Research Article

Application Effect Analysis of Operating Room Detailed Nursing Based on Medical Big Data in Patients Undergoing Gastrointestinal Tumor Surgery

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With the continuous development of internet information computing, the continuous improvement of medical and health systems, and the continuous increase of medical big data, traditional operating room care also needs to be further optimized. Medical big data is a forum data set for medical industry healthcare, electronic medical record information, clinical case record information, medical financial data, remote patient monitoring data, clinical decision support data, medical insurance data set, online consulting platform, and so on. Gastrointestinal tumors are currently one of the largest malignant tumors. Compared with ordinary patients, the presence of fear, depression, irritability, and other unhealthy emotions in patients with gastrointestinal tumors will reduce the therapeutic effect. Without careful care, the use of chemotherapy and other treatments makes patients vulnerable to various side effects. This article aims to study the use of medical big data intelligent algorithms to perform detailed care for patients during gastrointestinal tumor surgery and analyze the effects of care. This paper proposes an improved DNN algorithm; the DNN algorithm is to use several weight coefficient matrices and bias vectors to perform a series of linear operations and activation operations with the input value vector, starting from the input layer, backward calculation layer by layer, until the operation reaches the output layer, and the output result is obtained. This algorithm is used to study the theory, use mathematical formulas for method calculation and model design, and use the model to carry out detailed nursing experiments in the relevant operating room. The results of the experiment show that patients who have performed detailed care have a 27.2% improvement in treatment and rehabilitation effects than those who have not, and the level of detailed care has an obvious positive relationship with the rate of condition conversion. In the end, the hospital's detailed care quality evaluation index, which is QEI, increases by 1 point, which can increase the rate of condition conversion by 0.4.

1. Introduction

1.1. Background and Significance. In recent years, internet medical care has gradually been accepted and widely used by more and more people. Internet medical treatment optimizes medical procedures and alleviates problems such as uneven distribution of medical resources and asymmetry of medical information. Nowadays, the population's subhealth status is getting worse, and the incidence of chronic diseases and senile diseases is increasing. Traditional medicine uses doctors to diagnose and treat diseases. At present, with the

rapid development of medical information technology, disease prevention is more important than disease diagnosis and treatment. As an important part of the hospital, the operating room is an important place for the treatment of diseases. The effectiveness and safety of surgical treatment depend not only on the doctor's surgical skills but also on the quality and level of nursing work. The application of detailed nursing in the operating room can effectively reduce the impact of anesthetics and surgery on the patient, relieve the psychological pressure of the patient, improve the success rate of the patient's surgery, and provide a guarantee for the

recovery of health after the operation. Detailed nursing is a new type of superior nursing model. It requires nurses in the operating room to have proficient professional qualities and strong psychological qualities and at the same time pay attention to the details of the work, minimize the risks, and ensure the safety of the patients during the hospitalization as much as possible.

Gastrointestinal cancer is a common malignant tumor. However, because of the special location of the disease, many patients may be reluctant to receive treatment. As time delays, the tumor will grow larger and eventually reach the point where it cannot be treated. Therefore, the care of patients with gastrointestinal tumors is a kind of meticulous treatment. To achieve a more ideal treatment effect, treatments need to be carried out from various aspects such as psychology, diet, and daily life, so as to improve the quality of life of the patients and better adhere to the treatment. Medical big data uses the Internet to conduct online medical consultations for patients, understand the physical and mental conditions of patients at any time, inquire and communicate online, encourage patients to receive treatment in a timely manner, and be more intelligent and humane. The medical big data establishes the intelligent operating room, the establishment of an intelligent operating room, that is, the need to establish a digital operating room, intelligent drug management, intelligent consumables management, operating room personnel behavior management, intelligent logistics robot, intelligent hardware terminal, and so on. Intelligent hardware terminal includes intelligent logistics management system, digital integrated operating room system, intelligent drug management system, intelligent consumable management system, and operating room personnel behavior management system. Through joint development with hospitals, deep research in different types of hospitals such as cardiovascular and tumor, we constantly understand user needs and provide users with modular configuration solutions for different hospital levels and types, so as to achieve the perfect solution for user management needs, which can monitor the patient's physical condition in real time during the operation. Medical big data analysis provides medical care for the public, raises the threshold of disease prevention, and truly simplifies precision medicine, medical care, and public health.

1.2. Related Work. Some scholars have carried out relevant studies on the detailed care of patients with gastrointestinal tumor surgery. Gastrointestinal stromal tumors (GIST) account for 0.1–3% of gastrointestinal malignancies. Surgery is the main method of treatment, but in high-risk tumors, imatinib (tyrosine kinase inhibitor is a small molecule protein kinase inhibitor, which has the effect of blocking one or more protein kinases. It is clinically used to treat chronic myelogenous leukemia and malignant gastrointestinal stromal tumors) helps obtain better oncology results. Navarrete et al. introduces a rare gastric GIST patient. Despite the neoadjuvant treatment of imatinib, it has undergone a very thorough evolution in a short period of time [1]. A malignant gastrointestinal neuroectodermal tumor

(GNET) is a rare soft tissue sarcoma and a unique clinical pathological entity recently described. So far, only a few cases have been reported in the literature, so little is known about the behavior and diagnosis of the tumor. A case of the gastrointestinal neuroectodermal tumor with liver metastasis studied by Keditsu et al. can effectively inhibit the tumor; treatment of metastatic tumors in the liver is often ineffective. Systemic chemotherapy can temporarily shrink the mass and prolong life but is highly dependent on the primary site and cannot cure the disease. Some medical centers recommend hepatic arterial catheterization in selected cases, which has a significant effect on the treatment of most liver diseases [2]. The functional significance of missing microRNA has been reported in several human malignancies. An abnormally expressed transmembrane glycoprotein can effectively inhibit tumor growth in mice. However, the lack of an effective tumor-specific delivery system remains an unsolved clinical challenge for the successful translation of microRNA. Setua et al. has developed a miRNA-145-based magnetic nanoparticle formulation (miR-145-MNPF) and evaluated its anticancer efficacy. The expression of miR-145 (miRNA-145) plays an important regulatory role in the growth inhibition, metastasis, invasion, and chemosensitivity of various tumors. The high expression of miRNA-145 in tumor tissue cells can inhibit the activation of proto-oncogenes, while the downregulation of miRNA-145 expression can reduce the ability to inhibit the expression of proto-oncogenes and the growth, proliferation, and even metastasis of cancer cells. Experimental results show that miR-145-MNPF shows the best particle size and zeta potential, can effectively internalize and restore miR-145 in pancreatic cancer cells, and inhibit cell proliferation, clone formation, migration, and invasion of pancreatic cancer cells [3]. A patient's examination revealed a significantly enlarged gastrointestinal mass (2 cm in diameter) located in the gastric antrum near the pylorus at the greater curvature. EUS-FNA was performed with the assistance of on-site cytopathology to assess the adequacy of the material. The cytopathological smear showed a uniform group of round epithelioid cells with relatively small nucleoli and variable eosinophilic cytoplasm, stained with smooth muscle actin, but desmin, chromogranin, synapse, and keratin were negative, and the final cytological diagnosis of gastric globular tumor (GT) was obtained. The patient underwent a CT scan, which confirmed the presence of high-density lesions of approximately 14 mm and no lymphadenopathy or metastatic disease. There were no contraindications to surgery, so Castro Ruiz et al. performed gastric laparoscopic wedge resection (it is commonly used for surgical removal of lesions on the eyelids, nostrils, auricles, and lips. This kind of excision involves the full thickness and edge of local tissues or organs. The excised lesions are wide on the surface and narrow in the deep, in the shape of a wooden wedge. The sutures should also be sutured in layers) of the tumor. Laparoscopy is a very good minimally invasive technique for small and benign tumors. The patient is discharged on the fourth day after surgery. Macroscopically, the lesion has clear borders and is rubber-like. Histological examination confirmed the cytological diagnosis of gastric GT, and the

surgical margin was disease-free [4]. Although treatment with imatinib in patients with advanced gastrointestinal stromal tumors (GIST) has brought significant clinical benefits, the disease will eventually progress due to resistance to imatinib. Treatment options after the failure of first-line imatinib include dose escalation of imatinib or switching to sunitinib. However, there is currently no large-scale study to compare the differences in the efficacy of these two treatment strategies or the effects of surgery. Hsu et al. and other studies recruited hundreds of patients with advanced GIST, and surgery observed a favorable survival trend, although this advantage disappeared after adjusting for confounding factors. Hsu et al. were divided into three groups for patients with advanced GIST who no longer responded to first-line imatinib. The treatment success rate and surgical effect of the treatment plan were evaluated by the overall survival rate. It is concluded that for patients with advanced GIST who have failed first-line imatinib treatment, compared with directly switching to sunitinib, the dose escalation of imatinib can significantly prolong OS [5]. A woman in her 40s initially presented with anal pain and was diagnosed with rectal GIST. A 9 cm tumor extends near the anus and requires radical resection of the abdominal and perineal tumor. The patient initially received neoadjuvant treatment with imatinib mesylate. Six months of neoadjuvant chemotherapy reduced the tumor to about 47% of its original size and allowed anal-sparing surgery. Imatinib mesylate can inhibit Bcr-Abl tyrosine kinase at the cellular level in vitro and in vivo and can selectively inhibit Bcr-Abl positive cell line cells, Ph chromosome positive chronic myeloid leukemia, and acute lymphoblastic leukemia proliferation and induction of apoptosis in fresh cells from patients. In addition, imatinib mesylate can also inhibit platelet-derived growth factor (PDGF) receptor; stem cell factor (SCF); c-Kit receptor tyrosine kinase, thereby inhibiting PDGF; and stem cell factor-mediated cellular behavior. Research of Kenno et al. showed that from the perspective of preserving anal function, the neoadjuvant treatment of imatinib mesylate is useful for large rectal GIST [6]. Because the tumor is located in the pelvis, anal sparing surgery for large rectal gastrointestinal stromal tumors (GIST) can be difficult. Therefore, rectal GIST may require extensive surgery, such as abdominal perineal resection. In recent years, in some cases, preoperative imatinib treatment has been used to reduce tumor size and protect the anus. However, there are few reports of laparoscopic anus-sparing surgery for giant rectal GIST. In a 55-year-old male case, a 10 cm pelvic mass was found in the lower rectum. Sn A et al. performed ultrasound endoscopy with fine-needle aspiration, and the pathological results led to the diagnosis of GIST. The mass has spread to the prostate and left levator ani muscle, so surgery is considered difficult without damaging the pseudocapsule. Therefore, imatinib mesylate (IM) was used for 8 months of chemotherapy before surgery; the mass was reduced to 7.8 cm; and laparoscopic intersphincterectomy was performed. Among them, the patient underwent IM chemotherapy before surgery and then performed anus preservation surgery. In a review of patients who successfully underwent anal-sparing laparoscopic surgery after preoperative IM chemotherapy, this case represented the largest tumor size. It is concluded that preoperative imatinib mesylate chemotherapy can effectively reduce rectal GIST, and laparoscopic ISR can be used to preserve the anus, even if the tumor is large [7].

1.3. Innovation. (1) This article improved the model of knowledge map combined with deep learning to realize disease self-diagnosis; (2) the ranking learning is applied to doctor recommendation, and the characteristics of doctors are comprehensively considered for ranking; (3) this article enriched the research angles and research methods of the doctor-patient matching problem; and (4) this article diversified detailed care that made the treatment more efficient and the patients feel more at ease.

2. Detailed Nursing Plan under Big Data

2.1. Medical Big Data. With the rapid development of medical information engineering, the complex types and scale of medical data make the existing medical big data analysis technology unable to meet its needs. It is difficult to collect, analyze, and process medical data in a timely and streamlined manner and integrate it into useful information to support accurate medical decision-making. Therefore, how to efficiently calculate and integrate medical big data becomes more and more important [8].

2.1.1. Sources of Medical Big Data. Medical big data mainly comes from clinical medicine, biomedicine research and development, new medical models, and information-based treatment. The detailed source distribution can be shown in Figure 1.

2.1.2. The Characteristics of Medical Big Data. (1) Multiple data types include photos, audio, video, Bluetooth information, sensors, signal search, and so on. (2) Data sources are wide, such as the four main sources mentioned above. (3) A large amount of data needs to be stored. CT images contain about 100 MB of data, and the size of each genome sequence file is about 750 M. The high-resolution standard pathology map contains approximately 5 GB of medical data information. The unit of measurement for big data is at least a scientific measurement unit with 100 million as the unit. (4) Data development and update are fast; research on medical convenience is constantly updated and disseminated; and data change rapidly, which is different from traditional data mining technology. (There are mainly clustering methods, analysis methods, and regression methods. Traditional data mining techniques are all based on the development of a centralized underlying software architecture, which is difficult to parallelize and has low execution efficiency.) (5) Business value is great; health is very important; and big data analysis is used to understand the development mode and development trend of things and obtain valuable business information [9].
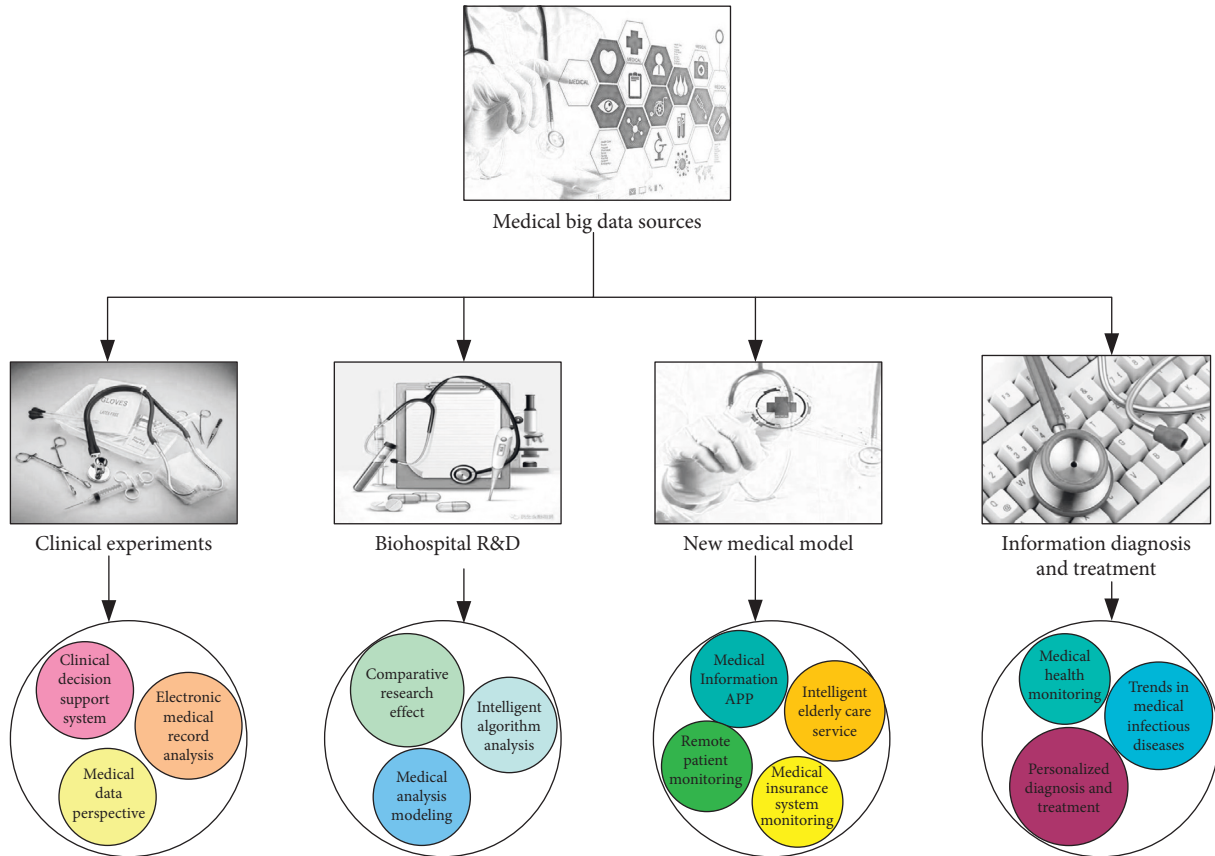
FIGURE 1: Sources of medical big data.

2.1.3. Application Scenarios of Medical Big Data. The current important application scenarios are: (1) Clinical decision support system. The data-driven clinical decision support system can make use of big data analysis technology to make itself more intelligent and improve the work efficiency of medical staff and the quality of medical services. (2) Remote monitoring through various wearable health equipment, remote monitoring of patients with chronic diseases, and remote recording of relevant data. Through the collection and analysis of big data, it can help healthcare professionals develop treatments for patients. (3) Comprehensively comparing and analyzing the patient's individual characteristics, disease-related data, and treatment effect data; thoroughly comparing various treatment methods; and finally determining the best treatment plan for a specific patient and conducting effective research. Big data visualization improves the transparency of medical data and processes, promotes the optimization of medical business processes, and reduces medical costs while improving the quality of medical services. And it regulates the medical behaviors between doctors and patients, makes medical behaviors more transparent and effective, reduces medical inconsistencies, and reduces medical disputes. Since the development of medical big data in 2005, the data have grown from several thousand T to hundreds of millions of T; and the application of data has grown exponentially. According to the collected statistics, it can be shown in Figure 2 [10].

2.1.4. Medical Big Data Algorithm. At present, there are many kinds of big data algorithms, which can be described as a hundred flowers blooming. For the common algorithms of medical big data, take the neural network algorithm as an example. Although traditional cloud computing can perform a large amount of data analysis and basically meet the requirements of medical quality evaluation, there are still many shortcomings, such as a long calculation process and a large number of sample training and testing. The DNN intelligent cloud algorithm proposed in this paper can significantly reduce the calculation time, and the quality evaluation index QEI obtained can more accurately reflect the patient's service evaluation of the detailed surgical care and can be used to detect the hospital's treatment effect [11].

2.2. DNN Algorithm Model. This article classifies the QEI of each hospital into categories I, II, III, and IV; QEI between 0 and 25 is type I; QEI between 25 and 50 is type II; QEI between 50 and 75 is type III; and QEI between 75 and 100 is type IV. The larger the QEI, the better the quality of detailed care in the hospital and the higher the treatment effect. From this analysis of the model, the following formula can be obtained:

$$QEI = \lambda_1 \times PI + \lambda_2 DI, \qquad (1)$$

where PI is the proximity index, DI is the disease index, and λ_1 and λ_2 are the proportional coefficients of PI and DI,
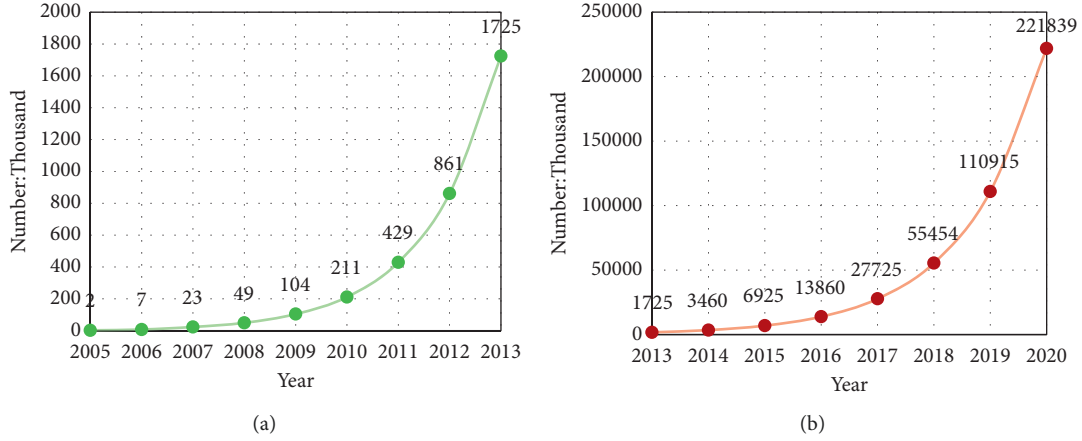
FIGURE 2: The growth of medical big data from 2005 to 2020.

respectively. It is related to the comprehensive medical level and medical equipment condition of each hospital. In order to get the actual value conveniently, this paper assigns values to PI and DI and λ_1 and λ_2, respectively, as shown in Table 1 [12].

Di is the disease-to-good rate, which can be obtained by formula conversion with the quality data value of the case known, and the conversion is shown in the following formula:

$$D_i = \frac{G + B}{S} \times 100\%, \quad (2)$$

where G is the number of optimistic conditions, B is the number of pessimistic conditions, and S is the number of total conditions.

P_i is the neighboring ratio of a hospital and can be calculated as follows:

$$P_i = \frac{m_i}{N_i}, \quad (3)$$

where m_i is the number of neighbors of the hospital and N_i is the total number of *data* of the hospital.

The neighboring point algorithm based on DNN can be understood as the neighboring ratio of the data x that needs to be detected is the distance from the x point to its i-th neighboring data. Formula (3) can be expressed as the area A where the data x is within its diameter:

$$A(x, r) = \{x \in D | r(x, i) \le R\}, \quad (4)$$

where r is the radius range value from point x to its i-th neighboring data, R is the maximum value, and D is the set of data x.

Therefore, the distance from point x to point i can be shown in formula (4):

$$L_i(x) = \{x \in D | r(x, i) \le l - r(i), x \ne i\}, \quad (5)$$

where l represents the number of neighbors.

Given D and l, then the l proximity distance of data x is shown in the following formula:

TABLE 1: Corresponding assignment for each indicator and parameter.

QEI genre	I	II	III	IV
PI	40	30	20	10
DI	10	20	30	40
λ_1	0.25	0.25	0.5	0.5
λ_2	0.4	0.4	0.6	0.6

$$D^l(i) = \frac{\sum_{x \in D} r(x, i)}{|Li|}. \quad (6)$$

This article has improved the previous algorithm. Assuming that the area range of the distance calculation between the two data is O, then

$$O = \left[\frac{N_i}{N_h} \right], \quad (7)$$

where N_h is the number set of the hospital. The purpose of this calculation is to make the number of data points be compared as much as possible to all the data points within the scope of the hospital [13]. Letting o be the midpoint data point of the class, and the number of data points in it should be at least n, take $d/2$ as the radius of the circle, and o as the center of the circle. For any two points, suppose x_1, x_2, then satisfy

$$r(x_1, x_2) \le \frac{d}{2}, \quad (8)$$

$$|N(x_1, x_2)| \ge n.$$

Filtering principle: When T has been assigned to the smallest value among n candidate neighboring points if it satisfies

$$D^l(i) + r(x_1, x_2) > T. \quad (9)$$

At this time, x_2 cannot be a neighboring point.

As shown in Figure 3, from x_1 and x_2 and the three neighboring points ω_1, ω_2, and ω_3, using the theorem that
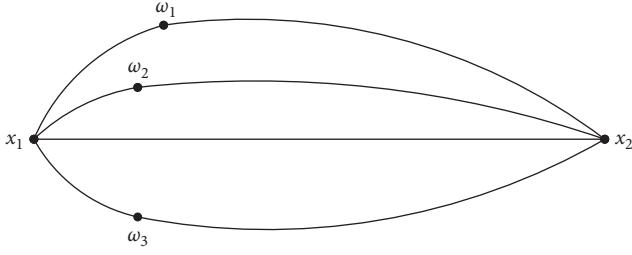
FIGURE 3: Schematic diagram of the neighbors of x_1 and x_2.

the sum of the two sides is greater than the third side, we can know

$$r(x_1, \omega_1) + r(x_1, x_2) > r(x_2, \omega_1),$$
$$r(x_1, \omega_2) + r(x_1, x_2) > r(x_2, \omega_2), \qquad (10)$$
$$r(x_1, \omega_3) + r(x_1, x_2) > r(x_2, \omega_3).$$

It can be generalized to get the following formula:

$$\sum_{i=1}^{n} {}_{\omega \in N(x_1, x_2)} r(x_1, \omega_i) + n \times r(x_1, x_2) > \sum_{i=1}^{n} {}_{\omega \in N(x_1, x_2)} r(x_2, \omega_i). \quad (11)$$

That is, if both sides are divided by n, we can get

$$\frac{1}{n}\sum_{i=1}^{n} {}_{\omega \in N(x_1, x_2)} r(x_1, \omega_i) + r(x_1, x_2) > \frac{1}{n}\sum_{i=1}^{n} {}_{\omega \in N(x_1, x_2)} r(x_2, \omega_i). \quad (12)$$

That is:

$$D^l(x_1) + r(x_1, x_2) > D^l(x_2). \qquad (13)$$

Combining formula (9), we know

$$D^l(x_1) + r(x_1, x_2) < T. \qquad (14)$$

Therefore,

$$D^l(x_2) < T. \qquad (15)$$

The above calculation can show that the neighboring point D^l is already greater than $D^l(x_2)$, and the neighbors of x_2 need to be filtered out.

Considering that the whole area can be divided into countless small areas, cluster analysis can be combined, assuming $\overline{O}$ is the average value of the data center points in a certain area. This area includes m data, then

$$\overline{O}_i = \frac{\sum_{i=1}^{m} x_i}{m} = \frac{x_1 + x_2 + \cdots + x_m}{m}. \qquad (16)$$

The complexity of this clustering can be expressed by the following formula:

$$\sigma = \frac{m}{n}(A + O) \times \left(m - \frac{(i-1)m}{x}\right). \qquad (17)$$

Then for the theoretically generated y cluster centers, their cluster center values are $\overline{O}_1, \overline{O}_2, \ldots, \overline{O}_y$, where $O_{\max}$ and $O_{\min}$, respectively, represent the maximum and minimum values in each cluster; then the assignment of each corresponding cluster center is

$$Y(x) = \frac{\lfloor 10 \times (\gamma + ((\overline{O}_i - \overline{O}_1)/(\overline{O}_y - \overline{O}_1))) \rfloor}{10} = \frac{\lfloor 10 \times (\gamma + ((\overline{O}_i - O_{\min})/(O_{\max} - O_{\min}))) \rfloor}{10}, \qquad (18)$$

where $\gamma = 0.1$ in the formula is to keep one decimal place for easy calculation [14].

2.3. Detailed Care in the Operating Room.

Compared with traditional nursing work, the meticulous care in the operating room allows patients to feel more considerate service, let them carefully immerse themselves in the warm treatment environment, follow the hospital's arrangements, improve patient satisfaction, treat patients, provide convenience for the operation, smooth implementation, improve the quality of postoperative rehabilitation of patients, and increase patient satisfaction with nursing work [14].

2.3.1. The Importance of Detailed Care in the Operating Room.

(1) Adapting a variety of nursing models to the needs of patients. Many patients have preoperative anxiety, which affects their effectiveness in treating certain diseases and makes it difficult for them to recover. Under the meticulous nursing mode, medical staff answer patients' questions, effectively reduce surgical anxiety, and cooperate more

actively with treatment, which improves the success rate of surgery to a certain extent. (2) Reducing postoperative complications (the statistical analysis method of classifying the clustered objects according to the characteristics of the things themselves; its purpose is to divide the data set according to a certain similarity measure) and improving patient care satisfaction. The medical staff will promptly inform the patient of the precautions after the operation, which can effectively calm down the patient's negative emotions. During the operation, the patient's physical characteristics can be detected and tracked in time. When a bad phenomenon occurs, it can be reported to the doctor in time, which can improve the treatment effect of the patient. At the same time, it also establishes a good image in front of the family and improves patients' satisfaction with long-term care. (3) Improving patient satisfaction and improving hospital reputation. In the advanced nursing mode, the nurse will explain the surgical precautions to the patient and family members when making an appointment for surgery to treat the disease. Family members have a deep understanding of the risks of treatment and the impact of surgery

on patients. Medical staff will do their best to improve patients to a certain extent and increase satisfaction and hospital reputation. Figure 4 shows the conventional process of detailed care in the operating room [15].

2.3.2. Application Measures of Detailed Nursing. (1) Pre-operative care. It includes the following: following the doctor's surgical plan to ensure that relevant equipment and items are installed on time and disinfection and sterilization are handled properly, developing detailed nursing procedures in the operating room, clarifying the job responsibilities of all levels of personnel related to surgery, classifying nursing tasks at different times, assigning nursing tasks to specific nursing staff, visiting patients in the ward, reading cases, communicating with patients and their families, observing patients' conditions, explaining surgical precautions, helping patients overcome tension, solving patient-related disease knowledge, stabilizing patients, and improving patient compliance. (2) Intraoperative care. Nursing staff maintain easy communication with patients, making patients more reliable. During the anesthesia process, the nursing staff can comfort and encourage the patient with gentle words, touch the patient's body gently, and improve the patient's safety awareness. The patient inspection system should be observed during the operation, and the nurses should adopt a standardized and gentle attitude to avoid infringing on the privacy of patients. During the operation, proper insulation care and proper insulation of the exposed area are carried out to reduce the discomfort of the patient. During surgery, the liquid is used to maintain the room temperature and improve patient comfort. Carefully observe and record the patient's vital signs and minimize the entry and exit of nonsurgeons to prevent pathogens from entering the operating room. During the operation, ensure that the functions of various instruments are normal and the surgical materials meet the requirements of the specification and are completely exposed to the doctor's field of vision to ensure the smooth progress of the operation. (3) After observing the patient's physical characteristics, the patient was fully awake; the side effects disappeared; and he was sent to the ward for rehabilitation and handed over work with the ward nurse. After the operation, the nurse went to the ward to understand the wound healing of the patient in time, help the patient restore function, explain the precautions, and request the evaluation of the patient's care quality [16, 17].

3. The Detailed Nursing Experiment of Gastrointestinal Tumor Based on Big Data

3.1. Design of Medical Big Data Model

3.1.1. Data Collection [18]. The big data mentioned in this article is geospatial big data, which mainly includes POI data and pedestrian navigation data. Among them, POI data is also called point of interest, which generally refers to point data on internet electronic maps. This includes vector point data with four main attributes: name, address, coordinates, and category. Pedestrian navigation data refers to route

planning data between multiple starting points and multiple destinations obtained through the electronic map API interface, which mainly includes route planning distance and driving time. The data terminal can be divided into multiple types, as shown in Figure 5 [19, 20].

This article investigated 29 hospitals for relevant data collection. The information was collected based on the comprehensive level of the hospital Q, the hospital's neighboring area A, the number of monthly illnesses S, the medical history of gastrointestinal tumors n, and the rate of disease conversion D_i, and so on, and the results are shown in Table 2.

3.1.2. Data Processing. (1) Data preprocessing. JSON is a lightweight data exchange format, and its concise and clear hierarchical structure makes it an ideal data exchange language. In order to facilitate data processing, this research saves POI data and walking time data in the form of json format and data frame objects. With the help of Pandas' powerful data aggregation capabilities, we can splice, transform, sort, and aggregate the acquired POI and walking time data to provide a more easily processed data format for data vectorization. (2) Data conversion. Different data sources are directly connected to the different coordinate systems in the above vector file. Therefore, before performing spatial statistical analysis and calculations, vector files must be coordinated and corrected to convert them into computer-recognizable data. (3) Establishing a spatial database. Add attribute data corresponding to point, line, and area elements for each administrative division, such as residential area label, resident health facility level, population, and so on. On this basis, establish a geographic database; import residential areas, medical facilities, administrative divisions, roads, and other elements into the database; and build the foundation for subsequent data processing, analysis, and visualization [21, 22].

This article sorts out the data in Table 2 and analyzes the relationship between A and S. The relationship between Q and D_i can be obtained as shown in Figure 6.

It can be seen from Figure 6(a) that A and S are roughly proportional, that is, the larger the neighboring point area, the more the number of nearby doctors. Although A is very small in some areas, the number of illnesses S is still very large, such as the number 15 hospital. The reason can be seen in Figure 6(b). Although the comprehensive level of No. 15 hospital is relatively low, it has a high rate of disease-turning yield. From the overall relationship diagram, there is no absolute proportional relationship between the hospital's comprehensive level Q and the disease-turning yield rate D_i [23]. In order to analyze the reasons, this article conducted a detailed nursing management survey on several hospitals with the same characteristics and found that these hospitals do better in detailed nursing than other hospitals.

In order to further find the relationship between detailed nursing and its rate of disease conversion, this article excludes the interference of other factors and compares and analyzes the specialized gastrointestinal tumor hospitals numbered 3, 4, 7, and 9. Assuming that the level of detailed
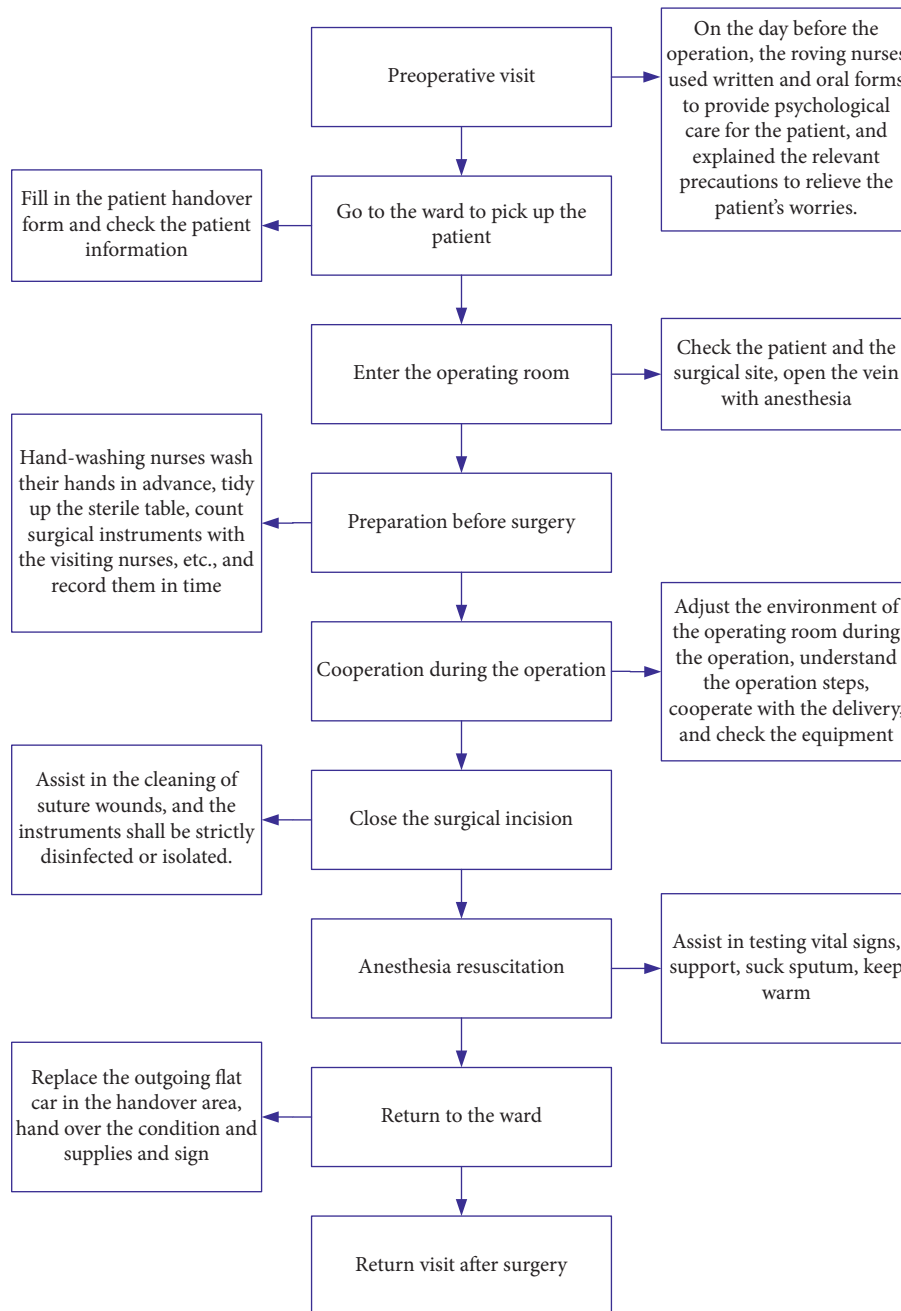
FIGURE 4: Detailed nursing process in the operating room.

nursing management is I, it can be divided into four levels: I, II, III, and IV, the higher the level, the more refined the care. The collated data is shown in Table 3:

After comparing the data in Table 3, it is found that the relationship between Q, A, N, and D_i is not obvious. From Table 3, it can be seen that the comprehensive level of hospital nos. 4 and 7 is quite high, no. 4 is slightly higher, and the medical records of gastrointestinal tumors are also similar, but the rate of disease conversion of no. 4 is lower than that of no. 7. The reason is that the level of detailed care management is higher and the detailed care is better. Similarly, observe hospital nos. 3, 7, 4 9; although the comprehensive level of the two groups is different, because

the level of detailed management is similar, the rate of disease conversion is very close. There is an obvious proportional relationship between I and D_i. In order to specify the value to express the relationship, detailed nursing experiments are carried out below in this article [24, 25].

3.2. Detailed Nursing Experiment

3.2.1. Experimental Subjects. One hundred surgical patients are included if they meet the following criteria: (1) all signed the informed consent; (2) no major disease; (3) no endocrine
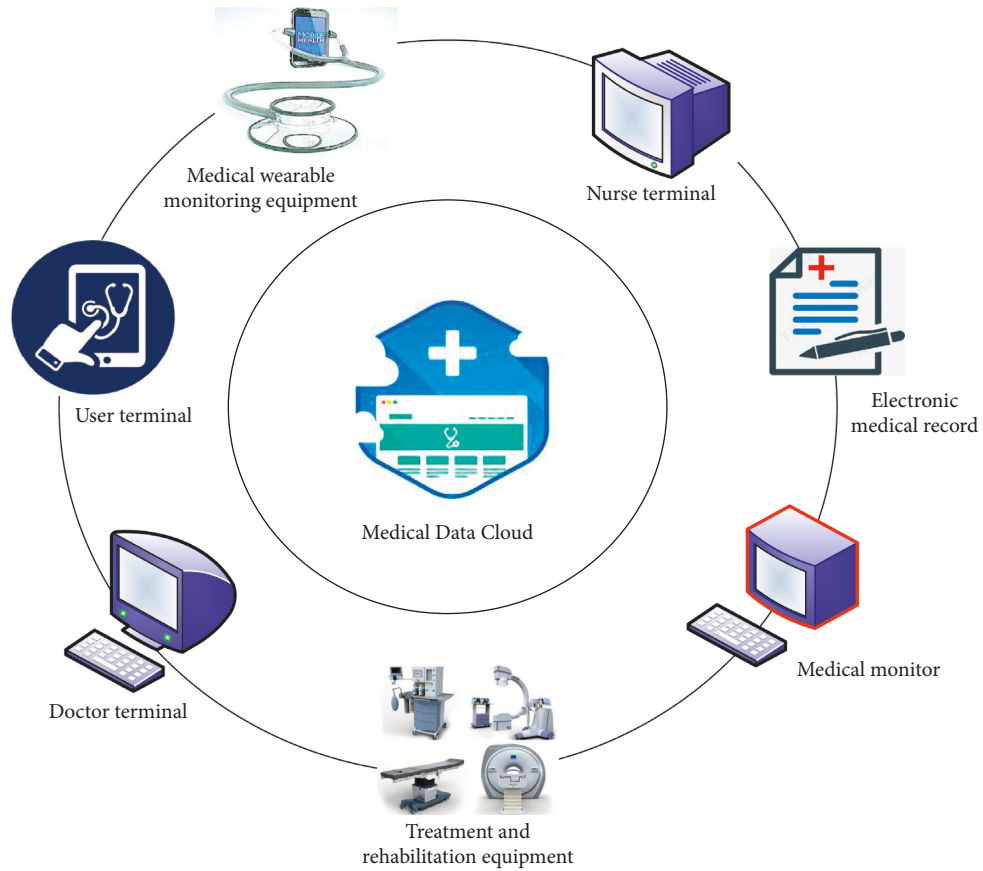
FIGURE 5: Data collection of the medical data cloud.

TABLE 2: Hospital-related data collection information.

| Hospital code	Q	A	S	n	D_i
1	96	1,299	1,594	273	70
2	92	1,600	2,006	213	96
3	87	888	1,510	1,892	74
4	96	406	926	1,870	67
5	88	2,945	3,762	442	75
6	87	2,425	3,616	359	72
7	91	918	1,974	1,861	74
8	97	1,837	2,946	357	92
9	72	2,926	4,059	1,901	65
10	83	979	2,085	25	67
11	85	333	1,451	696	62
12	71	1,530	2,581	101	81
13	90	2,029	7,929	818	86
14	97	776	6,233	522	72
15	79	538	6,078	507	83
16	95	333	5,989	580	92
17	84	2,632	8,555	751	81
18	66	2,804	8,040	39	98
19	79	2,878	8,877	621	88
20	65	1,856	3,915	106	88
21	66	2,502	4,958	280	86
22	83	1,021	3,397	206	80
23	73	1,334	3,593	175	80
24	88	832	3,313	72	79
25	84	700	1,532	219	91
26	77	2,225	3,293	162	99
27	93	2,066	3,901	127	60
28	93	114	792	250	81
29	73	887	3,020	177	63
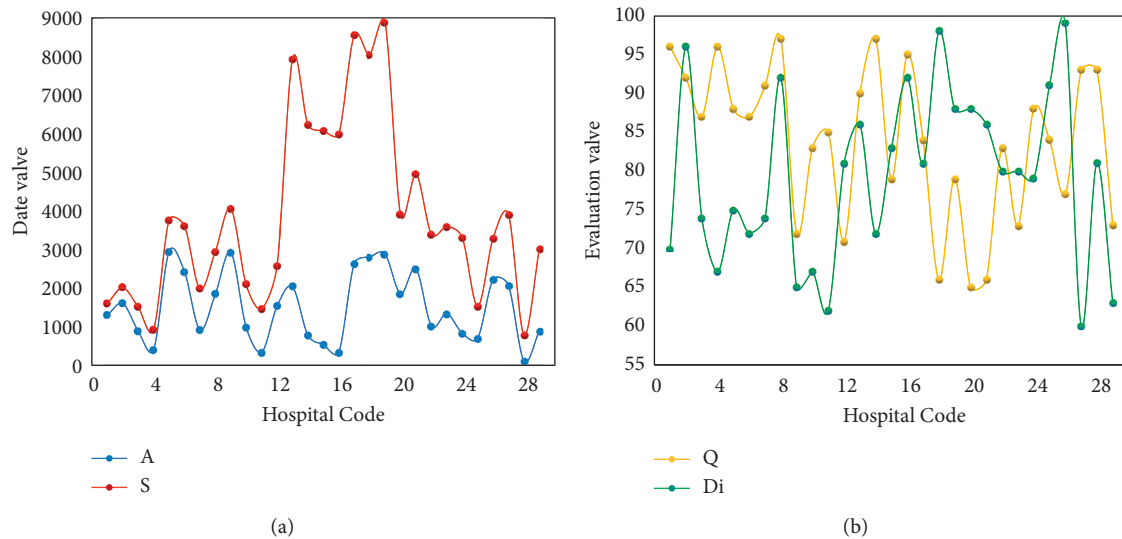
FIGURE 6: Relationship diagram of hospital-related data: (a) the relationship between the neighboring area and the number of monthly illnesses and (b) the relationship between the comprehensive level of the hospital and the rate of disease conversion.

TABLE 3: Gastrointestinal cancer hospital data information comparison.

Hospital code	Q	A	N	D_i	I
3	87	888	1,892	74	II
4	96	406	1,870	67	I
7	91	918	1,861	74	II
9	72	2,926	1,901	65	I

or immune system disease before the operation; and (4) primary school education or above, which is enough to complete the investigation.

Excluding factors include: (1) patients with severe immune system diseases; (2) combined with diabetes, liver cirrhosis, cardiovascular infection, and lung infection; (3) people who have recently suffered from functional gastrointestinal disease and are taking gastrointestinal motility drugs; (4) patients with a history of mental and neurological diseases; and (5) patients with severe postoperative complications. Among the 100 selected patients, 41 were males, and 59 were females, aged 19 to 45 years old, and the operation time was 30 to 230 minutes. In a randomized controlled trial, patients were divided into an observation group and a control group, with 50 patients in each group. There was no statistically significant (i.e., the true degree of some statistical results of the data is credible, and there is a great grasp that the results of the data are not caused by chance) difference in general information between the two groups.

3.2.2. Experimental Method.
The control group adopts routine nursing management, and the experimental group applies refined nursing to nursing management. Nursing staff need to effectively manage the details and provide adequate care and love for patients involved in performing various clinical nursing tasks for cancer patients. Nursing staff can explain future nursing operations to cancer patients so that they can make proper psychological preparations

before performing routine nursing operations. Compared with normal patients, the fear, depression, irritability, and other bad moods of patients with gastrointestinal stromal tumors reduce the therapeutic effect and are not conducive to the prognosis. Through chemotherapy and other treatments, patients are prone to various side effects. Nursing staff need to further strengthen communication, patiently understand the needs of patients, meet the reasonable requirements of patients, improve patients' treatment information, and prepare daily necessities related to patients. The specific steps are as follows: (1) convey information and education, (2) psychological detail care, (3) warm detail care, (4) meticulous care of intraoperative observation, and (5) detailed operation nursing [26, 27].

3.2.3. Evaluation Index.
Comparing nursing errors, inadequate nursing, nursing complaint rate, nursing quality, and postoperative recovery time, the nursing quality score is determined according to the hospital's self-made postoperative satisfaction survey score sheet. The total score is 100 points, which is directly proportional to the quality of care. Satisfaction with η is proportional to the quality evaluation index QEI, which can be converted by QEI = $k\eta$. Because according to the experiment, QEI is proportional to the disease, D_i, and the satisfaction is also proportional to D_i.

3.3. Experimental Results.
During the operation, the average communication times and the average communication
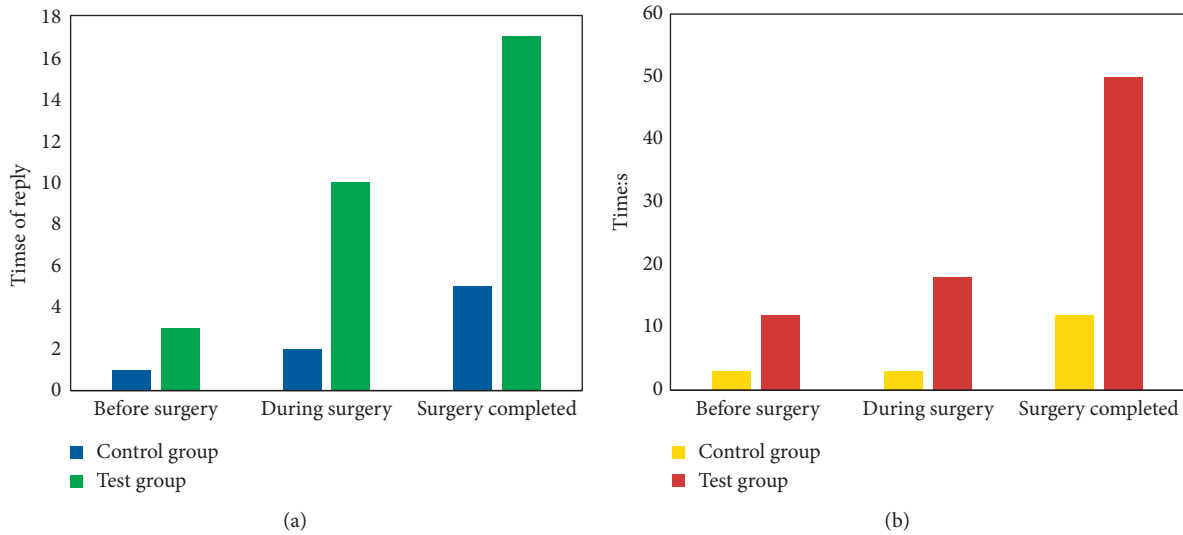
(a)

(b)

FIGURE 7: Comparison of patients' willingness to communicate: (a) comparison of patient response times and (b) comparison of patient communication time.

duration between the patient and the medical staff were compared, and the emotional value of the patient and the medical staff was compared as shown in Figure 7:

It can be seen from Figure 7 that for the experimental group that carried out detailed care, the number of patients' responses and the duration of communication were significantly greater, indicating that the patients' willingness to communicate was stronger. This is more conducive to solving the fears and doubts in the heart of the patient, calming the patient's psychology, and making the operation more smooth.

Then this article also compares the recovery of the two groups of patients after the operation, as shown in Figure 8.

It can be seen from Figure 8 that the average length of stay in the test group was 8 days, while that of the control group was 11 days, and the recovery efficiency increased by 27.2%. And the test group that performed detailed care is shown in Figure 8(a), and the mood before the operation is relatively better. With the increase in the number of days in the hospital, the mood of the patients in the test group for detailed care has improved significantly, while in the control group, as shown in Figure 8(b), the mood of the patients rises relatively slowly.

After that, this article investigates the degree of detailed care and the satisfaction of the tested patients and their families with the hospital. The results obtained are shown in Table 4.

The satisfaction degree mentioned above is directly proportional to QEI. According to the different detailed care levels of test groups 1 and 2, the relationship between QEI and D_i can be obtained as shown in Figure 9.

It can be seen from Figure 9 that as the QEI value increases, the D_i value of the test group is also increasing, and the increase value has been very stable, while the D_i value of the control group is not stable with the increase of QEI. The increase in QEI is not through optimizing the management

level of detailed care but through other unstable factors. And the QEI value increases by 5 points; the D_i value increases by about 2 points, that is, the QEI increases by 1 point, which can increase the rate of disease conversion by 0.4 points. It can be concluded that the use of detailed care can actually and effectively improve the success of the surgery and the effect of treatment and rehabilitation for patients with gastrointestinal tumors [28].

In addition, in order to compare the big data processing performance of the DNN algorithm of this system with traditional algorithms, we run this system on the Hadoop cluster in this experiment to analyze medical big data. At the same time, we also need a single-node host with the same physical configuration for comparison. The cluster used in this experiment is not the most effective in big data analysis and processing due to the limitation of the number of nodes, but it shows an excellent performance improvement effect in big data processing capacity compared to ordinary single-node hosts, as shown in Figure 10. The blue line represents the average time consumption of using a single-node algorithm to process different data sizes, while the red line is the average time consumption of distributed algorithm processing. As shown in Figure 10, when the data scale is small, the traditional algorithm is even faster than the DNN algorithm, For example, in the calculation time of the first 10^4 data, the traditional algorithm is lower than the DNN algorithm, while in the $10^{th}5$ data, the DNN algorithm is still relatively stable, and the time control is 4.92 s, while the traditional algorithm exceeds 6.46 s, and the operation speed is significantly slower, and this result occurs because a certain amount of time is inevitably consumed when the Hadoop cluster starts the Map and Reduce tasks. However, as the scale of data grows, single-node algorithms begin to be unable to complete the analysis and processing of big data within effective time constraints, and the advantages of distributed
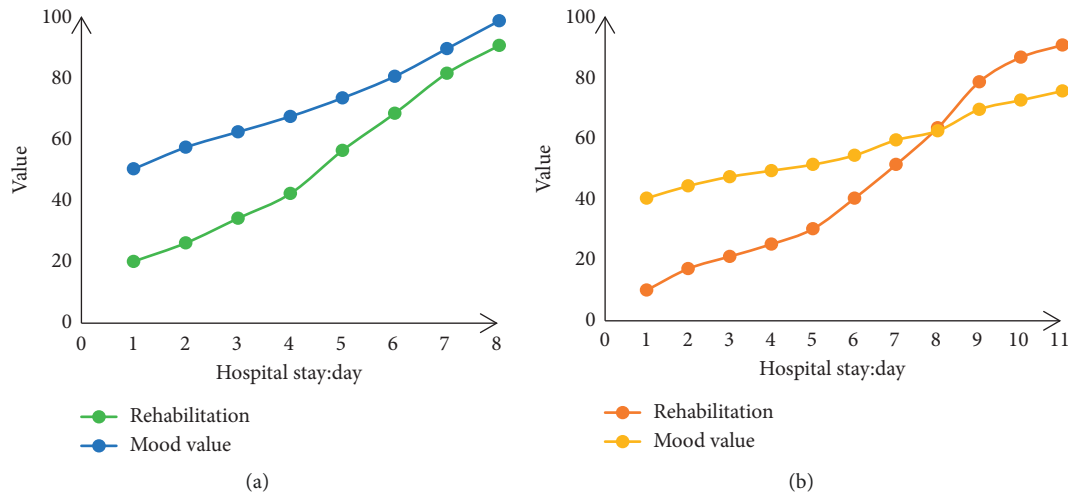
(a)

(b)

Figure 8: Postoperative rehabilitation of patients: (a) postoperative rehabilitation of patients in the test group and (b) postoperative rehabilitation of patients in the control group.

Table 4: Detailed nursing satisfaction survey.

Group	Number	Nursing errors	Nursing deficiencies	Nursing complaint rate	Nursing quality score
Control group	58	8	3	5.17	76
Test group 1	58	1	0	0	95
Test group 2	58	3	1	1.72	87
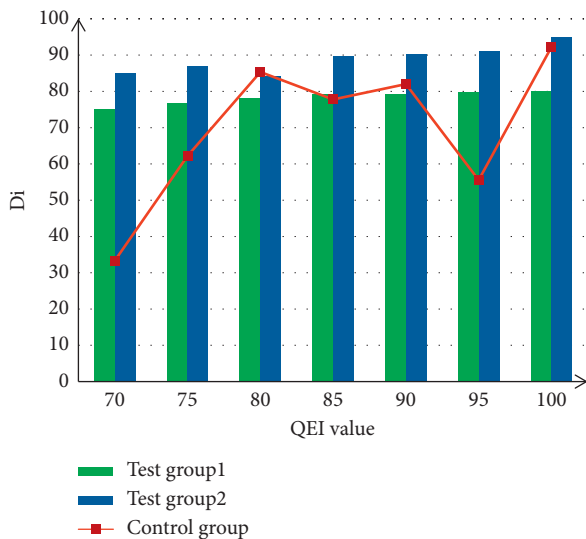
Figure 9: The relationship between quality evaluation indicators and the rate of disease conversion.

Figure 10: Comparison of DNN algorithm and traditional algorithm.

algorithms in big data processing have become apparent. In addition, when the distributed system reaches the bottleneck of data processing due to the increase in data scale, its capacity can be improved by increasing the number of DataNode nodes, which has good scalability compared with single-node algorithms.
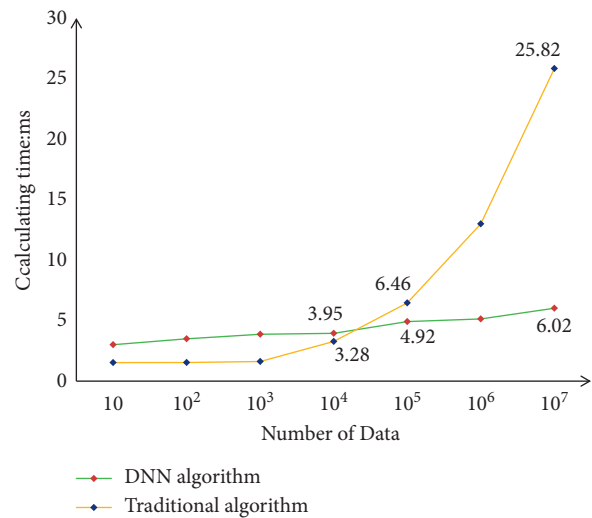
4. Discussion

The secondary use of medical data is of great significance to medical services and clinical research, but it has not been effectively carried out due to the lack of tools and methods. A lot of knowledge and value are hidden in medical big data. Due to the lack of adequate methods, previous data analysis

and research can only rely on questionnaire surveys in medical services and clinical research, focusing on a random sampling of small-scale data such as individuals or small groups. Compared with big data analysis, these studies are not sufficiently convincing, and the methods used in these studies cannot handle big data.

The detailed nursing method and the DNN big data algorithm proposed in this article can effectively guarantee the surgical success rate of gastrointestinal tumor patients and the effect of postoperative treatment and rehabilitation in the detailed nursing and postoperative nursing in the operating room. However, due to the author's limited level, the factors considered may not be comprehensive enough. It is necessary to conduct comprehensive research from disciplines such as psychology and behavioral science to further explore the many reasons for the anxiety, fear, and other emotions of patients with gastrointestinal tumor surgery [29].

5. Conclusions

This article first analyzes and explains the background significance of detailed nursing based on medical big data and then cited the related explorations of many scholars on the subject content of this article, summarized the deficiencies of previous studies, explained the improvements made in this article, summarized the innovations studied in this article, and then deeply studied the sources of medical big data, features, application scenarios, etc. At the same time, this article proposes an improved DNN algorithm, conducts theoretical research on the algorithm, uses mathematical formulas for method calculations, and then studies the nursing process, importance, and nursing measures of detailed nursing in the operating room. Then, the design of the medical big data model is carried out. First, the relevant information of many hospitals is collected, and the relationship between the relevant parameters is analyzed by chart comparison. Then two groups of patients were selected from different hospitals for detailed nursing experiments. The final experimental results show that patients who have undergone detailed care have a 27.2% improvement in treatment and rehabilitation effects than those who have not. Moreover, the level of detailed care has an obvious positive relationship with the rate of condition conversion. In the end, the hospital's detailed care quality evaluation index, which is QEI, increases by 1 point, which can increase the rate of condition conversion by 0.4.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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