International Journal of Medicine and Life Sciences
ISSN: 2518-0223, Volume 3, Issue 2, December, 2018

Research on Case Management Mode for Special Complications of Diabetic Patients under Two-way Referral

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Abstract: As a new type of social welfare service supply mode, the routine case management mode for special complications of diabetic patients can realize the management of different clinical diseases, but at the same time, it causes the waste of health resources in large hospitals and the sluggish demand of primary hospitals. Therefore, the research on case management mode for special complications of diabetic patients under two-way referral is put forward. The case management mode platform is built and the case management mode algorithm for special complications is constructed, so that the case management mode for special complications is completed. The parameters of special complications management for diabetic patients under two-way referral are loaded, and the case management mode for special complications of diabetic patients is analyzed. Therefore, the research on case management mode for special complications of diabetic patients under two-way referral is realized. The experimental data show that the case management mode for special complications of diabetic patients under two-way referral is 81.2% less waste of health resources and 2.7 times higher than that of conventional case management mode for special complications of diabetic patients. The case management mode for special complications of diabetic patients under two-way referral not only saves medical expenses, but also creates treatment opportunities for other difficult and critical patients in urgent need of hospitalization. It is a case management mode worthy of vigorous promotion.

Keywords: Two-way referral; Diabetic patients; Special complications; Case management; Management mode; Management parameters

1. Introduction

The conventional case management mode for special complications of diabetic patients can improve medical quality, control medical expenditure, and take various management measures to intervene and control. Case management mode plays an irreplaceable role in the management of special complications of diabetic patients. However, it will result in a large number of common diseases, frequently-occurring diseases in large urban general hospitals, waste of health resources, sluggish demand and too little visits of grass-roots hospitals and community medical service institutions and other phenomena [1]. For this reason, the case management mode for special complications of diabetic patients under two-way referral is proposed. Based on data acquisition, data preprocessing, data analysis and storage and data display, the research mode operation platform is constructed. Relying on the analysis module for data operation, the construction of the special complications case management mode is completed. By incorporating the management parameters of special complications of diabetic patients under two-way referral in the research mode, calculating and analyzing them, the case management mode for special complications of diabetic patients under two-way referral is completed. In order to ensure the validity of case management mode for special complications of diabetic patients under two-way referral, the experimental environment of urban general hospitals, grass-roots hospitals and community medical service institutions is simulated. Two different case management modes for special complications of diabetic patients are used to carry out simulation tests of health resources and visiting volume. The experimental results show that the case management mode proposed in this paper is highly effective.

2. Construction

The construction of case management mode for special complications mainly includes the construction of case management mode operation platform and the algorithm of case management mode for special complications.

2.1. Construction of case management mode operation platform

A case management mode operation platform is built. The research mode platform consists of four parts: data acquisition, data preprocessing, data analysis and storage, and data display. The main function of the analysis module is to replace the calculation and analysis of the original artificial form by computer technology [2]. Relying

on the analysis accuracy and rapidity of computer technology, a case management mode operation platform is built. Data acquisition part is mainly about through data acquisition media, statistics and synthesis of environmental data and analysis data are needed for data processing. The data acquisition part mainly includes real-time data acquisition and non-real-time data acquisition. Real-time data is mainly acquired through the acquisition of sensor real-time information, which is stored in the response medium to prepare for data preprocessing. Non-real-time data acquisition is the acquisition of the original data state, which may be a fixed state, or a fixed data format and so on. Real-time data and non-real-time data are placed in storage medium at the same time. Real-time data acquired by sensors are inconsistent in data type and case management. Therefore, data preprocessing is needed. The data preprocessing is mainly the process of data unification. Data accuracy in data analysis and storage process is ensured.

Data analysis and storage process are the core processes of the whole analysis module, which mainly include data analysis process and data storage process. The data analysis process uses the analysis multi-task processing system to analyze the data. The pre-processed data is defined as RT. It is decomposed into different analysis units through the analysis multi-task program, and data analysis and storage are realized by fast docking with Hadoop [4]. Its data analysis and storage diagram is shown in Figure 1.

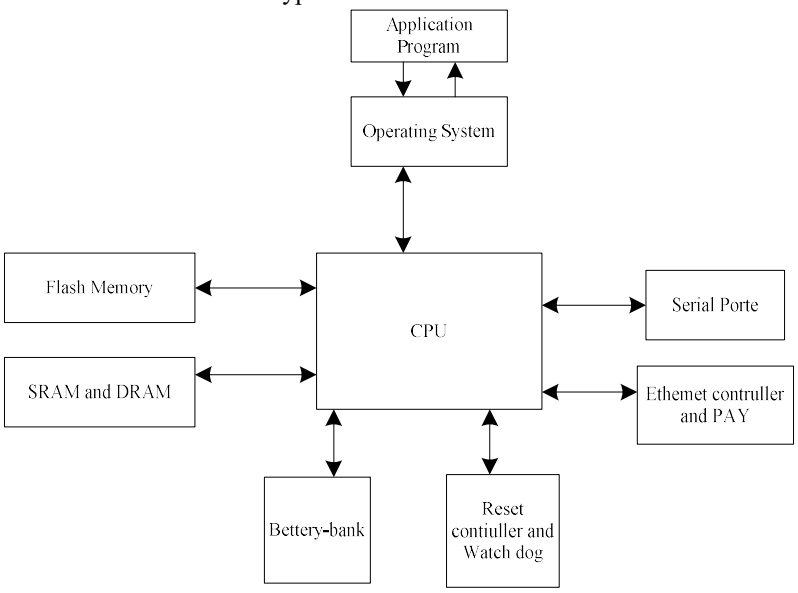

Figure 1. Data analysis and storage diagram

The data display process adopts the mainstream Web application development architecture, optimizes the display structure, adds CRM and OA interfaces, facilitates users to change or fine-tune data, and omits the input of the system. It can be directly transformed into the system through CRM or OA interfaces [5].

2.2. Construction of the algorithm of case management mode for special complications

By introducing statistics, this paper calculates the operation platform of the case management mode, analyses the case management of special complications, and carries out data operation relying on the analysis module. There are many large data computing platforms. In order to integrate with analysis multi-task processing system, Graph Lab data processing structure is adopted [6]. The core components of Graph Lab are distributed computing system (HEVT) and distributed computing framework (Map Reduce). Its Graph Lab data processing structure has the characteristics of simple interface with analysis programming, high parallelism and high computing efficiency. It is one of the mainstream large data processing technologies at present. The distributed computing system integrates the data structure processed by the analysis module, carries out parallel distributed computing, and integrates multiple single calculation results, thus forming large data processing, and obtains its promoting research conclusions based on large data processing. Its distributed computing framework is the overall framework of its big data structure operation. Data can be transmitted through the transmission control protocol (TCP) channel. At the same time, file data catalogue can be shared to realize multi-terminal data analysis [7]. Thus, the research on case management mode operation platform can be completed and the special construction can be achieved. The workflow diagram of

the case management mode for special complications is shown in Figure 2.

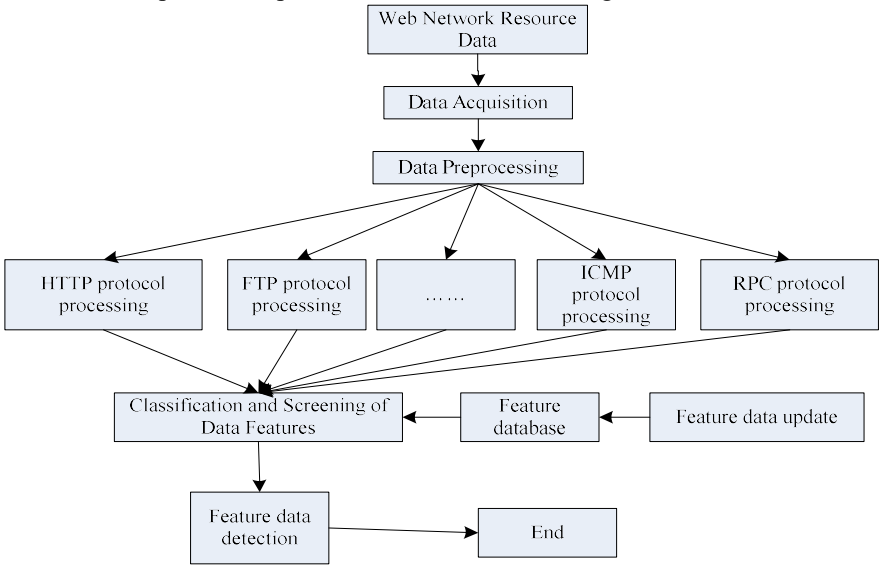

Figure 2. Workflow diagram of case management mode for special complications

3. Realizing The Research On Case Management Mode For Special Complications Of Diabetic Patients Under Two-way Referral

The implementation of case management mode for special complications of diabetic patients under two-way referral is achieved by loading management parameters of special complications of diabetic patients under two-way referral, calculating and analyzing their management mode.

3.1. Loading of management parameters for special complications of diabetic patients under two-way referral

Two-way referral system, in short, is "small illness into the community, serious illness into the hospital". It means that for patients who only need follow-up treatment, disease monitoring, rehabilitation guidance, nursing and other services, hospitals should publicize, encourage and mobilize them to transfer to the corresponding township health centers or community health service centers in accordance with the wishes of patients, and follow-up rehabilitation treatment should be completed by lower hospitals [8]. For those patients who can not get better medical services in our hospital, they are transferred to the upper level hospitals.

The management parameters of special complications of diabetic patients under two-way referral are loaded. By establishing the management files of special complications of diabetic patients in a certain time domain, the situation of diabetic patients under two-way referral is described, and then the management parameters of special complications of diabetic patients under two-way referral are loaded [9]. Assuming that the diabetic patient's visiting condition is k, the discrete system is defined as X (k), the system transformation function is F, the system accidental loss rate is W, the health resource utilization coefficient is Γ, and then the diabetic patient's visiting condition is k:

$$X(k)=F(k|k-1)X(k-1)+\Gamma(k-1)W(k-1) \quad (1)$$

The balance principle is generally used in the management parameters of special complications of diabetic patients under two-way referral. It is shown in formula (2):

$$I+P+G=ET+D+R\pm AWS \quad (2)$$

In the mode, I is the visiting volume of diabetic patients with special complications in T-period. P is the total visiting volume in T-period. G is the idle medical resource in T-period. ET is the visiting volume of other patients in T-period. D is the non-visiting volume. R is the missing visiting volume. AWS is the effective visiting volume in T-period. The special complications management of diabetic patients under two-way referral can not only make a holistic nursing plan for diabetic patients, but also provide the collected patient data for all members of the case management team to communicate with patients' families, so as to effectively evaluate and treat patients in real time [10]. Diabetes care process is continuous. The purpose of the special complications management mode for diabetic patients under two-way referral is to provide life-long help to patients in a planned way.

3.2. Computational analysis of case management mode for special complications of diabetic patients

Based on the loading of the management parameters of special complications of diabetic patients under two-way referral, the calculation and analysis are carried out. The analytical work mode is shown in Figure 3:

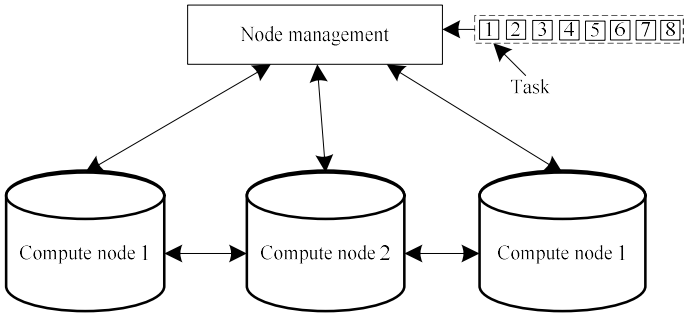

Figure 3. Computational and analytical mode of case management mode for special complications of diabetic patients

According to the calculation and analysis mode of the special complication case management mode of diabetic patients, the calculation analytical formula is shown in (3):

$$q = \frac{X(k) \cdot F(k \mid k-1) X(k-1)}{\Gamma(k-1) W(k-1)(I+P+G)} \quad (3)$$

By calculating the above formula, different q values are obtained. According to different q values, the case management mode of diabetic patients with special complications under two-way referral is determined [11]. Among them:

q > 0 represents the realization of case management of special complications of diabetic patients under two-way referral, which can reduce the waste of health resources caused by the large number of common diseases, frequently-occurring diagnostic and therapeutic tasks undertaken by urban general hospitals. It can also change the phenomena such as sluggish demand and too few visits of primary hospitals and community medical service institutions.

q < 0 represents that case management of special complications of diabetic patients under two-way referral can not alleviate the waste of health resources caused by a large number of common diseases, frequently-occurring diagnostic and therapeutic tasks undertaken by large urban general hospitals, nor can it change the phenomena of sluggish demand and too few visits of grass-roots hospitals and community medical service institutions.

q = 0 represents there is no impact that the case management of special complications of diabetes patients under two-way referral management alleviate the waste of health resources caused by the diagnosis and treatment of a large number of common diseases and frequently-occurring diseases in large comprehensive hospitals in cities. There is no impact on the sluggish demand and little consultation of grassroots hospitals and community medical service institutions.

According to the specific quantitative value of q value, the actual value of the management mode of special complications of diabetic patients under two-way referral is obtained. According to different quantitative values, the comparison under different conditions is carried out, so that the research on case management mode for special complications of diabetic patients under two-way referral is realized. The change brought about by the management mode of special complications of diabetic patients under two-way referral is shown in Figure 4.

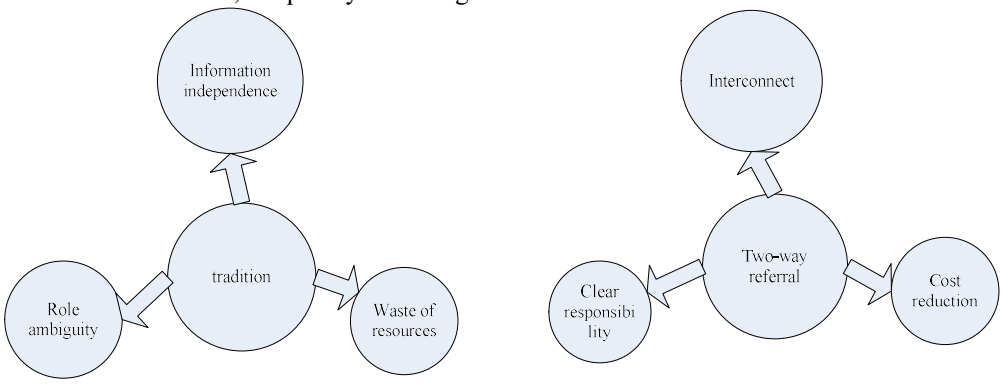

Figure 4. Change brought about by the management mode of special complications of diabetic patients under two-way referra

It is conducive to a comprehensive and systematic health education for patients at close range. Besides, it is conducive for patients to master diabetes series knowledge and health information and improve treatment results [12]. In addition, the community health service center's convenient resources can be used to connect with residents and build deeper feelings. The patient's strangeness and psychological barrier to community physicians are easy to eliminate. Trust is easier to be established than hospital doctors. Therefore, patients can achieve long-term, regular medication under the guidance and supervision of community physicians. A research on the case management of special complications of diabetic patients under two-way referral is realized.

4 Experimental Results And Analysis

In order to ensure the effectiveness of the research on the management mode of special complications of diabetic patients under the two-way referral, the simulation experiment is carried out. During the test, the hospital is tested with different specifications as the test object. The physical condition of the diabetic patients with special complications, all clinical information, lifestyle, patient's independent living ability, disease cognition ability, mental health, received care and services are now simulated. In order to ensure the effectiveness of the trial, the patient management mode of special complications of diabetes patients is used as a comparison object. The results of the two simulation experiments are compared, and the test data are presented in the same data chart.

4.1. Comparison of health resources waste in large hospitals

During the trial, two different cases of special complications of diabetes patients are used to work in the simulated environment to simulate the waste of health resources. The comparison results of the test results are shown in Table 1.

Table 1. Comparison of health resources waste in large hospitals

Type	Case management mode for special complications of diabetic patients under two-way referral	Case Management Mode of Special Complications in Conventional Diabetic Patients
Diabetic nephropathy	5%	85%
Diabetic retinopathy	6%	86%
Diabetic cataract	7%	82%
Diabetic foot	5%	83%
Diabetic cerebrovascular disease	2%	90%
Diabetic neuropathy	4%	91%

For the case management mode of special complications of diabetic patients under two-way referral and the conventional case management mode of special complications of diabetic patients, the waste of hospital resources in large hospitals is dealt with by arithmetic average. It is concluded that under the conventional case management mode of special complications of diabetic patients, the waste rate of hospital resources in large hospitals is 86%. While under the two-way referral case management mode of special complications of diabetic patients, the waste rate of hospital resources in large hospitals is 4.8%.

4.2. Comparison of the number of consultations in primary hospitals

During the experiment, two different case management modes of special complications of diabetic patients are used to simulate the waste of health resources in a simulated environment. The comparison results of the test results are shown in Figure 5.

Under the two-way referral case management mode for special complications of diabetic patients and the conventional case management mode for special complications of diabetic patients, the average number of visits in primary hospitals is processed by arithmetic. It is concluded that under the conventional case management mode for special complications of diabetic patients, the number of visits in primary hospitals in a day is 36. While under the case management mode of special complications of diabetic patients under two-way referral, the number of daily visit of primary hospitals is 98. The case management mode of special complications of diabetic patients under two-way referral is 81.2% less waste of health resources in large hospitals and 2.7 times more visits in grass-roots hospitals than that of conventional diabetic patients. The case management mode of special complications of diabetic patients under two-way referral not only saves medical expenses, but also creates treatment opportunities for other difficult and critical patients in urgent need of hospitalization. By solving the problem of overcrowding in large hospitals, we can spare more time and energy to solve difficult and serious diseases.

Diabetes treatment emphasizes the principles of early treatment, long-term treatment, comprehensive treatment and individualization of treatment. The specific measures for the treatment of the "five carriages" have been receiving more and more attention. The case management mode of special complications of diabetic patients under two-way referral is based on patients. Through the

implementation of two-way referral, a smooth two-way seamless connection between hospitals and communities is formed. In the process of referral, all medical and nursing staff are always around patients, which truly embodies patient-centered. The standardized management mode of community enhances the effect of prevention and treatment of diabetes. Moreover it has positive significance for effectively promoting the use of limited medical and health resources. Therefore, the case management mode of special complications of diabetic patients under two-way referral is worthy of vigorous promotion.

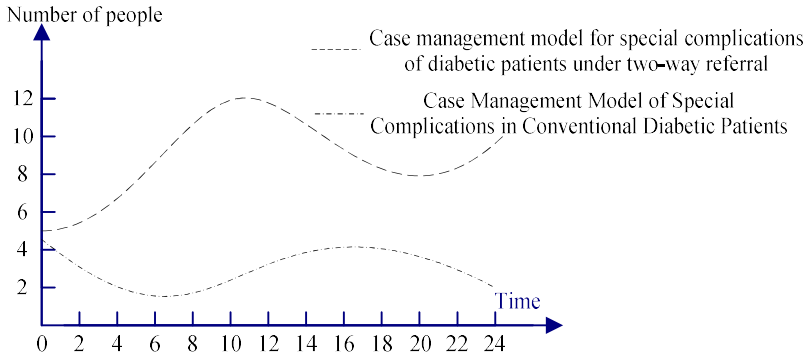

Figure 5. Comparison of the number of visits in primary hospitals

5. Conclusion

This paper proposes a case study on the management of special complications in patients with diabetes under two-way referral. Based on the mode management mode of the case management mode and the research of the special complication case management mode research mode algorithm, the special complication case management mode research mode is completed. By loading the parameters of special complications management of diabetic patients under two-way referral, the management mode of special complications of diabetic patients is calculated and analyzed. The management mode of special complications of diabetic patients under two-way referral is completed. The experimental data show that the case management mode of special complications of diabetic patients under two-way referral is extremely effective. It is hoped that the research in this paper can provide a theoretical basis for the management of cases of special complications of diabetic patients.

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