

Analyze the application and effect of physician rational drug use scorecard management under H-TOE model

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ABSTRACT

Objective: This study evaluated the application value of rational drug use scorecard management by analyzing the improvement of various drug use indicators after the implementation of the rational drug use scorecard management system. **Methods:** The H-TOE model was constructed, and the data of base drug varieties, drug proportion, total amount of antibacterial drug consumption, total amount of base drug consumption, total amount of auxiliary drug consumption, total amount of consumption of traditional Chinese medicine injection, total amount of consumption of key monitoring drugs, and the use intensity of antibiotics in hospital each month were collected from the year before and two years after the implementation of the assessment and management of the annual scorecard of rational drug use. Analyze the data obtained and verify the assumptions of the theoretical model. **Results:** Through data analysis, we found that the reliability of the survey was greater than 0.7 and the validity was greater than 0.5. The chi-square value and degree of freedom ratio of the model reached a significant level. The P values of the proposed assumptions are all less than 0.05. In addition, various drug use indicators have been significantly improved. **Conclusion:** After the application of the "Clinician rational drug use scorecard management", the indicators of rational drug use have been improved, which is expected to provide data support for the promotion of the "Clinician rational drug use scorecard management", and play a greater role in strengthening rational drug use, and improve patients' satisfaction with medical and health services.

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Keywords: H-TOE model: scorecard management: rational drug use, influencing factors

Introduction

At present, the TOE model is commonly used in the theory of organizational technology adoption, which was put forward by Tomatzky and Fleischer in 1990. It is believed that the adoption of an innovative technology by an organization is affected by three factors such as the characteristics of technology itself (T), organization (O) and environment (E). Among them, technical characteristics mainly focus on some characteristics of technology itself; Organizational factors refer to the organizational type and scale of the application technology; Environmental factors refer to pressure and challenges from outside the organization. This study assesses the application value of the rational drug use scorecard management for clinicians by analyzing the improvement of various drug use indicators after the implementation of the rational drug use scorecard management system. Based on this, this study is based on the H-TOE model, which integrates the HOT-fit model and the TOE framework, and combines the basic characteristics of the hospital information system, to study the main factors that affect the application and effect of the doctor's rational drug use scorecard management under the H-TOE model, integrate similar variables, and build a theoretical model for evaluating the influencing factors of the doctor's rational drug

use scorecard management system.

Data and methods

General information

Select a public Class III hospital and collect the differences after the implementation of the annual score card assessment management of rational drug use by doctors. On the basis of TOE model framework, HOT-fit model and other theories, combined with the current research status and the technical characteristics of PASS system itself, a research model on the influencing factors of the use evaluation of PASS system is constructed. The results are analyzed. Based on the results of empirical analysis, the conclusions of this study are drawn, the existing problems are analyzed, and suggestions are put forward to provide reliable basis for further application and improvement of the system, improve system performance and satisfaction, and improve the level of rational drug use and promote the development of hospital informatization.

Selection method

Collect hospital related data within a limited time, mainly



including the proportion of base drug varieties, drug proportion, total amount of antibacterial drug consumption, total amount of base drug consumption, total amount of auxiliary drug

consumption, total amount of traditional Chinese medicine injection consumption, key monitoring drug consumption, and the use intensity of antibacterial drugs in hospital every month.

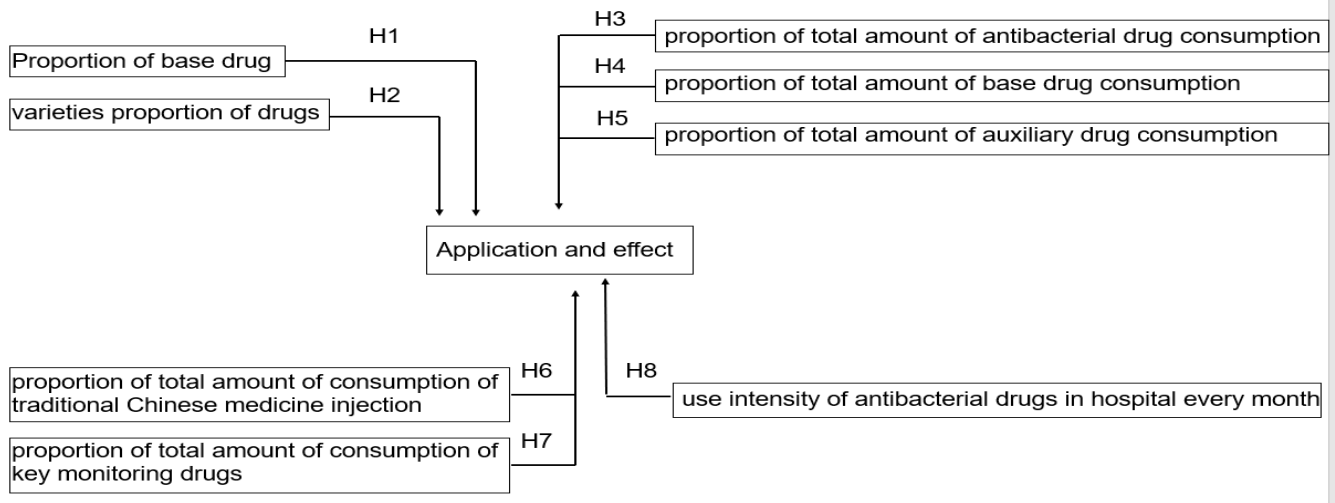


Figure 1: Application and effect influencing factor model of physician rational drug use scorecard management

Fitting index

Table 1 Fitting index

Fit index	Key value (recommended value)	Model indicators	Standard
ML X ²	The smaller the better	425.389	
Df	The bigger the better	180	
X ² /df	1<X ² /df<3	2.376	Standard
CFL	>0.9	0.974	Standard
TLI	>0.9	0.938	Standard
RMSEA	<0.08	0.064	Standard
SRMR	<0.08	0.044	Standard

Use Mplus7.0 to verify the research model, as shown in Table 1, the chi-square value is 425.389, the degree of freedom is 180, and the ratio between the two is between 1-3, indicating that it reaches a significant level of 0.05. Other fitting indexes: CFI=0.974,

TLI=0.938, and the recommended values are greater than 0.9. RMSEA=0.064, SRMR=0.044, the recommended values are less than 0.08. The fitting index is better than the recommended value, which indicates that the fitting degree of the model is good.

Research model hypothesis test results

Table 2 Test the hypothesis of the research model

DV	Estimate	P-Value	Hypo
H1	0.212	0.040	Support
H2	0.195	0.005	Support
H3	0.091	0.033	Support
H4	0.123	***	Support
H5	0.112	0.024	Support
He	0.021	***	Support
H7	0.169	***	Support
H8	0.089	0.021	Support

*** : P<0.001

It can be seen from the above results:

H1: According to the results of the table, various influencing factors have a relatively direct effect on the application value of the clinical doctor's rational drug use scorecard management. Among them, the path coefficient of the evaluation of the scorecard management system based on the proportion of basic drug varieties is 0.212, indicating that it has a positive effect on the application value of the clinical doctor's rational drug use scorecard management, so it is assumed that H1 is established.

H2: The proportion of traditional Chinese medicine varieties has a positive impact on the evaluation of the scorecard management system. The path coefficient is 0.195, indicating that it has a positive impact on the application value of the scorecard management of rational use of drugs by clinicians. Therefore, it is assumed that H2 is established.

H3: The proportion of the total amount of antibacterial drug consumption has a positive impact on the evaluation of the rational drug use monitoring system, and the path coefficient is

0.091, which indicates that it has a positive impact on the application value of the clinical physician's rational drug use scorecard management, so it is assumed that H3 is established.

H4: The proportion of the total amount of basic drug consumption has a positive impact on the evaluation of the scorecard management system, and the path coefficient is 0.123, indicating that it has a positive impact on the application value of the scorecard management of rational use of drugs by clinicians, so it is assumed that H4 is established.

H5: The proportion of the total amount of auxiliary drugs consumed has a positive impact on the evaluation of the scorecard management system, and the path coefficient is 0.112, indicating that it has a positive impact on the application value of the scorecard management of rational use of drugs by clinicians, so it is assumed that H5 is established.

H6: The proportion of the total consumption of traditional Chinese medicine injections has a positive impact on the evaluation of the scorecard management system. The path coefficient is 0.021, indicating that it has a positive impact on the application value of the scorecard management of rational use of drugs by clinicians. Therefore, it is assumed that H6 is established.

H7: Among them, the proportion of the total amount of key monitoring drugs consumption has a positive impact on the evaluation of the scorecard management system, and the path coefficient is 0.169, which indicates that it has a positive impact on the application value of the scorecard management of rational use of drugs by clinicians, so it is assumed that H7 is established.

H8: The use intensity of antibacterial drugs in hospital each month has a positive impact on the evaluation of the scorecard management system, and the path coefficient is 0.089, indicating that it has a positive impact on the application value of the scorecard management of rational use of drugs by clinicians, so it is assumed that H8 is established.

1.3 Statistical analysis

In this study, Epidata software is used to double enter the data, SPSS21.0 software is used to collate and analyze the results, structural equation modeling (SEM) is used as the data analysis method, and Mplus7.0 is selected as the structural equation model analysis software and the hypothesis model is verified.

Results

(1) Through data analysis, the reliability is greater than 0.7 and the validity is greater than 0.5, indicating that the questionnaire has good reliability and validity; The ratio of chi-square value and degree of freedom of the model is 2.376, reaching a significant level of 0.05, indicating that the model has a good fit. (2) Among the nine assumptions put forward, the proportion of base drug varieties, drug proportion, total amount of antibacterial drug consumption, total amount of base drug consumption, total amount of auxiliary drug consumption, total amount of traditional Chinese medicine injection consumption, and the proportion of total amount of key monitoring drugs consumption, as well as the P value of the use intensity of antibacterial drugs in hospital each month, are less than 0.05. The assumption is passed. In addition, the drug use indicators have been significantly improved. (3) After the application of the "Clinician rational drug use scorecard management", the indicators of rational drug use have been improved, which is expected to provide data support for the promotion of the

"Clinician rational drug use scorecard management", and play a greater role in strengthening rational drug use, and improve patients' satisfaction with medical and health services.

Discussion

[1] This study, This study, based on the relevant literature query, constructed the H-TOE model integrated with the TOE model framework and the HOF-Fit model as the theoretical model, and based on the technology-task matching model and the rational behavior theory, investigated the medical staff of a Class III public hospital who used the rational drug use monitoring system, and counted the proportion of basic drug varieties, drugs The proportion of the total amount of antibacterial drugs consumed, the proportion of the total amount of base drugs consumed, the proportion of the total amount of auxiliary drugs consumed, the proportion of the total amount of traditional Chinese medicine injections consumed, the proportion of the total amount of key monitored drugs consumed, and the data of the use intensity of antibacterial drugs in each month's hospitalization. Input and integrate the obtained data with statistical analysis software, use structural equation model as the data analysis method, and use Mplus7.0 software to verify and empirically analyze the assumptions of the theoretical model. In order to better adopt technology, reduce medical errors, reduce medical costs, and help medical staff make decisions and find medical solutions, various information systems have been introduced into medical institutions. Analysis of the application system of the doctor's rational drug use scorecard management under the H-TOE model belongs to one of the information systems. Its purpose is to use the information system to improve the work efficiency of medical staff and provide convenient medical services for patients. Nevertheless, there are still many problems in the internal and external factors of system application [2, 3]. Therefore, the evaluation of the application system of physician rational drug use scorecard management under the H-TOE model should focus on the impact of these internal and external factors, including technology, organization, environment, human and other factors. Therefore, based on the theoretical basis, this study complements and fuses the two model frameworks of TOE (Technology Organization Environment, TOE) and HOF-fit (Human Organization Environment Fit) to form the H-TOE model framework as the theoretical basis. The TOE model is mainly an extension of Tornatzky and Fleischer's innovation diffusion model. They believe that when a new technology is to be adopted or decided by an organization, it will be affected by three factors: technology (T), organization (O) and environment (E) [4, 5]. The technology includes two aspects: the technology that has been used inside the organization and the technology that can be obtained outside the organization through some way [6, 7] Organization refers to the characteristics of the organization, such as its human resources, material resources and financial resources, as well as its organizational management model, cultural concepts, etc; Environment refers to the external environment or internal environment of the organization, such as the competition in other industries, government policy environment, own development needs, social development trends, etc [8, 9]. The TOE model is selected as a part of the theoretical model in this study because medical personnel need to consider the technical performance of the system, the degree of organizational support and the need for environmental promotion when evaluating an information system, and the three dimensions contained in the TOE model completely cover these aspects. Based on the above

discussion, we believe that TOE model is suitable for this study. However, this paper studies and analyzes the application and effect evaluation of the physician's rational drug use scorecard management under the H-TOE model, and also needs to look for the influencing factors from the perspective of the personnel themselves. Therefore, in order to make up for the lack of personnel factors in the TOE model, this study introduces the HOT-Fit model. Referring to the previous evaluation research on the application of information systems, we can recognize that [10, 11]. The HOT-Fit model is a new model based on human, organizational and technical dimensions developed by Yusof and others through critical evaluation of the existing information system evaluation research and health information system results. Yusof, Stergioulas and Zugic believe that according to the HOT-Fit model, the human factor is the key and affects the evaluation of the adoption and development of the health information system. The health information system assessment framework they proposed contains comprehensive dimensions and measures [12, 13]. However, human factor is often ignored in most studies. According to the research of Ahmadi and Marques., when adopting and implementing a new system in the hospital industry, human related factors need to be considered [14, 15]. The researchers emphasized that the possibility of evaluating the health information system is positively correlated with the degree of matching between organizations, personnel and technology [16, 17].

[18, 19] This study combines the theoretical framework of TOE and the HOT-fit model to form the theoretical model of H-TOE, and takes this as the basic framework to extract the main influencing factors of the application and effect evaluation of the management of the doctor's rational drug use scorecard under the H-TOE model, and build the theoretical model of the application and effect of the analysis of the management of the doctor's rational drug use scorecard under the H-TOE model, Eight factors affecting the application and effect of the doctor's rational drug use scorecard management under the H-TOE model were proposed, and the hypothesis of the theoretical model was empirically analyzed and tested.

In order to better improve the application and effect of the doctor's rational drug use scorecard management under the H-TOE model, promote its development, improve and promote its wider use, and provide suggestions and countermeasures for its existing problems, so as to standardize the medical behavior of doctors and ensure drug safety, it is of great significance to prevent adverse drug events and improve the level of rational drug use. 3.1 The main work of this paper is as follows:

(1) Taking medical staff as the research object, starting from the problems existing in the application of the current rational drug use monitoring system, and combining the H-TOE theoretical framework and relevant research documents that integrate TOE and HOT-fit models, this paper constructs the influencing factor model for evaluating the rational drug use monitoring system.

(2) A data collection scale was designed to influence the four aspects of the evaluation of the rational drug use monitoring system. The data of 333 clinicians who have used the system for more than one year were collected through questionnaire survey. After empirical analysis of the data, eight main factors affecting the evaluation of the rational drug use monitoring system were obtained, namely, ease of use, compatibility, perceived benefits, high-level support Hospital informatization level, external

environment, use attitude and subjective intention.

(3) Based on the results of the empirical analysis, the conclusions of this study are put forward.

On the technical level, the research objects pay more attention to the ease of use and compatibility of the rational drug use monitoring system, and the improvement of perceived benefits will also have a positive impact on the evaluation of the rational drug use monitoring system; At the organizational level, high-level support and hospital informatization level play an important role in the evaluation of rational drug use monitoring system; At the environmental level, the external environmental factors proposed in this study also passed the test, while some uncertain variables failed to pass the test. At the personnel level, the use attitude and subjective intention also have an impact on the evaluation of the rational drug use monitoring system [20].

(4) Based on the research conclusion, the corresponding countermeasures and suggestions are put forward for technology, organization, environment and people respectively, to improve the evaluation of the rational drug use monitoring system, improve the application of the rational drug use monitoring system, promote the rational drug use, and standardize the medical behavior.

Innovation points

The innovation points of this study are as follows: (1) The domestic research on rational drug use monitoring system is not comprehensive and in-depth. This study is based on theory and empirical, and scientifically evaluates the application and effect of physician rational drug use scorecard management under the H-TOE model, which is more in-depth and comprehensive than domestic research.

(2) This study combines TOE model and HOT-fit theoretical model to form a new comprehensive theoretical framework, namely H-TOE theoretical model.

(3) Through relevant literature research and empirical research, the theoretical model of the application and effect of physician rational drug use scorecard management under the H-TOE model has been established and verified, and the conclusion has been drawn, which provides important practical guidance for the application and promotion of software suppliers in the system performance bias and the physician rational drug use scorecard management under the H-TOE model in hospitals.

Research prospect

This study is based on literature research and empirical analysis. Through the evaluation and analysis of the application of the doctor's rational drug use scorecard management under the H-TOE model, some research conclusions have been obtained, providing theoretical reference value for the development of the application system of the doctor's rational drug use scorecard management under the H-TOE model and even other information systems in hospitals. However, due to limited time and resources, this study still has the following deficiencies:

Research object question

Due to the limited research resources in this paper, it does not cover all hospitals at all levels. At the same time, hospitals in different regions will also be different, and the sample size is not complete. During the study, there was no separate study for units at all levels. This study was conducted in public hospitals. It is

recommended that future research expand the scope of the current study, including the combination of private and public hospitals, expand the number and coverage of samples, and improve the accuracy of the study.

Limitations of research methods and data collection methods

This study is mainly to collect data directly from the hospital. The research time is not rich enough and the data volume is not large enough. It is suggested that various methods can be added in future research to improve the accuracy of the study.

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