



Inequality in the last resort: how medical appraisal affects malpractice litigations in China

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Abstract

Background Medical malpractice litigations affect the practices of patient safety. However, medical malpractice litigations involve highly specialized knowledge. Thus, medical appraisal is usually essential in the ascertainment of responsibility and judicial decision-making. China's judicial system is characterized by a dual-mode of medical appraisal resulting from two parallel appraisal agencies: judicial appraisal institutions and medical associations. This paper examines whether or not and how choices of different medical appraisal agencies affect malpractice lawsuit results in China.

Methods We collected and sampled a total of 2557 verdicts pertaining to medical disputes from “China Judgements Online” in 2014. We used an ordinary least square regression model and a mediating effect regression model to analyze to what extent and how different choices between two medical appraisal agencies affect malpractice litigations.

Results (1) Almost 81.55% (2082) of litigants resorted to medical malpractice appraisals in China in 2014. Among 2070 cases with appraisal results accepted by the court, 60.10% of the litigants chose judicial appraisal institutions (1244), as opposed to medical associations (826). (2) Among 2557 cases, 2306 (90.18%) claimed compensation and 1919 (83.22%) were awarded compensation by the courts. The proportion of compensation paid in a case is 48% on average. (3) Appraisal agencies matter in the investigation of medical errors, which in turn affects the proportion of compensation paid in a case. (4) Choosing judicial appraisal institutions will raise the proportion of compensation paid by about 10% on average.

Conclusions Different choices between appraisal institutions affect malpractice litigations in China. As the last resort for remedying medical malpractice, medical appraisals in the judicial system could be a source of inequality in China's medical litigation outcomes.

Keywords Malpractice litigations · Medical appraisal · Inequality · Patient safety

Introduction

“To err is human” but “to sue is human” too [1]. Medical malpractice results in at least 43 million injuries one year, which threatens patients' safety and the quality of medical services [2]. Besides, medical malpractice induces an abundant amount of litigations [3–10]. As the last resort for

stakeholders, malpractice litigations perform the function of identifying, compensating for, and deterring medical injuries or frivolous litigations [11, 12]. Such functions are premised on impartial adjudication, which means that the judicial system does not favor anyone [13]. However, to judge is also human, and adjudications in medical litigations rely on malpractice appraisals in both the tort system and the no-fault system. Experts' opinions of medical malpractices can diverge and the existence of two distinct medical appraisal agencies can make the matter worse [14].

Medical appraisal has become increasingly essential and inevitable in medical litigations for its role in the ascertainment and evaluation of cases of suspected subjective medical liability [15]. Objective and reproductive methods of medical appraisal, such as the “European Guidelines on Methods of Ascertainment and Criteria of Evaluation,” could decrease the huge heterogeneity that exists in damage compensations for

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similar malpractice cases in court decisions [16, 17]. However, in the absence of a scientific appraisal approach, the diversity of regulatory frameworks and operative systems matters in the ascertainment and evaluation of medical errors, professional liability, and damage compensations in medical litigations [16]. In China, medical litigators can choose judicial appraisal institutions and medical associations to conduct medical appraisals. Do different appraisal institutions lead to different litigation outcomes?

China achieved universal health insurance covering up to 1.3 billion people in 2011, but now faces an explosive demand for health services and surging medical disputes [18]. The inadequacy of quality control gives rise to medical errors, which in turn bring about great physical injuries and economic loss for patients, consequently deteriorating the doctor-patient relationship [11, 19, 20]. There are three main mechanisms for addressing medical disputes in China, including private remedies (direct bargaining between patients and service providers), administrative mediation, and litigation. In recent years, about 19,944 medical litigation cases were accepted by the court all around the nation in 2014, which accounted for about 17% of the 115 thousand medical disputes that year [21]. Among those medical disputes, the litigation mechanism matters in providing a fair and just platform for litigations. Furthermore, the litigation mechanism is a last resort for medical disputes.

China has a dual mode of medical appraisal and medical litigators can choose either judicial appraisal institutions or medical associations when a medical appraisal is needed. These two medical appraisal agencies differentiate from each other in terms of their appraisal standards, procedures, and legal basis. Variations in expert opinions in medical litigation reviews have been acknowledged [14]. Conflicting opinions in medical appraisals are often attributed to bias regarding the compensation claimed by litigators, the relationships between experts and litigators, and different regulatory frameworks and national operative systems [22, 23]. But to what extent and how different medical appraisal agencies affect appraisal results remains unexplored.

These two medical appraisal agencies differ in terms of tasks, affiliation, compositions, and appraisal procedures. Firstly, medical associations undertake the task that organizes medical incident appraisal, especially to decide whether a litigation case constitutes a medical incident or not. In comparison, judicial appraisal institutions undertake the task that organizes medical negligence appraisal, which means to decide whether medical treatment constitutes medical negligence or error and whether there is a causality relationship between medical treatment and physical injuries [24].

Secondly, medical associations differ from judicial appraisal institutions in their semi-official role and their dependence upon the government at all levels. Although medical associations legally are academic and non-profit associations that are

voluntarily constituted by medical workers, in practice, they are subordinated to the health administration department under the Regulations on Handling Medical Accidents. By contrast, judicial appraisal institutions are affiliated to the judicial department under Tort Liability Law or judicial interpretations [25].

Thirdly, the compositions of two medical appraisal agencies differ dramatically. The appraisal staff of the medical association is mainly composed of clinicians in the local medical community. According to the Regulations on Handling Medical Malpractice, these clinicians who hold a senior technical position should have worked at least 3 years.¹ These physicians are likely to be colleagues, classmates, or friends of the doctors who are involved in litigations, whereas the judicial appraisal institutions are composed of professional appraisal staff who have relevant working qualifications or undergraduate degree in relevant majors [25]. As a result, the qualification requirements of medical appraisal staff of the medical association are higher than those of judicial appraisal institutions.

Fourthly, there are some important variations in appraisal procedures between medical associations and judicial appraisal institutions. For instance, the medical associations' appraisal implements the expert group responsibility system, which means that there is no need to sign the name of the specific appraiser on the appraisal conclusion, and the appraisal expert does not need to testify in court. This leads to a situation where no one is responsible for the appraisal conclusion. On the contrary, the judicial appraisal requires that each appraisal expert must sign the appraisal conclusion and must also participate in the court to testify [25]. As a result, the different appraisal conclusions of the same litigation case could be made between medical associations and judicial appraisal institutions.

Methods

Data sources

Our data were collected from "China Judgements Online." Since 2010, the Supreme People's Court of the People's Republic of China has twice required courts at all levels to publicize online the verdicts they have made that have already come into effect. By 2014, most verdicts were accessible through "China Judgements Online." Using a computer crawler program, we collected a total of 5237 medical litigations that took place in 2014. After removing 238 flawed verdicts, we used systematic sampling to obtain 2557 verdicts.

¹ Regulations on Handling Medical Malpractice, http://www.gov.cn/banshi/2005-08/02/content_19167.htm.

Coding strategy

We hired and trained four research assistants (RAs) to code adjudication documents. The coding process is as follows.

First, we prepared a coding manual and conducted pilot coding with 200 verdicts. These 200 verdicts were duplicated and randomly assigned to RAs to test the reliability of the coding scheme. Second, we revised our coding manual based on feedback from the pilot coding. Third, the remaining coding work was aided by 100 overlapping copies and a checklist to reduce information omission. Data were entered into STATA15.0.

We calculated inter-rater reliability, which reflects the degree to which two coders agree with each other in regard to coding overlapping verdicts. The results showed that the coding reliability of the two groups was above 90%, and the overall reliability was 93.05%, indicating that the data are of a high quality.

Variables and measurement

Dependent variable We use proportion of compensation paid in a case (hereinafter, PROPORTION) as the measurement of the litigation results. PROPORTION is measured by the percentage of money awarded to the plaintiff divided by their claimed amount. Winning or losing is always the focus of medical litigations [26]. At the same time, the extent of the financial compensation for Chinese patients and the factors behind it have yet to be systematically evaluated [27]. The claimed expense categories by patients include the following: emotional, medical, traffic, nursing, food, and work; the items awarded most frequently to the plaintiff include emotional, medical, traffic, nursing, work, and appraisal.

Independent variable Our independent variable is the choice between two medical malpractice appraisal agencies (hereafter, CHOICE): judicial appraisal institutions or medical associations. We examine whether or not and how the choice of appraisal agencies affects litigations outcomes.

Control variables We also include a set of factors that may influence the adjudication. (1) Court level: China's courts are divided into four levels: basic people's courts, intermediate people's courts, higher people's courts, and the supreme people's court. (2) Legal representation of patient and provider: legal resources are vital to the result of litigations; thus, we need to consider the types of legal agent that the plaintiff and defendant use in court. (3) The rank and ownership of providers: China's hospitals can be categorized into three types: primary, secondary, and tertiary institutions. (4) Patient's household registration types: patient's household registration types were classified as urban, rural, and town. Urban and

rural residents and migrant workers have different compensation standards.

Mediation variables We posit that why the choice of different appraisal institutions affects litigation outcomes is due to a set of mediation variables, including the degree of injury, the existence of medical errors, and the extent to which the patients' loss is caused by the medical providers' errors. China adopts the principle of fault liability in medical litigations and compensation is awarded on the basis of four conditions: (1) patients' degree of injury; (2) whether or not there is a medical error; (3) the causal relationship between medical errors and injury; and (4) the extent to which medical errors lead to injury. In a typical medical appraisal report, information is clearly displayed regarding the degree of injury, the existence of medical errors, and the attributable degree of medical error. The appraisal report serves as a starting point for judges to make decisions.

Models

The proportion of compensation paid was a continuous variable, so we used an ordinary least square (OLS) regression model for the data analysis. Then, we added into the mediating effect regression three variables, including degree of injury, whether or not there exists a medical error, and the attributable degree of the medical error. We used the most commonly used and recognized bootstrap test to check the robustness of the models [28].

To analyze how the choice between two appraisal agencies affects PROPORTION, we examined the mediating roles of the degree of injury (DI), whether or not there is a medical error (ME), and the attributable degree of the medical error (ADME). We used a nonparametric percentile bootstrap method with deviation correction to test the mediating effects. On the basis of our sample ($N=2557$), 1000 bootstrap samples were extracted by repeating a random sampling method. The estimated values of 1000 mediating effects were sequenced and the confidence interval at the 95% confidence level was obtained to describe the uncertainty regarding the average mediating effects. If the 95% confidence interval of the mediating effect does not include 0, then the mediating effect is significant.

Results

Descriptive statistics

In this article, we are concerned with the results of medical litigations—primarily the financial results. Among 2557 cases, 2306 (90.18%) patients claimed for compensation and

1919 (83.22%) of them were awarded to different degrees by the courts. It is noteworthy that 251 (9.82%) cases did not claim for compensation, but 206 (82.07%) of them were awarded compensation by the courts (Table 1). In the following sections, we focus on the cases in which compensation was claimed and awarded.

Dependent variable The average proportion of compensation paid in a case (PROPORTION) is 48%, indicating that, on average, patients were awarded 48% of what they claimed. The most claimed expense categories by patients are as follows: emotional ($n = 1500$), medical ($n = 1423$), traffic ($n = 1221$), and nursing ($n = 1129$); the items awarded most frequently to the plaintiff include emotional ($n = 1563$), medical ($n = 1525$), traffic ($n = 1364$), and nursing ($n = 1303$).

Independent variable In our sample ($n = 2557$), 81.55% ($n = 2082$) of the cases adopted medical malpractice appraisals (outliers dropped). Our explanatory variable is the choice between two medical malpractice appraisal agencies. This article focuses on those cases (2070) in which appraisal results were accepted by the court, while other cases could not be judged in regard to whether their appraisal results came from medical associations or judicial appraisal institutions. Among these 2070 cases, 1244 cases (60.10%) chose judicial appraisal institutions, while the remaining 39.90% chose medical associations (Table 2).

Control variables (1) Court level: most medical litigations were adjudicated in basic people's courts (60.85%) and very few cases (0.47%) were brought to the higher people's courts. (2) As for legal resources, the number of plaintiffs with a lawyer as legal agents is 11% lower than that of defendants, which reflects the inequality of resources and capabilities between patients and doctors. (3) Patient's household: about 67% of the patients came from urban areas (cities and towns), including migrant workers who have worked in cities for more than 1 year. (4) Hospital rank and hospital ownership: tertiary and secondary hospitals accounted for 55% and 34% of hospitals involving in litigation, respectively, and most hospitals are state-owned (88%) (Table 2).

Table 1 Cases claimed and awarded compensation ($n = 2557$)

		Compensation awarded		Total
		Yes	No	
Compensation claimed	Yes	1919	387	2306
	No	206	45	251
	Total	2125	432	2557

Mediation variables (1) Degree of injury (DI): 38.14% of patients suffered a disability due to a medical injury and there was a loss of life in 42.49% of cases. (2) Medical error (ME): 84.02% of patients suffered from medical errors, while only 15.98% of medical litigations were deemed to be without medical error. (3) The attributable degree of medical error (ADME): the average degree of medical error involved is 45.34%, with a variance of 29.7% (Table 3).

Regression analysis results

In Table 4, we examined the impact of the choice of appraisal agencies on the outcome, PROPORTION, with control variables. According to the regression analysis results, the choice of judicial appraisal institutions as the medical appraisal agency was positively associated with the proportion of compensation in claims. All things being equal, plaintiffs may obtain 10% higher compensation when they choose judicial appraisal institutions, compared with medical association agencies.

According to the bootstrap mediation tests (Table 5), the effect size of the choice of appraisal agencies in the mediation variable model significantly decreased, compared with the model without mediation variables. However, there is no statistical evidence in support of the mediating effect of the degree of injury (DI) and the attributable degree of medical error (ADME) on PROPORTION, given the fact that the 95% confidence intervals include 0. However, whether or not there is a medical error (ME) significantly mediates the relationship between the choice of appraisal agencies and the proportion of compensation, with an indirect effect of 0.015 and a 95% confidence interval of (0.007, 0.023). In this mediation variable model, the mediating effect of medical errors accounted for 27.27% of the total effect size.

Discussion

Fair compensation is central to medical litigations: victims turn to the court to redress medical malpractice done to them, which in turn deters medical errors from occurring and then improves patient safety. A well-designed legal framework would help to realize justice. However, we found that some institutional factors are causing structural variations in Chinese medical litigations. We find that different medical appraisal agencies differ in their judgments about the existence of medical errors, thereby affecting the proportion of compensation paid. More specifically, choosing judicial appraisal institutions will raise the proportion of compensation paid by about 10% on average. According to our findings, the irony is that the system designed to promote justice has become a source of inequality. This irony of inequality is rooted in the idea that "to appraise is human too."

Table 2 Descriptive statistics of the main variables

Variables	Observations	Proportions	Cum-proportions
Choice			
Judicial appraisal institutions	1244	60.10	60.10
Medical associations	826	39.90	100
Total	2070	100	
Court level			
Basic people's courts	1556	60.85	60.85
Intermediate people's courts	989	38.68	99.53
Higher people's courts	12	0.47	100
Total	2557	100	
Legal representation of patients			
Non-legal	416	19.20	19.20
Legal professional	158	7.29	26.49
Lawyer	1593	73.51	100
Total	2167	100	
Household			
Rural	493	32.54	32.54
Urban	794	52.41	84.95
Town	228	15.05	100
Total	1515	100	
Legal representation of hospitals			
Non-legal	293	12.99	12.99
Legal professional	65	2.88	15.88
Lawyer	1897	84.12	100
Total	2255	100	
Hospital rank			
Primary	175	10.68	10.68
Secondary	562	34.29	44.97
Tertiary	902	55.03	100
Total	1639	100	
Hospital ownership			
Non-public	209	12.04	12.04
Governmental	1527	87.96	100
Total	1736	100	

Table 3 Descriptive statistics of the mediation variables

Variables	Observations	Proportion (%)	Cum-proportion
Degree of injury			
Non-disability	450	19.37	19.37
Disability	886	38.14	57.51
Death	987	42.49	100
Total	2323	100	
Medical error			
No	394	15.98	15.98
Yes	2072	84.02	100
Total	2466	100	
Attributable degree	2213	45.34	

This article focuses on how different medical malpractice appraisal agencies affect malpractice litigations in China. Our findings are as follows. First, medical malpractice appraisal plays a crucial role in the adjudication of medical litigations in China: 81.55% of litigants employ medical appraisal and judges rely heavily on appraisal results. Second, in our samples, 2306 (90.18%) of patients claimed for compensation and 1919 (83.22%) of them were supported to different extents by the courts. The proportion of compensation paid in a case is 48%, on average, in China. Compared with the choice of medical associations as appraisal agencies, judicial appraisal institutions increase PROPORTION about 10% on average. Third, we found evidence for the way in which appraisal institution matters through a mediating effect analysis. Patients are more likely to receive compensation when turning to

Table 4 Impact of the appraisal institutions on PROPORTION

	Proportion
Appraisal institutions	
Judicial appraisal institutions (reference group: medical associations)	0.102** (0.049)
Court level (reference group: basic people's courts)	
Intermediate people's courts	0.109** (0.052)
Higher people's courts	0.023 (0.276)
Legal representation of patient (reference group: non-legal)	
Legal professional	0.249** (0.099)
Lawyer	0.057 (0.066)
Legal representation of hospitals (reference group: non-legal)	
Legal professional	-0.312* (0.176)
Lawyer	-0.049 (0.066)
Hospital rank (reference group: primary)	
Secondary	0.004 (0.114)
Tertiary	-0.057 (0.115)
Hospital ownership (reference group: non-public)	
Governmental	-0.022 (0.112)
Household (reference group: rural)	
Urban	0.096* (0.052)
Town	0.199*** (0.074)
Constant	0.356*** (0.132)
Observations	637
R square	0.038

judicial appraisal agencies, because it is more likely that the appraisal institution concludes the existence of medical errors. This partly explains the rising popularity of judicial appraisal among patients.

Recognizing the role of the appraisal mechanism in medical malpractice litigations has profound policy implications. We illustrate the role of medical appraisal in judicial decision-making by examining the dualistic appraisal mode in China. This mode is meant to provide citizens with more options, but multiple consequences might play out: (1) it may breed structural variation in litigations results. (2) Stakeholders may choose appraisal agencies to their advantage. Patients suffering as a result of medical errors are more likely to choose judicial appraisal institutions (supported by data), although those agencies are professionally inferior to medical associations. (3) Medical appraisal agencies may be incentivized to modify their evaluations and cater to consumers due to competition pressure. In fact, news reports have covered cases in

which appraisal agencies have made up reports to satisfy consumers, which erodes the basis of judicial adjudication.

Our analysis deepens our understanding of the functioning logic of Chinese courts and provides lessons for other countries. Medical disputes and litigations are prevalent in most countries, causing soaring medical costs, insurance costs, and other overall medical expenses, the expansion of defensive medicine, and the decline of medical quality. Fair and just judicial decision-making necessitates solid medical appraisals, which are not common in many developing countries. Our study casts doubt on the dualistic design of the coexistence of two distinct appraisal agencies.

Conclusion

Since to appraise is human, ascertainment and evaluation in medical liability are critical in malpractice litigations. This

Table 5 Bootstrap mediation tests

Bootstrap mediation tests	Total_eff	Dir_eff	Ind_eff	[95%, CI]
CHOICE→DI→PROPORTION	0.052	0.047	0.005	[-0.001, 0.014]
CHOICE→ME→PROPORTION	0.055	0.040	0.015***	[0.007, 0.023]
CHOICE→ADME→PROPORTION	0.023	0.012	0.011	[-0.002, 0.143]

research may stimulate the discussion on equality and fairness in malpractice litigations, especially in regard to the role of legal mechanisms, such as medical appraisals rooted in the judicial system. Improving the quality of medical services is the key to solving problems, but the role of the legal system in solving medical disputes cannot be ignored, especially given the influence of the legal system on the fairness of dispute resolution. The inequality and unfairness of malpractice litigations infract the justice of legal medicine and the functioning of the health care system in the long run. Researchers and legislators could pay more attention to institutional arrangements in the judicial system to promote justice, deter malpractice, and improve patient safety.

Our research has some limitations as follows. One of the limitations of this study is that litigation is only one of the ways to deal with medical disputes and cannot represent the whole picture of medical dispute resolution in China [29]. Besides, China's legal system is deeply influenced by the continental law system, which makes Chinese courts follow different behavioral logic when judging medical disputes compared with European and American countries. Thus, although this research is enlightening for tort liability reform in other countries, its results and implications should be taken with caution.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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