Research on Optimization Countermeasures of Medical Liability Insurance from the Perspective of Game

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Abstract

Medical liability insurance has the function of alleviating medical contradictions, and is also an important means of transferring risks in the medical industry, but it has not been fully established and implemented in China. This article starts with the reasons for the disputes between doctors and patients, based on the different degrees of information obtained by both doctors and patients, and aims at the economic benefits obtained by both parties, and conducts a layer-by-layer game; at the same time, it conducts an in-depth analysis of the existence of the current medical liability insurance system; Finally, put forward feasible suggestions and opinions on the existing problems, for example, appropriately expand the contracting scope and liability limit of medical liability insurance, further optimize the premium raising method of medical liability insurance, and improve the additional insurance in medical liability insurance to promote Further comprehensive development of medical liability insurance development and improve the relationship between doctors and patients.

Keywords

Medical Liability Insurance; Doctor-patient Disputes; Dynamic Game.

1. Introduction

We all know that the medical industry can be very dangerous. With the prosperity and development of the economy and the continuous improvement of the legal system, people have higher and higher requirements for the service effect of the medical industry. In the process of medical diagnosis, the contradiction between doctors and patients has become a very prominent problem in the medical industry.
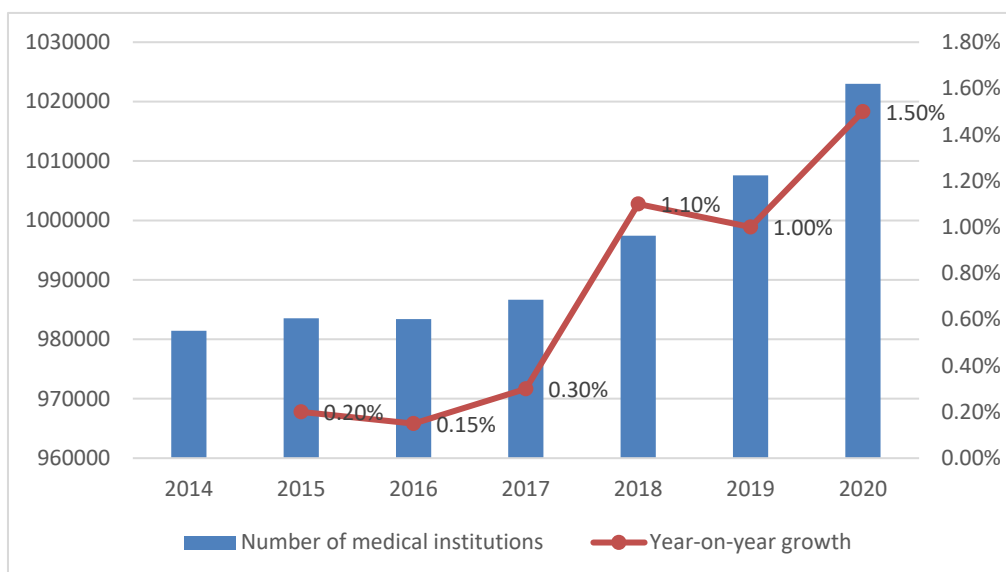

Figure 1. Statistics on the number of medical institutions in China from 2010 to 2020

From 2010 to 2020, the number of medical institutions in China showed a growing trend. At the end of the month, the number of medical institutions nationwide reached more than 1.023 million, an increase of 15,400 compared with December 2019 , and a year-on-year increase of 1.5%.
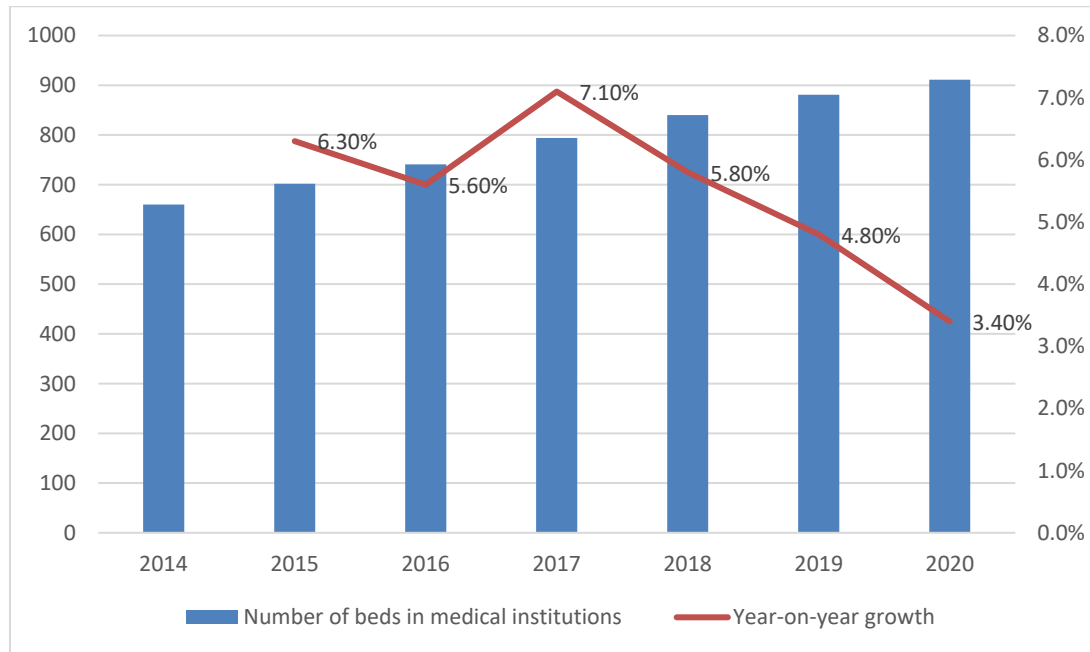

Figure 2. Statistics of beds in Chinese medical institutions from 2010 to 2020
Source: National Bureau of Statistics

With the increase in the number of medical and health institutions in China, the number of beds has also increased accordingly. Year 2014 By 2020 , the total number of beds in China's medical institutions will increase year by year, but the growth trend is relatively slow. Due to China's large population , the aging trend is becoming more and more prominent, and the production methods and diseases of Chinese residents are constantly changing, and there is a problem of insufficient supply and demand of medical resources. The imbalance between the supply and demand of medical resources is one of .

In the process of doctor-patient disputes, insurance companies, as a "third party" force, can promptly transfer medical disputes from inside the medical institution to outside the medical institution, which is conducive to alleviating the tension between doctors and patients and ensuring normal medical order. Create a harmonious hospital. On July 9 , 2014 , the National Health Commission, the Ministry of Finance, the Ministry of Justice, the State Administration of Traditional Chinese Medicine, and the China Insurance Regulatory Commission jointly issued the "Opinions on Strengthening Medical Liability Insurance ". Before the end of 2015 , the coverage rate of tertiary public hospitals across the country should reach 100%; the coverage rate of secondary public hospitals should reach more than 90% ." From the word " should it can be seen that the state's policy on some hospitals Take compulsory insurance. It can be seen that the Chinese government and relevant departments are constantly promoting and improving the reform of the medical insurance system to ease the relationship between doctors and patients.

2. Literature Review

Foreign scholars' research on medical liability insurance began gradually in the 1970s . The first thing to focus on is the identification of the nature of the liability for medical damages (Patricia M. Danzon , 1984) , followed by the no-fault principle.

The emergence of medical liability risks has expanded continuously, and the mechanism for resolving disputes between doctors and patients has also continued to deepen (Patricia Born et al, 1995) . Feldman (1979) found through empirical research that income level is the decision to buy medical liability insurance. At the same time, Quinn (1998) also found that the reputation has a significant impact on defensive medicine; Karl (2013) found through comparison that there is a significant gap between the compensation of medical liability insurance and the compensation of commercial health insurance in the United States. significant positive correlation.

Domestic scholars' research on medical liability insurance mainly focuses on the development model and cognition of medical liability insurance.

Demand status, system construction and so on. In terms of the development model of medical liability insurance, Deng Ying (2021) pointed out that the administrative-led model of medical liability insurance in China is not fully applicable, and suggested that a compulsory insurance model be adopted, that is, the subject of compulsory underwriting and compulsory insurance should be stipulated in legislation. At the same time, Erken (2017) proposed to formulate the " Medical Liability Compulsory Insurance Law" and implement the medical liability compulsory insurance system to protect the legitimate rights and interests of patients.

In terms of the cognition and demand status of medical liability insurance, Yu Min (2016) and others combined the pilot situation of medical liability insurance in Yunnan, Beijing , Shanghai, and Shenzhen to analyze the existence of medical liability insurance in China. Institutional insurance participation rate is not high, medical staff's understanding is weak and there are deviations, medical liability insurance product design is not perfect, and after-sales service is not in place; Bai Qiangwei (2018) and others conducted a questionnaire survey on nurses in a tertiary hospital It is found that nurses generally have a low level of awareness of medical liability insurance, and they also lack awareness of risk prevention.

Foreign scholars are more inclined to maintain the further development of medical liability insurance through legal means, while Chinese scholars focus on theoretical research, model discussion and status quo analysis of medical liability insurance. This article starts with the emergence of doctor-patient disputes, further analyzes based on the perspective of information asymmetry between doctors and patients, and at the same time conducts a game analysis on medical liability insurance, and finally puts forward feasible suggestions and opinions on the conclusion of the game.

3. Doctor-patient Dispute Game

3.1. Medical Disputes Arise

Due to the strong professionalism of the medical industry, doctors and patients have different understandings of medical information. During the treatment process, patients will be dissatisfied with the doctor, which will be accompanied by medical disputes.

The patient has two choices, namely treatment or no treatment. If the patient chooses not to treat, the game ends. Because the patient's disease cannot be treated in time, he will feel great . At this time, the benefit is regarded as -B , and the doctor has no benefit. Under normal circumstances, the patient's goal is physical recovery. Although certain medical expenses are expected to occur, rational patients will choose treatment. Therefore, the choice of treatment is an advantageous strategy for patients. After choosing a treatment strategy, the patient's right

to choose is transferred to the doctor. Due to the limitations of medical technology and the lack of medical services, the following three situations : successful medical treatment, medical malpractice and technical limitations. The success of medical treatment is the common expectation of doctors and patients. The patient gets rid of the pain successfully and obtains a great sense of satisfaction B , and at the same time the doctor also obtains a certain benefit A, which is a win-win situation. However, in the latter two cases, the patient not only loses a healthy life, but also bears a medical cost, which is negative remuneration (-B -A) ; in this case, the doctor can get the treatment cost a.

In real life, if the patient chooses to give up treatment when he is unwell, the condition will only get worse and may worsen, which is obviously not in the interest of the patient. If you choose treatment, when the doctor and patient take the initiative, if they can successfully treat the patient, the patient's body can be recovered. However, once the medical accident or , the patient will lose a high medical expense. At the same time, precious lives will be lost. Therefore, rational patients will definitely choose timely treatment. Although they will still face more uncontrollable risks during the treatment process, patients also know that only by choosing treatment can they recover, so doctor-patient disputes With the ensuing possibility.

3.2. Information Asymmetric Game Analysis

Taking information asymmetry as the entry point, construct a dynamic game model between doctors and patients, let $i \in (0,1)$ be the degree of information asymmetry between doctors and patients , and stipulate that the degree of information asymmetry between doctors and patients = the degree of understanding of treatment information by patients (i)/ Doctor's knowledge of treatment information. The degree of information asymmetry between the doctor and the patient reflects the patient's understanding of . Therefore, the amount of Chinese medicine compensation in the case of doctor-patient disputes is also affected by the degree of information asymmetry.

Among them, in the entire doctor-patient dispute game, the economic benefits obtained by the patient are proportional to, while the economic benefits obtained by the doctor are proportional to the degree of information asymmetry (1- i). Assuming that the economic compensation of the doctor in a medical accident is H , in the game of doctor-patient disputes, both the patient and the patient have two choices: cooperation strategy and conflict strategy. H is the economic interests that both parties compete for in the process of doctor-patient disputes, and C is the economic cost to choose the conflict strategy. When one of the doctors and patients chooses the cooperation strategy while the other chooses the conflict strategy, the benefits of choosing the cooperation strategy and the conflict strategy are 0 and H respectively . When both doctors and patients choose the cooperation strategy at the same time, the patient gets the benefit i H, and the doctor gets the benefit (1- i)H, denoted as (i H, (1-i)H); when both doctors and patients choose conflict strategies, the benefits obtained by both doctors and patients are i (HC) and (1-i)(HC), denoted as (i (HC), (1- i)(HC)). The specific benefits of both doctors and patients are shown in the table below.

Table 1. The profit matrix of the doctor-patient dispute game under information asymmetry

patient Medical	cooperate	conflict
cooperate	(iH,(1-i)H)	(0,H)
conflict	(H,0)	((H-C),(1-i)(H-C))

Let the patient's benefit function be E 1 , the doctor's benefit function be E 2 , the ratio of doctor-patient conflict of interest = the economic benefit H of doctor-patient disputes / the cost of conflict between doctor and patient C . It is stipulated that the probabilities of patients and doctors choosing cooperation strategies are x and y respectively , and the profit functions of patients choosing cooperation strategies and conflict strategies are E 1 combined and E 1 rushing respectively ;

The profit functions of the parties choosing the cooperation strategy and the conflict strategy are E 2 combined and E 2 rushed respectively , and the following functions can be obtained

E 1 close =y· i H+(1-y)·0

E 1 stroke =y·H+ i (HC)·(1-y)

E 2 combined =x·(1- i)·H+(1-x)·0

E 2 strokes =x·H+(1-x)·(1-y)·(HC)

E 1 =x·E 1 combination +(1-x)·E 1 stroke

E 2 =y·E 2 combined +(1-y)·E 2 strokes

Let $\frac{\partial E_1}{\partial x}=0, \frac{\partial E_2}{\partial y}=0$

X0=$\frac{(1-i)(H-C)}{(1-2i)\cdot H-(1-i)\cdot C}$

Y0=$\frac{i(H-C)}{(2i-1)\cdot H-i\cdot C}$

Make the doctor-patient conflict of interest ratio H/C=A

X0=$\frac{(1-i)(A-1)}{(1-2i)\cdot A-(1-i)}$

=$\frac{i(A-1)}{(2i-1)\cdot A-i}$

When the probability of cooperation between the doctor and the patient is x 0 , y 0 , the doctor and the patient reach the Nash equilibrium solution, that is, the highest income is obtained. Therefore, both doctors and patients can constantly adjust their selection strategies in the process of disputes in order to obtain maximum economic benefits.

When a doctor-patient dispute occurs, both parties choose strategies to obtain higher economic benefits, while the doctor adopts different strategies based on the patient's choice to reduce its economic costs. In the case , once the patient proposes a higher compensation amount again and again, the doctor will take legal channels or medical appraisal to deal with it regardless of whether there is a treatment defect. The image of institutions and healthcare workers. Through the establishment of a third-party doctor-patient adjustment department to deal with disputes , it may be more conducive to patients' conviction and acceptance. In fact, some violent medical incidents often evolve from small disputes at the beginning to large-scale disputes step by step. There may be no way to complain about ordinary disputes, or even long-term entrustment, and the patient may take extreme measures to force medical treatment. The organization solves the problem in a timely manner. Therefore, the contradiction between doctors and patients can be eliminated in the bud in time, and only by paying high attention to it and dealing with it in a timely manner can the contradiction between doctors and patients be effectively resolved.

3.3. Game Analysis of Medical Liability Insurance

On the premise of purchasing medical liability insurance, when an insured accident occurs, the insurance institution can bear the financial compensation responsibility for the medical institution. Insurance institutions usually take targeted measures to limit the frequency of claims for such insurance, including raising premiums and limiting exclusions. Under the huge compensation liability, the most direct way for the insurer is to increase the premium to maintain the normal operation of the insurance company. As the insurance fees charged by the

insurer to the hospital continue to increase, the hospital will further increase the medical fees in order to maintain operating profits. Ultimately, the cost of medical liability insurance will be passed on to patients.

The conclusion of this round of game is not what we want to foresee. Both the insurer and the doctor as the participants of this round of game have a certain right to choose and can transfer costs reasonably, while patients as third-party participants only have the right to choose different hospitals. , instead of not seeing a doctor when you are sick. In the end, the only patient in this game who did not have the right to choose became the sacrificed party.

In the process of implementing the medical liability insurance system, when both medical institutions and insurance companies have the right to set prices freely, medical institutions and insurance institutions will choose to continuously increase the economic pressure on patients, and at the same time, there will also be insurance thresholds for this type of insurance high feature. Therefore, only the timely intervention of government departments can break the bad cycle of this link. On the one hand, government departments have made mandatory regulations on the insurance coverage of medical institutions, and at the same time require insurance institutions not to refuse coverage without reason. At the same time, by restricting the free pricing of medical institutions and insurance institutions , it is possible to prevent the transfer of costs to patients. On the other hand, government departments should also provide appropriate financial subsidies to the premiums of medical liability insurance to increase the enthusiasm of policyholders and underwriters.

3.4. Behavioral Game between Doctors and Patients under Government Control

Government regulation plays a vital role in resolving conflicts between doctors and patients. However, when the government's control over "medical trouble" behavior is different, its effect on resolving the conflict between doctors and patients will also be different.

When the government has a relatively high degree of control over the medical and health field, for medical institutions, their violations have great safety risks. If there is a violation, the extra income obtained is hardly enough to make up for the punishment of the government department. Therefore, when the government controls a large degree, medical institutions will tend to standardize their practice. For patients, at this time, in order to obtain additional economic compensation, patients will gradually choose "medicaltrouble" strategy. As shown in Figure 3.
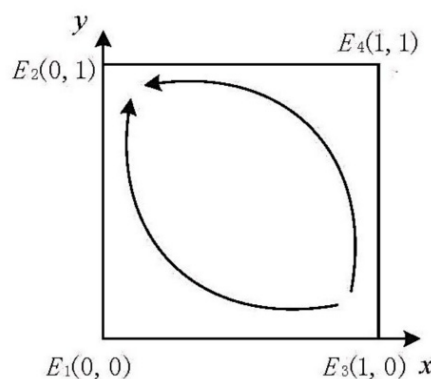

Figure 3. Patient strategy selection under government regulation

When the government's control over the medical and health field is relatively small, patients think that it is difficult to make up for the losses caused by the voluntary , so it is likely to further expand doctor-patient disputes, and even take "medical trouble" behaviors to This forces the government and relevant departments to increase control.

4. Policy Recommendations for Improving Medical Liability Insurance

Insurance institutions serve as a "buffer belt" to resolve disputes between doctors and patients, and medical institutions purchase insurance spread risks, which is an effective way to reduce the burden on medical institutions and protect the legitimate rights and interests of patients. Since the comprehensive introduction of medical liability insurance in 2000 , its implementation effect has not achieved the desired effect. combined blog

Based on game analysis, the author puts forward feasible policy suggestions on improving medical liability insurance.

4.1. Expand the Coverage of Medical Liability Insurance

At present, the scope of insurance liability in the medical liability insurance provided by insurance companies is limited to casualties caused by medical , and the insurance coverage is extended to medical accidents caused by medical accidents by purchasing additional insurance. The casualties caused by other circumstances are not covered by the medical liability insurance.

The author believes that the contracting scope of medical liability insurance only includes the losses caused by medical accidents.

not enough. On the one hand, many current medical disputes do not originate from medical malpractice, but more from medical negligence. For medical negligence caused by medical negligence, insurance companies will refuse , causing medical institutions to needs cannot be met. On the other hand, the factors that cause , so as to effectively alleviate the doctor-patient conflicts and give full play to the value of medical liability insurance.

Generally speaking, the narrow scope of insurance liability is not conducive to the comprehensive popularization of medical liability insurance. Only when the scope of liability of medical insurance is sufficient to cover various medical accidents can the protective effect of medical liability insurance be truly exerted.

4.2. Optimizing the Way of Raising Premiums for Medical Liability Insurance

At present, the premium income of China's medical liability insurance mainly comes from the government, medical institutions and medical personnel. It is a good choice for the premium composition to be based on medical institutions and medical personnel, supplemented by government funding. Since the policyholders of China's compulsory medical liability insurance are limited to medical institutions, the contributions of medical institutions and medical personnel should be considered as a whole. The model of personal reserves can be adopted, that is, medical institutions and medical staff pay premiums together according to a certain ratio. When an insurance accident occurs, the medical institution first bears a certain amount of economic compensation, and the remaining economic compensation comes from the personal reserve fund account of the medical staff. Withdrawal. When medical personnel retire, all remaining amounts of the personal reserve fund can be withdrawn. This model, to a certain extent, encourages medical staff to work more cautiously, thereby objectively reducing the incidence of medical accidents.

The state's special subsidies through government funding also reflect the public welfare of compulsory medical insurance. In addition , the financial department can target the premium paid by medical personnel, allowing them to carry out and reduce or exempt the value-added tax of insurance companies. Continuously increasing government support is an important guarantee for the realization of compulsory medical liability insurance.

This mode of raising premiums reduces the financial burden on medical institutions and medical personnel to a certain extent, and the financial support of the government has also become an important guarantee for the realization of compulsory medical liability insurance. Continue to develop.

4.3. Expand the Liability Limit of Medical Liability Insurance

Due to the uncontrollability of medical risks, medical liability insurance involves the economic interests of insurance companies, doctors, and patients. Insurance institutions, adhering to the principle of protecting capital and making small profits, should stipulate the maximum compensation limit in the medical insurance contract .

The author believes that in the whole process of constructing and perfecting the medical liability insurance system, we should combine the.

The level of economic development and the level of medical and health development refer to the compensation liability limits set ; at the same time, with the continuous improvement of people's economic living standards, the amount of claims for medical damage compensation has also risen sharply. Hundreds of thousands or even millions of cases of huge compensation emerge in an endless stream. The existing insurance compensation amount will not be able to meet the insurance needs of medical institutions at this stage, so the compensation limit should also be updated .

4.4. Improve the Additional Liability Insurance in the Products of Medical Liability Insurance

The liability for compensation caused by accidents other than medical malpractice is often passed on through additional medical liability insurance, and it is recommended that medical institutions choose to purchase medical liability insurance when purchasing. It is worth noting that the additional liability insurance takes effect only during the insurance period or prosecution period of the main insurance in the insurance policy. Additional liability insurance mainly includes liability for compensation caused by the defects of medicines . Among them, the scope of coverage needs to be specified in detail. The additional liability insurance in medical liability insurance products should be continuously improved, and the coverage of medical liability insurance should be continuously expanded, so as to effectively transfer medical risks.

4.5. Build a "Medical Liability Insurance Information Exchange Platform" to Realize Information Exchange between Medical Institutions and Insurance Companies

After the establishment of the insurance contract, the patient's medical information is uploaded in real time. When a medical dispute occurs, the insurance company can use the information grasped by the platform to process it programmatically at the first time, shortening the claim time and making it transparent. The standardized claims settlement is also conducive to the real-time supervision of the Banking and Insurance Regulatory Commission and the National Health Commission.

Acknowledgments

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