The Real-Time Secondary Information Support to Improve the Utilization of Inpatient Facility

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Abstract We established the utility indices of inpatient facility based on our own design and technology and created the method for the establishment of the real-time secondary information support system related to them and put it into practice. First of all, we designed the formula yielding norm of the indices which can evaluate the bed utilization rate, including the real-time therapeutic norm, days of bed utilization and length of stay, and automated the yielding of norm of plan with real-time. On the other hand, we collected the real-time actual results on every index and established secondary information support system on the utilization rate of facility. In conclusion, after information support the numbers of inpatients and the patients who received operation were increased to 105.6 and 106.6%, respectively, compared with before.

Key words hospital management information, information support system

Introduction

The great leader Comrade **Kim Jong Il** said as follows.

"In addition, in-depth studies must be conducted to explore new fields of medical science and introduce the latest advances of science and technology into curative and preventive services."("ON THE FURTHER IMPROVEMENT OF THE HEALTH SERVICE" P. 18)

Recently, it is an important scientific and technical problem needed to be solved in health sector that informationize the hospital management true to the requirements of information age. The information of the hospital management is the most important core part of information of health sector and has the highest practicality. Therefore, the information of hospital management is first-ever informationization in heath sector and has the longest history [2].

The information of hospital management consists of statistical management of therapy and prevention, management of labor, finance, patients, facilities, and drugs. Major attention has been paid to the management of finance, patients and facilities, which makes it possible to improve the bed utilization and becomes main way to provide more patients with high-quality medical care by specialist, related to the administration cost of hospital. That's why the current sectional management of the hospital has been switched over to the integrated management system and development of this section has been dominated [10].

In the Belor hospital and Amlita hospital of India the appointment-system has been served for inpatients, and decreases the length of stay and analyzes the statistical data of inpatients and hospital expense based on the information of inpatients [5].

And the numbers of treated patients are the evaluation index of doctor activity and also the basis of salary [3, 4, 6]. But there was no real-time secondary information support system in the number of inpatients and bed utilization.

The basis of this information management system is the electronic medical record [1, 7−9].

From this, in order to improve the utilization of inpatient facility, we designed the electronic medical record in our Juche style and so based on it, established secondary information support system which can be able to improve the hospital management and the utilization of facility by using processed useful information, not by the primary information, initial data of inpatient facility.

For this end, first of all, we designed the method for yielding the real-time norm of treatment per a doctor and bed utilization as the utility index of inpatient facility and automated their norm-yielding.

On the other hand, we established the information management system in order to collect the actual results related to the utilization of inpatient facility.

And based on the norm of utilization of inpatient facility and actual results, we made the substantial contribution to the improvement of utilization of inpatient facility by establishing the real-time secondary information support system on it by the formulas we designed.

1. Materials and Method

1.1. Materials

357 doctors in the inpatient ward, 1 211 beds and 16 000 inpatients during the study period in the national hospitals were included in our study and we used patient records and the number of beds per department and room in every department.

1.2. Method

We considered the days of bed utilization and length of stay related to plan implementation rate of treatment and bed turnover as the utility indices of the facility. Influencing factors such as real-time number of used beds and unused beds, days of confirmation, length of pre-operative stay, diagnosis coincidence rate, rates of complication and concomitant diseases, the number of prolonged stayed patients and epidemiologic surveillance were analyzed.

We yielded the real-time norm of utilization of facility by our formulas and collected actual results by network.

On the basis of the real-time norm and actual results, we calculated the real-time utilization rate of facility.

1.2.1. Real-time plan implementation rate of treatment

$$P_p = \frac{R_p}{N_p} \times 100$$

where R_p is the real-time number of actual inpatients and N_p is the real-time number of planned inpatients.

$$N_p = \frac{P_y}{365} \times D$$

where D is the accumulative days from baseline date and P_y is the annual number of planned inpatients.

1.2.2. Real-time plan implementation rate of days of bed utilization

$$P_b = \frac{R_b}{N_b} \times 100$$

where R_b is the real-time actual accumulative days of bed utilization and N_b is the real-time planned accumulative days of bed utilization.

$$N_b = (B \times C) \times D$$

where B is the number of beds and C is the coefficient of bed utilization.

1.2.3. Real-time plan implementation rate of length of hospital stay

$$P_L = \frac{N_L}{R_L} \times 100$$

where N_L is the planned average length of stay and R_L is the actual average length of stay.

We constructed the standard database including name of department and doctor, the number of beds per a department and a room, the coefficient of bed utilization, name of disease and operation, and other utilization standard of facility on every index.

2. Results and Discussion

2.1. Real-time information support to increase the plan implementation rate of treatment of doctors

The activity of doctors is evaluated as the plan implementation rate of treatment and real-time information support on plan implementation rate helps the implementation of treatment plan.

On August 30th, 2013, we evaluated the plan implementation rate of treatment and operation. The result showed that treatment and operation plan was carried out in 27, 14 departments, respectively, and not carried out in 3 and 2 departments, respectively. And as for individual doctors, 17 doctors carried out and a doctor did not carry out in respiratory department.

These data were collected, advanced and displayed automatically with real-time.

This is the basis of decision-making for carrying out the treatment plan.

2.2. Real-time information support to improve the utilization rate of beds

It consists of information support on days of bed utilization and length of stay.

2.2.1. Real-time information support to extend days of bed utilization

The days of bed utilization are evaluated as accumulative days of bed utilization and 25 departments carried out the plan and average 3 to 4 unused beds were in 11 departments on August 30th.

Such information is very important to increase the bed utilization rate and extend days of bed utilization by monitoring every bed utilization with real-time.

2.2.2. Real-time information support to shorten the length of hospital stay

Length of hospital stay is a decisive factor in determination of the bed turnover and influences on the economic life.

We established the real-time information support system related to length of stay and our result showed that the plan of length of stay was carried out in 28 departments and not in 2 departments.

We also established the real-time information support system related to days of confirmation, length of preoperative stay, diagnosis coincidence rate, rates of complication and concomitant diseases and the number of prolonged stayed patients which are major factors in influencing on the length of stay.

Our results showed that days of confirmation, length of preoperative stay, diagnosis coincidence rate and rates of complication and concomitant diseases are 0.7 days, 1.5 days, 98.5% and 4.5%, respectively, on August 30th.

We also established the epidemiologic-monitoring information support system on patients with suspected infectious diseases including acute hepatitis, tuberculosis and malaria and made it enable to decrease the rates of nosocomial infections and shorten the average length of stay.

By providing to all the departments and doctors with such real-time information, we made it possible for them to make the precise decision and take the appropriate measure in time and shorten the length of stay and improve the bed utilization.

The effectiveness of key indices achieved by this real-time information support system was shown in table.

As shown in table, plan implementation rate of operation after information support was most increased to 106.6% compared with before, and arrange number of treated patients, length of stay, accumulative days of bed utilization.

Table. Plan implementation rate(%) of every index before and after real-time information support

Indices	2008	2013
The number of treated patients	100.0	105.6
The number of operated patients	100.0	106.6
The days of bed utilization	100.0	104.0
Length of stay	100.0	104.7

That is, by extending days of bed utilization and shortening length of hospital stay, the numbers of inpatients and operated patients were increased by approximate 6% compared with before information support.

Conclusion

First, we developed the real-time norm-making method on every index related to utilization of inpatient facility and automated the real-time norm-making,

Second, we established information management system for collecting the actual results of every index related to utilization of inpatient facility,

Third, we established the real-time information support system related to utilization of inpatient facility and improved their utilization.

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