications, they teach the patients and their families online about the relevant issues. Nonlocal patients are advised to go to the specialist outpatient clinic of their nearest hospital in a timely manner to receive treatment. When necessary, we can discuss the specific nursing plans with specialist nurses in the patient's closest hospital. Local patients are advised to go to the specialist nursing clinic of our hospital for treatment. |
| For patients from the medical cooperation unit | 1. The medical cooperation unit connects with our hospital through the telemedicine platform, sends the basic information about the patient and related pictures, and makes an appointment.  
2. The specialist nurses then receive the request for the consultation. After learning about the patient's existing nursing problems and needs through video calls, texts and pictures, they talk with the patient’s medical and nursing team to formulate a treatment plan, which will provide the medical cooperation unit with guidance regarding how to treat the patient’s wound or stoma.  
3. After the online consultation, the patients fill out the satisfaction survey and provide feedback. |
| For outpatients | 1. Before the patients come to the hospital, online consultation information is added, including the relevant epidemiological history and whether they have fever, cough, expectoration, diarrhea and other symptoms.  
2. When the patients come to the hospital, they are screened again for the relevant epidemiological history and symptoms such as fever, cough, expectoration and diarrhea.  
3. Stratified management is adopted for patients after screening.  
① If the patient’s temperature is normal and there is no relevant epidemiological history, we implement first-level protection measures. The specific measures are as follows: Implement adequate standard prevention measures. Specialist nurses are equipped with disposable surgical masks, disposable caps and disposable latex gloves. The masks and caps are replaced every 4 hours and any time they become wet or contaminated. In addition, the consulting room is strictly managed and controlled, and only one patient is received at a time. More than one meter of distance is maintained between waiting patients.  
② If the patient has a fever or has relevant epidemiological history, the outpatient screening staff immediately report this to the Preventive Health Care Department, Medical Department, Nursing Department, and Infection Control Department, and place the patient in an independent consulting room. Then, the infectious disease experts in our hospital consult with the patient. After excluding the diagnosis of COVID-19, specialist nurses implement second-level protection measures. The specific measures are as follows: Implement adequate standard prevention measures. Specialist nurses are equipped with isolation gowns, medical goggles, N95 masks, disposable caps, disposable shoe covers and disposable gloves.  
③ If the patient is suspected of having or is diagnosed with COVID-19, they are placed in an independent consulting room. The specialist nurses implement third-level protection measures. The specific measures are as follows: Implement adequate standard prevention measures. Specialist nurses are equipped with disposable protective clothing, full-face respiratory system protectors, N95 masks, disposable caps, disposable shoe covers and disposable gloves. The patient is (Continues)
members. Three specialist nurses were mainly responsible for the online consultations and follow-up visits through the platform and were involved in patient outcomes. One specialist nurse was responsible for the diagnosis and care of outpatients. One specialist nurse was responsible for the diagnosis and care of inpatients. Two scientific research nurses were responsible for collecting and analyzing the feedback and assisting the team leader with adjusting and improving the plan in a timely manner. Three network engineers were responsible for monitoring the network platform and adjusting the platform in a timely manner based on the feedback from the clinical staff. In the absence of special circumstances, all members communicated online. The specific organizational structure and responsibilities of the team are shown in Figure 1.

2.5 Data collection

After each online consultation, we collected data on patient satisfaction. The level of patient satisfaction was divided into four categories: very satisfied, satisfied, dissatisfied, and very dissatisfied. The overall level of patient satisfaction was calculated as follows: cumulative number of very satisfied and satisfied answers/visit times \times 100\%.

Two weeks after the online consultations, two specialist nurses with more than 10 years of experience conducted follow-up visits with the patients through the network platform to jointly evaluate the treatment effect. For patients with wounds, clinical manifestations such as wound shrinkage, exudation reduction, and relief of redness, swelling, and pain, were considered indications of improvement. Other possible

---

**TABLE 1 (Continued)**

| Categories | Main points |
|------------|-------------|
| isolated and observed in our hospital. Patients with COVID-19 are sent to the government-designated medical institution for treatment in accordance with the standard transfer process for COVID-19 patients. 4. The consulting rooms are disinfected with ultraviolet light twice a day for 1 hour each time. The items in the consulting room are wiped and disinfected with 1000 mg/L chloride-containing disinfectant twice a day. The floors are mopped with 1000 mg/L chloride-containing disinfectant twice a day. For ground that has been contaminated by blood, body fluids, secretions, excrement, etc., hygroscopic materials (such as gauze) are first used to remove visible contaminants, and then 4000 mg/L chloride-containing disinfectant is used. After 30 minutes, the floor is wiped and mopped with clean water. |

For patients in our hospital

1. The nurse in the ward applies to the contingency management team for an intra-hospital consultation.
2. Specialist nurses inquire about the basic condition of the patient and take appropriate protective measures. If the patient’s temperature is normal and there is no relevant epidemiological history, we implement first-level protection measures. Specialist nurses are equipped with disposable surgical masks, disposable caps, and disposable latex gloves. If the patient has a fever or relevant epidemiological history but does not have COVID-19, we implement second-level protection measures. Specialist nurses are equipped with isolation gowns, medical goggles, N95 masks, disposable caps, disposable shoe covers, and disposable gloves. If the patient is suspected of having or diagnosed with COVID-19, we implement third-level protection measures. Specialist nurses are equipped with disposable protective clothing, full-face respiratory system protectors, N95 masks, disposable caps, disposable shoe covers, and disposable gloves.
3. After the first in-person consultation, specialist nurses enroll the patient in the online management system.
4. During hospitalization, if the patients experience any discomfort in the wound or stoma, they can first receive care through the online wound and stoma specialist clinic. If the problem cannot be solved online, the specialist nurse will go to the ward to administer treatment, and the corresponding protective measures will be the same as those for the first visit.
5. For those who are not cured by the time they are discharged, we will guide them to continue treatment according to the protocol for patients who need follow-up in our hospital.

---

**FIGURE 1** The organizational structure and implementation of the team
assessments were no obvious change and deterioration. In stoma, improvement was indicated by a reduction in the peristomal skin tool score (DET score\textsuperscript{16}) or reductions in the clinical manifestations of other stoma complications. Again, other possible assessments were no obvious change and deterioration. The proportion of patients who did not need to go to the hospital for treatment was calculated as follows: the number of patients who did not need to go to the hospital for treatment/the number of patients who had online visits × 100%. The proportion of patients with improved symptoms was calculated as follows: the number of patients with improved symptoms/the number of patients who had online visits × 100%.

2.6 | Data analysis

The descriptive statistical analysis was performed with IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp, Armonk, NY, USA). For enumeration data, the results are presented as numbers and percentages. The quantitative data are presented as the means ± SDs.

3 | RESULTS

From January 25 to April 30, 2020, a total of 304 patients attended online consultations. Among them, 14 patients received consultations with the medical cooperation unit, 58 patients received intra-hospital consultations, 35 patients were referred to an in-person clinic in our hospital for treatment, 26 patients were referred to an in-person clinic in another hospital for treatment, and 171 patients received treatment exclusively from the online clinic in our hospital. See Figure 2 for details. Among the 304 patients, there were 186 males and 118 females, and their ages ranged from 27 to 93 years old, with an average age of 59.25 ± 11.95 years. See Table 2 for details. A total of 872 online visits occurred. The level of patient satisfaction with online treatment was 99.4% (867/872). A total of 56.3% (171/304) of the patients mastered the relevant self-care methods under the guidance of the specialist nurses and did not need to go to the hospital for treatment. A total of 89.5% (196/219) of the patients showed improvements in symptoms. A total of 10.5% (23/219) of the patients had no change in their symptoms, and no patients experienced deterioration of their condition. Ninety-one patients selected the contactless express delivery service. None of the patients or nurses contracted COVID-19. The categories of the reasons for consultation are shown in Table 3.

4 | DISCUSSION

4.1 | Impetus for the “Internet+” management plan for cancer patients with wounds/stomas during the COVID-19 epidemic

On January 23, 2020, due to the serious situation regarding the prevention and control of the COVID-19 epidemic, a lockdown was initiated in Wuhan, China. Subsequently, first-level response measures for a public health emergency were initiated in many places across the country. These first-level measures are the most extreme emergency response measures implemented in China in response to the nature, severity, and scope of the public health emergency. As the duration of

| Variable | Data |
|----------|------|
| Sex      |      |
| Male     | 186(61.18) |
| Female   | 118(38.82)  |
| Age, years |      |
| ≤40      | 59.25 ± 11.95 |
| 40–55    | 22(7.24)   |
| 55–70    | 9731(9.1) |
| 70–85    | 13444(4.08) |
| >85      | 4615(1.64)  |

the COVID-19 epidemic is still uncertain, cancer patients with wounds/stomas who were scheduled to go to the outpatient clinic for follow-up consultations have experienced many difficulties. If a patient does not receive effective treatment for a long time, they may experience worsening symptoms and deterioration of their condition. However, if a patient goes to the outpatient clinic during the epidemic, the risk of cross-infection and the burden of ensuring epidemic prevention and control in medical institutions are increased. Therefore, in the current serious situation with regard to the epidemic, it is important to standardize the rapid and effective management of cancer patients with wounds or stomas to reduce the risk of cross-infection while ensuring adequate follow-up care. In recent years, with the improvement of digital technology, telemedicine has gradually entered the mainstream as a modality for patient diagnosis, treatment and nursing.17,18 It can overcome temporal and spatial barriers to providing medical services and improve patient compliance; in addition, it has the advantages of being easy to use, convenient, and cost-effective.19–21 Therefore, it was necessary to take into account the characteristics of the epidemic and combine the advantages of the “Internet+” model of health service provision with the key aspects of nursing care for cancer patients with wounds or stomas to develop the “Internet+” management plan during the COVID-19 pandemic situation. It is very important to reduce the risk of disease transmission and improve the prognosis of patients.

### 4.2 “Internet+” management plan alleviated the burden of epidemic prevention and control measures in medical institutions and reduced the risk of cross-infection

Hospitals are densely populated, and the population is highly mobile, which increases the risk of cross-infection. Wang et al showed that of

| Consultation reason | Number of patients | Percentage (%) | Triage | Number of patients in symptom improvements |
|---------------------|--------------------|----------------|--------|------------------------------------------|
| Pressure injury     | 46                 | 15.13          | 1,2,3,4,5 | 42                                       |
| Fungating wound     | 24                 | 7.89           | 1,2,3,4  | 9                                        |
| Radiation skin injury | 29             | 9.54           | 2,3,5   | 29                                       |
| Delayed healing of Surgical site incision | 24 | 7.89 | 1,2,3,4 | 22                                       |
| Scald               | 8                  | 2.63           | 3,4,5   | 8                                        |
| Trauma              | 6                  | 1.97           | 2,3,5   | 5                                        |
| Diabetic foot       | 2                  | 0.66           | 2       | 1                                        |
| Ulceration due to gout stones in lower extremities | 1 | 0.33 | 2       | 1                                        |
| Moisture-associated skin damage | 11 | 3.62 | 2,5 | 11                                       |
| Exfoliative dermatitis caused by targeted therapy | 2 | 0.66 | 5       | 2                                        |
| Scar prevention     | 4                  | 1.32           | 5       | 4                                        |
| Fungating wound and moisture-associated skin damage | 1 | 0.33 | 2       | 1                                        |
| Fungating wound and pressure injury | 1 | 0.33 | 1       | 1                                        |
| Peristomal irritant dermatitis | 15 | 4.93 | 2,3,4,5 | 15                                       |
| Parastomal hernia   | 8                  | 2.63           | 2,5     | 8                                        |
| Stoma granulomas    | 6                  | 1.97           | 3,4     | 6                                        |
| Urate crystal       | 6                  | 1.97           | 2,5     | 6                                        |
| Stoma mucocutaneous separation | 6 | 1.97 | 2,3,4,5 | 6                                        |
| Stoma bleeding      | 5                  | 1.64           | 2,5     | 5                                        |
| Peristomal hyperplasia | 4           | 1.32           | 5       | 4                                        |
| Peristomal skin ulcer | 3            | 0.99           | 2,3,4   | 3                                        |
| Stoma diarrhea      | 3                  | 0.99           | 5       | 3                                        |
| Stoma constipation  | 2                  | 0.66           | 2,5     | 2                                        |
| Stoma prolapse      | 2                  | 0.66           | 2,3     | 2                                        |
| Stoma patient routine follow-up visit | 51 | 16.78 | 5 | ---                                       |
| Selection and purchase of ostomy supplies | 34 | 11.18 | 5 | ---                                       |

Note: Consultation reason: The number of patients receiving routine follow-up visits for stomas is the number of patients who returned for follow-up visits within the study period but had no stoma-related complications. The number of patients in the selection and purchase of ostomy supplies category is the number of patients who only used the online outpatient clinic to consult with a healthcare provider about and purchase ostomy supplies after discharge. Triage: 1 = Medical cooperation unit consultation, 2 = Intra-hospital consultation, 3 = In-person in a clinic in our hospital, 4 = In-person in a clinic in another hospital, 5 = Only in online clinic of our hospital.
138 hospitalized COVID-19 patients, 41.3% were presumed to be infected via hospital-associated transmission.\textsuperscript{7} In our study, after the initiation of the “Internet+” management plan, 56.3% of the patients mastered the relevant self-care methods under the guidance of specialist nurses and did not need to go to the hospital for treatment. In addition, while the management plan was operating, none of the patients or nurses contracted COVID-19. The following factors may be responsible for these outcomes. First, our team used Internet technology to conduct online triage and prescreening of patients, which effectively alleviated the burden imposed by epidemic prevention and control measures in the hospital. Gong et al also confirmed the important role played by online health services in preventing and controlling the COVID-19 pandemic. Online health services can not only provide the public with basic medical support, reduce panic, and reduce the spread of the epidemic but also improve epidemiological screening.\textsuperscript{22} This is also consistent with the conclusions drawn by Li G et al\textsuperscript{23} and Hong Z et al.\textsuperscript{24} Therefore, Internet technology is the key tool that enables hospitals to effectively manage patients during the COVID-19 pandemic. Second, early establishment of the management plan based on the characteristics of the epidemic and the needs of the patients may also be important for ensuring the effectiveness of the management plan. Jiang et al implemented a variety of measures in fever clinics as early as possible in response to the COVID-19 pandemic and reported no cases of nosocomial cross-infection.\textsuperscript{25} Wu et al also urgently implemented a series of nursing management measures to systematically and effectively leverage all available personnel and material resources to prevent and control the COVID-19 epidemic. As a result, all COVID-19 patients were cured and discharged, and the patients and staff members were not infected.\textsuperscript{26} These finding suggest that we should implement response measures as soon as possible to minimize the damage caused by public health emergencies.

4.3 “Internet+” management plan alleviates symptoms and led to high levels of patient satisfaction

In our study, after the implementation of the “Internet+” management plan, 89.5% of patients showed improvements in symptoms, indicating that the management plan effectively alleviated the symptoms of cancer patients with wounds/stomas during the epidemic. This may be related to the timely initiation of the management plan. After the implementations of the program, the patients were no longer required to visit the hospital in person during the pandemic. They were able to obtain professional guidance and advice from specialist nurses in a timely manner, which helped them avoid delays in treatment to the greatest extent and prevention complication with the early detection and treatment of problems.\textsuperscript{27} In addition, our study also showed a high level of patient satisfaction with the online treatment, with 99.4% of the patients indicating that they were satisfied. This indicates that the management plan was generally accepted by patients. Due to the epidemic, the government has recommended limiting the movement of people. This is inconvenient for cancer patients with wounds/stomas who urgently need follow-up visits and consultations. After the implementation of the plan, the specialist nurses were able to provide the patients with one-on-one online guidance and health education and to answer any questions the patients had regarding their condition, which alleviated the patients’ anxiety regarding seeking medical treatment during the COVID-19 pandemic.

4.4 Limitations

There are some problems regarding the collection of fees for medical services that will need to be addressed in the future. During the pandemic, all online diagnosis and treatment services have been provided free of charge, and only delivery services cost a fee. Therefore, it is necessary to further refine and improve the management plan in the future, which will reduce the pressure on hospital visits by triaging patients and provide a convenient alternative to in-person visits for patients.

5 CONCLUSIONS

In summary, the “Internet+” management plan for cancer patients with wounds/stomas during the COVID-19 pandemic has been shown to be effective; it has helped alleviate the burden imposed on medical institutions by the epidemic prevention and control measures and reduced the risk of cross-infection. In addition, it effectively improved patient symptoms, and the level of patient satisfaction was high. Furthermore, this plan provides a foundation for further discussions on “Internet+” online nursing service standards for cancer patients with wounds/stomas and the expansion of nursing service models.

ACKNOWLEDGMENTS

This study was funded by the Science and Technology Planning Project of Jiangsu Province (No. BE2019757), the Hospital Management Innovation Project of Jiangsu Province (No. JSYGY-3-2020-478) and the Advantageous discipline project in Colleges and Universities of Jiangsu Province (No. NYZLKF-1-202108).

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHOR CONTRIBUTIONS

All authors had access to the data. Niu N., Meng A.F., Zhi X.X., Zhang L.L., Zhang Y.N., Wang M.X., Zhao Y., Yang L.F.: Made substantial contributions to the design of the study. Zhang Y.N., Niu N., Zhi X.X., Zhang L.L., Yang L.F., Wu B., Zhu P., Wang N.: Made substantial contributions to data collection and analysis. Niu N., Zhi X.X.: Made substantial contributions in drafting the manuscript. Meng A.F., Zhang Y.N., Zhang M. M., Wu B.N., Wang M.X.: Made substantial contributions in revising the manuscript. We have obtained the informed consent from participants in this study.
ETHICS STATEMENT
The study was conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the Jiangsu Cancer Hospital ethics committee (reference number: 2019–007). In addition, we have obtained the informed consent from participants in this study.

REFERENCES
1. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2020;395(10233):470-473.
2. Siordia JA. Epidemiology and clinical features of COVID-19: a review of current literature. J Clin Virol. 2020;127(104357):1-7.
3. Wang Y, Wang Y, Chen Y, Qin Q. Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures. J Med Virol. 2020;92(6):568-576.
4. National Health Commission of the People’s Republic of China. COVID-19 pneumonia is included in the management of legal infectious diseases. National Health Commission of the People’s Republic of China Website. http://www.nhc.gov.cn/xcs/zhengcwj/202001/44a3a8b2456e049dfb373a4f275929d386.shtml. Accessed January 20, 2020. (in Chinese).
5. World Health Organization. WHO Coronavirus disease (COVID-2019) situation report No. 11. World Health Organization Website. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline#: Accessed January 30, 2020.
6. Giunta DH, Pedretti AS, Elizondo CM, et al. Analysis of crowding in an adult emergency department of a tertiary university hospital. Rev Med Chil. 2017;145(5):557-563.
7. Wang DW, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA. 2020;323(11):1061-1069.
8. Zhang L, Zhu F, Xie L, et al. Clinical characteristics of COVID-19-infected cancer patients: a retrospective case study in three hospitals within Wuhan. China Ann Oncol. 2020;31(7):894-901.
9. Baker J, Stanley A. Telemedicine technology: a review of services, equipment, and other aspects. Curr Allergy Asthma Rep. 2018;18(11):60.
10. Liu L, Duan S, Zhang Y, Wu Y, Zhang L. Initial experience of the synthesis, real-time, interactive, remote transthoracic echocardiogram consultation system in rural China: longitudinal observational study. JIMR Med Inform. 2019;7(3):e14248.
11. National Health Commission of the People’s Republic of China. Novel Coronavirus Infection Prevention and Control Technical Guidelines in Medical Institutions. 1st ed. National Health Commission of the People’s Republic of China Website. 2020. http://www.nhc.gov.cn/xcs/yqfck/202001/b91fdaa47c304431eb082d67847d27e14.shtml. Accessed January 23, 2020. (in Chinese).
12. National Health Commission of the People’s Republic of China, State Administration of Traditional Chinese Medicine. Chinese Clinical Guideline for Novel Coronavirus Infection Diagnosis and Treatment. 3rd ed. National Health Commission of the People’s Republic of China Website. 2020. http://www.nhc.gov.cn/xcs/zhengcwj/202001/f492c9153ea9437bb587ce2ffcbbee1fa.shtml, Accessed January 23, 2020. (in Chinese).
13. Wu L, Yang LF, Li JY, et al. Application of home care mobile app in discharged patients with permanent enterostomy in Jiangsu Province. Chin J Nurs. 2017;52(10):1192-1194. (in Chinese).
14. Bai F, Meng L, Zhang JJ, et al. Construction of “Internet+” health management model for physical examination population. Chin J Mod Nurs. 2019;25(17):2176-2179. (in Chinese).
15. Wang L, Fu AD, Huang Y, Yi L, Li F. Establishment and implementation of an “Internet+” hospital-community-family collaborative nursing service model. Chin Nurs Manag. 2019;19(11):1617-1621. (in Chinese).
16. Martins L, Ayello EA, Claessens I, et al. The ostomy skin tool: tracking peristomal skin changes. Br J Nurs. 2010;19(15):960-964.
17. Weinstein RS, Krupinski EA, Doarn CR. Clinical examination component of telemedicine, telehealth, mHealth, and connected health medical practices. Med Clin North Am. 2018;102(3):533-544.
18. Mahoney MF. Telehealth, telemedicine, and related technological platforms. J Wound Ostomy Continence Nurs. 2020;47(5):439-444.
19. Waller M, Stotter C. Telemedicine: a primer. Curr Allergy Asthma Rep. 2018;18(10):54-63.
20. Delgoshaii B, Mobinizadeh M, Mozdekar R, Afzal E, Arabloo J, Mohamadi E. Telemedicine: a systematic review of economic evaluations. Med J Islam Repub Iran. 2017;31(1):754-761.
21. Asiri A, AlBishi S, AlMadani W, ElMetwally A, House M. The use of telemedicine in surgical care: a systematic review. Acta Med Inform. 2018;26(3):201-206.
22. Gong K, Xu Z, Cai Z, Chen Y, Wang Z. Internet hospitals help prevent and control the epidemic of COVID-19 in China: multicenter user profiling study. J Med Internet Res. 2020;22(4):e18908.
23. Li G, Fan G, Chen Y, Deng Z. What patients “see” doctors in online fever clinics during COVID-19 in Wuhan? J Am Med Inform Assoc. 2020;27(10):1067-1071.
24. Hong Z, Li N, Li DJ, et al. Telemedicine during the COVID-19 pandemic: experiences from Western China. J Med Internet Res. 2020;22(5):e19577.
25. Jiang H, Liu JW, Ren N, He R, Li MQ, Dong QC. Emergency management in fever clinic during the outbreak of COVID-19: an experience from Zhejiang. J Infect. 2020;80(1):1-5.
26. Wu X, Zheng S, Huang J, Zheng ZL, Xu MQ, Zhou YH. Contingency nursing management in designated hospitals during COVID-19 outbreak. Ann Glob Health. 2020;86(1):1-5.
27. Engels D, Austin M, Doty S, Sanders K, McNichol L. Broadening our bandwidth: a multiple case report of expanded use of telehealth technology to perform wound consultations during the COVID-19 pandemic. J Wound Ostomy Continence Nurs. 2020;47(5):450-455.

How to cite this article: Niu N, Zhi X, Zhang L, et al. Development and implementation of an “Internet+” management plan for cancer patients with wounds/stomas during the coronavirus disease 2019 pandemic. Precision Medical Sciences. 2021;10(4):159-166. doi:10.1002/prm2.12055