FROM INTENTION TO BEHAVIOR: ANALYTICAL MODEL OF DOCTOR'S MORAL HAZARD BEHAVIOR-BASED ON PLANNED BEHAVIOR THEORY

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Abstract: Based on the concept of doctor's moral hazard behavior and the theoretical model of planned behavior, this paper constructs a theoretical model of doctor's moral hazard behavior, and analyzes the main influencing factors of doctor's moral hazard behavior in detail, including behavioral attitudes, subjective norms and perceived behavioral control. Combined with the results of questionnaire survey, this paper uses structural equation model and factor analysis to verify the hypotheses. The results show that in the theoretical model of doctor's moral hazard behavior, doctors' moral risk intentions are affected by three independent variables: behavioral attitudes, subjective norms and perceived behavioral control. As an intermediary variable, moral risk intentions have a mediating effect on doctors' moral hazard behavior. All path coefficients meet the requirements, and all assumptions of the model are verified. The theoretical model of doctor's moral hazard behavior established in this study can effectively explain the occurrence law of doctor's moral hazard behavior and can predict doctor's moral hazard behavior according to the actual situation of various influencing factors. This provides an effective theoretical guidance for the next step to better carry out the relevant research on doctor's moral hazard based on the management perspective, especially the establishment of prevention and control strategies for doctor's moral hazard behavior.

Keywords: doctor, moral hazard, behavior analysis, planned behavior theory, structural equation model

De la intención al comportamiento: modelo analítico del comportamiento de riesgo moral del médico basado en la teoría del comportamiento planificado

Resumen: Basado en el concepto de comportamiento de riesgo moral del médico y el modelo teórico de comportamiento planificado, este artículo construye un modelo teórico del comportamiento de riesgo moral del médico y analiza en detalle los principales factores que influyen en el comportamiento de riesgo moral del médico, incluidas las actitudes conductuales, subjetivas normas y control conductual percibido. En combinación con los resultados de la encuesta por cuestionario, este artículo utiliza un modelo de ecuación estructural y un análisis factorial para verificar las hipótesis. Los resultados muestran que en el modelo teórico de la conducta de riesgo moral del médico, las intenciones de riesgo moral de los médicos se ven afectadas por tres variables independientes: actitudes conductuales, normas subjetivas y control conductual percibido. Como variable intermedia, las intenciones de riesgo moral tienen un efecto mediador en el comportamiento de riesgo moral de los médicos. Todos los coeficientes de trayectoria cumplen los requisitos y se verifican todos los supuestos del modelo. El modelo teórico del comportamiento de riesgo moral del médico establecido en este estudio puede explicar eficazmente la ley de ocurrencia del comportamiento de riesgo moral del médico y predecir este comportamiento de acuerdo con la situación real de varios factores influyentes. Esto proporciona una guía teórica eficaz para el siguiente paso para llevar a cabo mejor la investigación relevante sobre el riesgo moral del médico basada en la perspectiva de la gestión, especialmente el establecimiento de estrategias de prevención y control para el comportamiento de riesgo moral del médico.

Palabras clave: médico, riesgo moral, análisis de conducta, teoría del comportamiento planificado, modelo de ecuación estructural

Da intenção ao comportamento: modelo analítico do comportamento moral de risco de médicos baseado na teoria do comportamento planejado

Resumo: Baseado no conceito de comportamento moral de risco de médicos e o modelo teórico do comportamento planejado, este artigo constrói um modelo teórico de comportamento de risco moral de médicos e analisa os fatores principais que influenciam o comportamento moral de risco de médicos em detalhes, incluindo atitudes comportamentais, normas subjetivas e controle comportamental percebido. Combinado com os resultados de levantamentos com questionários, esse artigo usa o modelo de equação estrutural e análise fatorial para verificar as hipóteses. Os resultados mostram que no modelo teórico do comportamento de risco moral de médicos, as intenções de risco moral de médicos são afetadas por três variáveis independentes: atitudes comportamentais, normas subjetivas e controle comportamental percebido. Como uma variável intermediária, intenções de risco moral tem um efeito mediador no comportamento de risco moral de médicos. Todos os coeficientes de caminho cumprem os requisitos e todas as suposições do modelo são comprovadas. O modelo teórico do comportamento de risco moral de médicos estabelecidos nesse estudo podem efetivamente explicar a lei de ocorrência do comportamento de risco moral de médicos e pode predizer o comportamento de risco moral de médicos de acordo com a situação real de vários fatores de influência. Isto fornece um guia teórico efetivo para os próximos passos para melhor conduzir pesquisas relevantes sobre risco moral de médicos baseadas na perspectiva de gestão, especialmente o estabelecimento de estratégias de prevenção e controle para o comportamento de risco moral de médicos.

Palavras chave: médico, risco moral, análise de comportamento, teoria do comportamento planejado, modelo de equação estrutural

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1. Introduction

Due to information asymmetry, moral hazard in medical service is inevitable. Generally speaking, the participants of moral hazard relationship include not only the demander, but also the supplier(1). The moral hazard of doctors leads to rapid growth of medical expenses in various countries. In 1963, Arrow put forward the concept of moral hazard, which can be applied to the field of health care. He observed that due to the professional training of doctors, they can accurately assess the differences in the health status of patients, and doctors can also create medical demand(2). For example, doctors can ask patients to undergo expensive tests. In medical insurance, the moral hazard of medical service providers is an opportunistic behavior to increase medical costs by using the information they have under the drive of their own economic interests.

The theory of information economics shows that the essence of moral hazard is an opportunistic behavior. Doctor's moral hazard is an opportunistic behavior that maximizes self-interest and is not conducive to patients. Some scholars think that doctor's moral hazard is essentially doctor induced demand. Studies have shown that the moral hazard in health care is mainly concentrated in drug treatment, hospitalization and patient examination(3). Evans found that doctors' moral hazard is manifested in the examination, drugs and costs, such as unnecessary or expensive tests, and expensive or overused drugs(4). Later studies have shown that overcharging and accepting money gifts which are not related to treatment are also part of doctor's moral hazard(5,6). Doctors' moral hazard is mainly caused by information asymmetry, opportunity and self-rationalization, which directly leads to the increase of medical cost. At present, the detailed research on individual moral hazard behavior of doctors is still very limited, and some aspects of moral hazard behavior have not been studied, such as reducing standards of surgical indications, doctors' excessive use of surgical consumables in violation of treatment principles, and doctors' malfeasance in other aspects. This is still a brand new field that needs to be studied.Because doctors dominate the whole process of medical treatment, the doctor's moral hazard is the core part of medi-

cal ethics. The research on doctor's moral hazard and its theoretical model can further promote the in-depth study of medical ethics, so as to better implement the relevant requirements of medical ethics in medical practice.

There are quite a lot of research results on doctor's moral hazard. As for the behavior realization of doctor's moral hazard, our research team has done an in-depth and grounded research. There are six forms of doctor's moral hazard, including over examination, over medication, excessive hospitalization, etc.(7). It is generally believed that the influencing factors of doctor's moral hazard are caused by information asymmetry, opportunity and self-rationalization. Mcquade believes that defensive treatment is a medical service for doctors' self-protection, and it does not consider the actual needs of patients(8). Therefore, self-protection has become a part of the causes of doctors' moral hazard. Yousefi et al.(9) proposed that the influencing factors of doctors' rational drug use included living habits, medication culture, supervision of regulatory agencies and policies(10). The main influencing factors of medical education were proposed, such as the lack of medical education guidance, the lack of medical education guidance (2013) and the lack of medical education guidance. Mohamadloo et al.(11) conducted a qualitative study on the main factors of induced demand in medical prescriptions, and put forward the influencing factors such as information asymmetry, patient expectation, patient ignorance, doctor's lack of knowledge, neglect of patients' rights, economic stimulus, insurance company obstacles, reimbursement mechanism, pharmaceutical enterprise advertising, pharmacy losses and social interaction(11). Mahmoudi et al. (2019) studied the influencing factors of induced demand, and put forward the following aspects: the awareness of service objects, the personal interests of doctors, the supervision of insurance companies, the degree of health care, the industrialization of health, the quality of experts and the training quality of service providers.

These studies have explored more about the influencing factors of doctor's moral hazard, but lack of scientific revealing the psychological law of doctors in the process of moral hazard behavior based on the doctor's personal perspective. Only

by establishing the theoretical model of doctor's moral hazard behavior can we put forward more systematically how to prevent the occurrence of doctor's moral hazard in medical practice. In addition, from the perspective of management, there is still no good theoretical model that can explain the influencing factors and interaction mechanism of doctor's moral hazard, and establish the prediction model of doctor's moral hazard behavior in specific practice environment from doctor's individual perspective. Based on the theory of planned behavior, this paper constructs a systematic analysis framework of doctor's moral hazard intention, doctor's moral hazard behavior and its influencing factors, and uses structural equation model to empirically analyze the factors influencing doctor's moral hazard behavior.

2. Theoretical analysis and research hypotheses

2.1 Theoretical analysis

In the 1980s, Ajzen proposed the theory of behavior (TPB) based on the theory of rational action (TRA)*(12)*. This theory assumes that people are rational individuals. Whether people engage in a certain behavior is directly affected by behavioral intentions. The formation of behavioral intention is determined by attitudes towards behavior subjects and the influences of subjective norms. This is a social cognitive theory aimed at explaining intentional behavior, as shown in figure 1.

Figure 1.
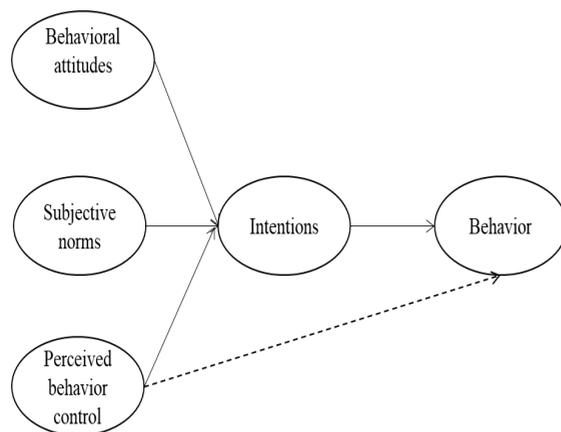
There are five aspects in the theory of planned behavior. Firstly, it points out that attitude refers to the positive or negative feelings of an individual towards the behavior, and the attitude formed by the conceptualization of an individual's evaluation of the specific behavior. Therefore, the components of attitude are often regarded as a function of individual's significant belief in the outcome of the behavior. For example, doctors' attitude towards moral hazard behavior shows whether doctors hold reasonable views on moral hazard behavior. Secondly, subjective norms refer to the social pressure that individuals feel about whether to take a specific behavior. When a hospital implements moral hazard behavior, affected by the behaviors of hospitals, other doctors, teams and patients, it is possible that a person's reaction choice will be restricted by the environment to a large extent. Next, perceptual behavioral control refers to the hindrance reflecting someone's past experience and expectation. When an individual thinks that the more resources and opportunities he has, the less obstacles he / she expects, and the stronger his / her control of behavior will be. Then, the intentions of behavior refer to individual's judgment on the subjective probability of taking a certain behavior, which reflects the individual's willingness to take action on a specific behavior. Finally, the last move refers to the action that the individual actually takes.

2.2 Research hypotheses

According to the theoretical framework of planned behavior theory, and combined with the reality of medical industry, this paper will analyze the influencing factors of doctor's moral hazard behavior and put forward the corresponding hypotheses.

Doctors are rational individuals. Whether they carry out moral hazard behavior is directly affected by their behavior intention, which in turn is influenced by doctors' attitude towards moral hazard behavior and subjective norms. There is an

incentive mechanism behind the doctor's moral hazard intention, which represents the doctor's plan and effort to implement moral hazard behavior. These intentions of doctors play a direct guiding role in their moral hazard behavior, and a mediating role in the attitudes, subjective norms, perceived behavioral control and final actions of their moral hazard behavior. So, doctors' moral hazard behavior intentions are influenced by attitudes, subjective norms and perceived behavioral control.

Doctor's attitude refers to the general position and evaluation of moral hazard behavior, which is determined by behavior belief and behavior consequence evaluation. Self-rationalization is a process in which doctors find excuses for their moral hazard behaviors, that is, they explain the objective reasons for their own behaviors, which cannot be attributed to personal reasons. Therefore, in the medical service industry, doctors' attitudes towards moral hazard can be expressed by rationalization variables. Doctors' evaluation of the rationalization level of moral hazard behavior reflects doctors' value judgment on the implementation of moral hazard behavior. The higher the rationalization level is, the more willingly the behavior will be recognized. Therefore, the doctors will not be self-restraint. On the contrary, with the lower rationalization level, this behavior will possibly be resisted, and the doctors will objectively prevent the occurrence of this behavior consciously.

Subjective norms in the process of medical service refer to the tendency of doctors to make standardized diagnosis and treatment behaviors according to various guidelines and patient expectations, including normative beliefs and compliance motivation. Subjective norm refers to people's cognition of the pressure of certain behavior, that is, the code of conduct formed by people's behavior standards, expectations, norms and motivation to comply with these expectations. Doctor's moral hazard behavior means that doctors violate subjective norms, including the disappearance of normative belief and compliance motivation. On the other hand, if the hospitals and patients have lower requirements on doctors' subjective norms, it means that doctors have more opportunities to carry out moral hazard behaviors during practice process.

The perceptual behavioral control in medical service process refers to the assessment of external obstacles (such as resources, opportunities, etc.) and internal difficulties (such as ability, skill, etc.) in the process of medical service. That is to say, the stronger the doctor's ability to implement moral hazard, the more he can overcome the external obstacles and internal difficulties. Conversely, the weaker the ability is, the more difficult it is for them to overcome the external obstacles and internal difficulties.

According to the analysis above, the influencing factors of doctor's moral hazard behavior include the following 5 aspects: behavioral attitudes, subjective norms, perceived behavioral control, intentions and behavior. Here are 5 hypotheses:

Hypothesis 1: Behavioral attitudes have a positive effect on intention;

Hypothesis 2: Subjective norms have a positive effect on intention;

Hypothesis 3: Perceptual behavioral control has a positive effect on intentions;

Hypothesis 4: Perceptual behavior control has a positive effect on behavior;

Hypothesis 5: Doctors' moral hazard intentions have a positive impact on doctor's moral hazard behavior.

2.3 Questionnaire design

Based on the related literature of planned behavior theory, the results of relevant research and design of scales, this study initially designed a Likert 5-point scale with 23 items to measure doctors' attitudes to moral hazard, subjective norms, perceptual behavior control, intentions and behavior. In this survey, the interviewees choose an integer from 1 to 5 according to whether they agree with the statement or not: Answer 1 means very disagree, 5 means very agree, and other numbers indicate a certain degree of disagreement or agreement. The measurement of each variable is composed of about five items. All items of each variable are summarized and the scale description is added to form a survey questionnaire.

2.4 Data collection

In order to improve the efficiency of the survey, and reduce the error at the same time caused by cognitive differences among different personnel when filling in the questionnaire, the paper questionnaire was issued by holding a meeting in the survey hospital, through which the necessary explanation and guidance were carried out, so as to avoid the investigation failure caused by sensitive problems. After unified interpretation, the medical staff should fill in the information on the spot under the premise of voluntary. Based on Mueller (1997) and Thompson (2000) on the number of samples, this study expects to collect about 400 qualified and effective questionnaires. Considering the elimination of unqualified samples, the number of questionnaires collected should be more than 400. The original data is obtained by sorting out the paper questionnaires distributed on the spot while some questionnaires which are not filled in and obviously wrong are also eliminated after analysis. The relevant data of the effective questionnaires are manually input into the computer one by one, and personnel are arranged to check to ensure the accuracy of the input data.

3. Reliability and validity test

3.1 Basic information of samples

In this study, gender, age, professional title, position, education background, hospital level and hospital nature are selected as main demographic variables. In this survey, the total sample size reaches 426 cases. From the perspective of gender distribution, male accounts for 51.5% while female accounts for 48.5%. So the proportion of male and female is basically balanced. And from the perspective of age distribution, 62.41% is distributed between 25 and 44. Furthermore, the proportion of the undergraduate and master is about 70%. The proportion of doctors is relatively small, which is related to the overall low number of doctors in hospitals at all levels. In all, the total sample size meets the data requirements of structural equation model analysis, and other aspects of data is representative and effective.

3.2 Normal test of sample data

In order to ensure the scientificity of structural equation model, the sample data should satisfy normal distribution. Skewness and kurtosis tests are usually used to evaluate the normal distribution. It is generally believed that if the median and median of sample data are close, the skewness value is less than 2, and the kurtosis value is lower than 5*(13)*, then it meets the conditions of normal distribution. In this study, Spss23.0 was used to analyze the skewness and kurtosis of the sample data. The absolute value of the skewness of the observed variables was within 0.421, while the absolute value of kurtosis was within 1.009, which met the requirements of normal distribution's skewness value and peak value respectively. Therefore, the data in this paper obey normal distribution.

3.3 Reliability analysis

In order to ensure the scientific value of this study, the reliability of measurement should be evaluated. That is to say, the consistency of measurement results should meet the research requirements. This study mainly tests the construction reliability, that is, a group of measurable variables jointly explain the degree of a potential variable, and reflect an important indicator of internal consistency. Cronbach's alpha coefficient was used to realize it. The larger the alpha coefficient is, the higher the reliability of the scale. The results show that the correlation coefficients of all items in this study are greater than 0.4, and the Cronbach's alpha coefficients of all variables are greater than 0.7, indicating that the questionnaire of this study is quite reliable*(14)*.

3.4 Validity analysis

These data show that the measurement items of each variable, including attitudes, subjective norms, perceived behavioral control, intentions and behavior, have achieved satisfactory convergence validity in statistical analysis. The specific values and the structural validity test results of all variables are shown in table 1.

As shown in relevant literature, we can use any of the three relationships to judge the discriminant validity of latent variables: interval estimation method of correlation relationship, comparison

Table 1: Variable convergence validity test

Variables	Measurement items	Factor load	Cronbach's Alpha	rho_A	Composite reliability	Average extraction variation (AVE)
Behavioral attitudes	R1	0.91	0.95	0.951	0.96	0.799
	R2	0.897				
	R3	0.869				
	R4	0.882				
	R5	0.901				
	R6	0.903				
Subjective norms	O1	0.93	0.935	0.936	0.953	0.836
	O3	0.91				
	O6	0.901				
	O7	0.917				
Perceived behavioral control	A1	0.889	0.854	0.855	0.912	0.775
	A2	0.867				
	A3	0.884				
Intentions	I1	0.877	0.916	0.92	0.934	0.704
	I2	0.813				
	I3	0.818				
	I4	0.796				
	I5	0.844				
	I6	0.883				
Behavior	B1	0.859	0.911	0.914	0.931	0.691
	B2	0.824				
	B3	0.785				
	B4	0.844				
	B5	0.819				
	B6	0.855				

method of competitive model and comparison method of average variation extraction amount and square of correlation coefficient. In this paper, the discrimination validity of potential variables was evaluated by comparing the average variance extraction and the square of correlation coefficients for each variable of doctor's moral hazard, including behavioral attitudes, subjective norms, perceived behavioral control, intentions and behavior.

In table 2, the diagonal element represents the average variation extraction amount of the latent variable, and the non-diagonal element represents the square of the correlation coefficient of the latent variable. The discriminant validity of latent variables was determined by using the

mean value of variation extraction of any two latent variables greater than the square of correlation coefficient*(15)*. As shown in the table above, the calculation results of each latent variable meet the judgment criteria, indicating that the discriminant validity of latent variables is very ideal.

4. Structural equation model analysis

Based on the analysis above, in order to express the research hypotheses and their results more intuitively, this paper analyzed and summarized test results of the research hypotheses, path relationship coefficient, t value and p value in the main effect model. The relevant results are shown in table 3.

Empirical data show that each hypothesis' test

results in the main effect model have been verified. Behavioral attitudes, subjective norms and perceived behavioral control variables have positive effects on doctors' moral hazard intention variables, and the positive influence of intention variables on behavioral variables has also been verified. In addition, perceptual behavioral control variables directly affect behavior variables, with path coefficient reaching 0.514, indicating that the direct effect is significant.

Through the empirical verification above, in order to understand the occurrence mechanism model of doctor's moral hazard behavior better, the main effect model validation results are analyzed below.

Firstly, the more obvious the attitude is, the stronger the intentions are. For example, doctors should carry out moral hazard behavior in the process of practice. Higher degree of rationalization means that doctors regard this behavior as the most normal behavior, which will objectively promote the occurrence of this behavior, at least will lower their desire and requirement of self-restraint. The more the doctors accept their moral hazard behavior, the more likely it is for them to form the intentions of moral hazard behavior and further implement moral hazard behavior.

Next, the lower the degree of subjective norms is, the stronger the doctor's intention. Doctor's moral hazard behavior means doctors' violation of subjective norms, including the decline of normative belief and compliance motivation. On the other hand, if the hospitals and patients have lower requirements on doctors' subjective norms, it means that doctors have more opportunities to carry out moral hazard behaviors in the practice process.

Then, if the perceived behavioral control is stronger, the resistance of doctors to implement behavior will be lower the intention will be stronger, which makes doctors feel easy to implement moral hazard behavior, and there is no difficulty and challenge at all. As a result, doctors will behave more frequently. So, the strength of perceived behavioral control can directly affect doctors' moral hazard behavior.

Finally, from the perspective of support, doctor's moral hazard intentions can positively affect their moral hazard behavior. In the absence of regulatory factors, the stronger the doctors' intentions of moral hazard are, the higher the probability of moral hazard behavior will be. According to TPB theory, intentions have a direct impact on behavior. In the main model of the occurrence mecha-

Table 2 Variable convergence validity test

	Behavioral attitudes	Subjective norms	Perceived behavioral control	Intentions	Behavior
Behavioral Attitude	0.894				
Subjective norms	0.881	0.839			
Perceived behavioral control	0.832	0.902	0.914		
Intentions	0.829	0.859	0.839	0.88	
Behavior	0.774	0.734	0.76	0.764	0.832

Table 3 Test results in main effect model

	Path relationship coefficient	t	P	Test results
Behavioral Attitude -> Intentions	0.292	8.322	0.000	Supportive
Subjective norms -> Intentions	0.363	9.168	0.000	Supportive
Perceived behavioral control ->Intentions	0.140	3.864	0.000	Supportive
Intentions -> Behavior	0.292	5.394	0.000	Supportive
Perceived behavioral control -> Behavior	0.514	9.907	0.000	Supportive

nism of doctor's moral hazard, doctors form moral hazard intentions under the action of three variables: behavior attitudes, subjective norms and perceived behavioral control. Furthermore, they will implement related moral hazard behavior on the basis of this intention. Combined with the analysis above, this empirical study demonstrates the rationality of the main effect model.

In conclusion, the hypotheses of influencing factors and interaction mechanism of doctor's moral hazard have been verified by this empirical study. The hypotheses about the mechanism of doctor's moral hazard proposed in this paper based on the theory of planned behavior have also been verified.

5. Conclusions

Based on the theoretical framework of autonomous motivation and planned behavior, this paper analyzes the influencing factors and mechanism of doctor's moral hazard behaviors, and puts forward relevant research hypotheses. Combined with the effective investigation of 428 medical staff, the following conclusions can be obtained: (1) doctors' moral hazard intentions are formed under the joint action of behavioral attitudes, subjective norms and perceived behavioral control; (2) doctor's moral hazard intention is a mediator variable, which plays an intermediary role in the mechanism of doctor's moral hazard behavior; (3) doctor's moral hazard behavior is based on the specific characteristics of doctors themselves, and is formed under the combination of practice environment, behavioral attitudes, subjective norms, perceived behavioral control and intentions.

Studies have confirmed the effectiveness of the planned behavior theory in explaining doctors' moral hazard behavior. The occurrence mechanism model of doctor's moral hazard is a powerful model, which can effectively explain the influencing factors and interaction relationship of doctor's moral hazard behavior. It can provide effective theoretical guidance on relevant research of doctor's moral hazard behavior, especially on how to establish prevention and control strategy of doctor's moral hazard models.

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