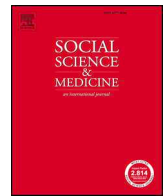




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# The weakness of the strong: Examining the squeaky-wheel effect of hospital violence in China

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## ABSTRACT

Hospital violence has become a worldwide issue that disturbs health care systems. China is in a particular dilemma between meeting the healthcare demand of 1.39 billion residents and ensuring the safety of 12.3 million health professionals. Drawing on data from an administrative survey, we presented the types and distribution of disruptive behaviors, as well as the summary statistics of 225 medical disputes that took place from 2012 to 2013 in Z city. Logit and OLS regression analyses show that disruptive behaviors, characterized by the number of protest participants and the length of protest, can significantly predict whether the claimant receives compensation and the amount of compensation. All else equal, a one-person increase in the number of participants is associated with 3.94% higher odds of getting compensated, whereas a one-day increase in the length of protest is associated with a 1.03% increase in the odds of receiving compensation. Further analyses show that the link between disruptive behaviors and compensation outcomes is due to the involvement of the state, which tends to press hospitals to pay when substantial violence is present. Chinese government's overwhelming emphasis on social stability gives protestors leverage against hospitals, which can be summarized as "the squeaky wheel gets the grease." Ironically, the sensitivity of Chinese government towards social stability becomes a weakness of its own. Government's active intervention to reach a peace-oriented goal will incentivize patients to resort to violence in pursuit of compensation. This study has implications for understanding the Chinese government's logic of addressing social problems that range from hospital violence, labor disputes, land disputes to demolition compensation and civil petitions.

## 1. Introduction

The 49th World Health Assembly adopted Resolution WHA49.25, declaring violence a major and growing public health problem across the world (Krug et al., 2002). After 20 years, violence remains a challenging problem worldwide, and it results in the deaths of more than 1.3 million people each year (Butchart and Mikton, 2014). Among its many types, violence against healthcare workers draws salient attention. According to a 2003 report of multi-country case studies, more than half of the responding healthcare personnel experienced at least one incident of physical or psychological violence during the last year: 75.8% in Bulgaria; 67.2% in Australia; 61.0% in South Africa; in Portugal, 60.0% in the Health Centre complex and 37.0% in hospitals; 54.0% in Thailand; and 46.7% in Brazil (Martino, 2003). Hospital

violence has become a global health issue, troubling not only developing countries, but also industrialized societies, including the United States (Phillips, 2016), Italy (Magnavita and Heponiemi, 2011), and Japan (Fujita et al., 2012).

Like many countries, China also suffers from workplace violence in hospitals, despite a host of cultural-political distinctions in its management of healthcare. As a populous transition economy of 1.39 billion citizens (National Bureau of Statistics of China, 2018), China faces the challenge of satisfying healthcare demand with limited medical resources. Moreover, China's hospital violence is largely a byproduct of healthcare reform initiated in the 1980s. Therefore, this study has particular implications for countries reforming their healthcare systems.

When looking at the prevalence of hospital violence globally, China fares no better than other countries. A representative survey conducted

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in 2017 revealed that 66% of interviewed doctors had experienced hospital violence (Chinese Medical Doctor Association, 2018). Disruptive behaviors on behalf of patients have been found to impair doctors' diagnostic reasoning (Mamede et al., 2016; Schmidt et al., 2016), harm their mental health (Gong et al., 2014; Shi et al., 2015, 2018; Zhao et al., 2018; Sun et al., 2017b; Zhang et al., 2018), decrease their job satisfaction (Yao et al., 2014; Wu et al., 2014), and undermine patient-physician trust (He and Qian, 2016).

Both Chinese hospitals and the government have responded to the increasingly rampant hospital violence. Hospitals used to adopt various measures to protect their employees, including distributing helmets and even bulletproof vests to medical workers. In Shenyang, police officers were hired as deputy presidents for 27 hospitals (Liebman, 2013). Laws and regulations have also been amended or enacted to provide legal support for medical workers (Lin and Hu, 2018). Despite these efforts, hospital violence is still prevalent throughout the country (Hall et al., 2018). For instance, the number of reported medical disputes was 6324 in 2003, and it surged to around 115,000 in 2014 (Geng, 2015). A cross-sectional study of 15,970 nurses at 44 tertiary hospitals and 90 county-level hospitals in 16 provinces showed that 65.8% of interviewees encountered workplace violence in 2015 (Shi et al., 2017).

Existing studies on patient-physician conflicts have identified several risk factors as to why the patient-physician relationship in China has deteriorated to such a degree. These include individual variables such as gender, age, education, marital status, occupational category, professional title, work experience, shift work, and anxiety levels in addition to institutional characteristics such as the type of hospital, medical procedure, and economic compensation (Wu et al., 2012; Liu et al., 2015, 2018; Jiao et al., 2015; Xing et al., 2015, 2016; Sun et al., 2017b; Zhou et al., 2017; Lu et al., 2018). However, to the best of our knowledge, the effects of violence on the outcomes of medical disputes have not been addressed. Little is known about the resolution of these disputes such as why some medical disputes end in compensation, while others do not. This paper attempts to link hospital violence with the outcome. We find that the state involvement may create a positive incentive for patients to resort to violence. Due to the priority of stability maintenance on the government's agenda, hospitals are likely to yield to violence and compensate patients under pressure from governments. Our study suggests that this government involvement, even though it intends to curb hospital violence, may partly account for its occurrence and aggravation in the long term.

## 2. Literature review

Hospital violence is a worldwide issue. There are different terms that can be used to describe hospital violence, such as medical workplace violence (Hall et al., 2018) and medical disputes (Liebman, 2013). According to a WTO report on violence in the healthcare sector, violence refers to "incidents where employees are abused, threatened, assaulted or subjected to other offensive behaviors in circumstances related to their work" (Martino, 2003, p.1). In the context of China, hospital violence is basically equivalent to medical disputes or physician-patient conflict.

China's hospital violence should be viewed in the context of the socioeconomic transformation that had taken place since 1978 when the country started to open its door to the outside world and initiated internal reforms (Zheng et al., 2006). Hospital violence reveals a deeply flawed healthcare system in China after four decades of marketization reform (Blumenthal and Hsiao, 2015). Before China became more open and initiated reforms in 1978, the healthcare system was effective in providing basic care for the vast majority of citizens, despite its low quality (Chen, 2001). In the planned economy era, China's public hospitals provided services at low costs, but the marketization reform pushed them to change their incentives in response to financial pressure and internal decentralization (Geng, 2015). Consequently, over-prescription and unnecessary diagnostic tests prevail, placing heavy financial burdens on patients (He

and Qian, 2016).

As the medical dispute issue gains increasing salience in China, it also garners more media attention. However, empirical research has neglected the topic until recently. Scholars have yet to reach a consensus on the causes of medical disputes. The emerging literature tends to scrutinize either physicians or patients. Medical service providers have long been blamed for triggering hospital violence. In the current healthcare system, doctors are widely believed to pursue economic benefits over caregiving, leading to patient distrust (Tucker et al., 2015). The Chinese healthcare system can be error-prone, but the punitive approach to error is currently dominating (Liu et al., 2013), which can cause inadequate research and practice regarding quality control. Moreover, most medical schools in China offer only a limited number of medical humanities courses, leaving doctors poorly equipped, especially with regard to communication skills and the concept of "the whole patient care experience" (Li et al., 2012; Tucker et al., 2014; Branch, 2014). Miscommunication could constitute the primary cause of medical disputes (Cai et al., 2011). To make matters worse, some doctors have responded to deteriorating physician-patient relationships by practicing defensive medicine (He, 2014), which could further undermine public trust in healthcare professionals.

Other studies argue that patients are to blame for surging medical disputes. Firstly, scholars are often critical of the limited awareness most clients have of patient safety (Nie et al., 2013). Additionally, most Chinese patients lack an adequate level of health literacy. According to a report released by national health authorities, Chinese residents' overall health literacy rate was 9.48% in 2013, which means that fewer than 10 out of 100 people possess basic knowledge of medicine (National Health and Family Planning Commission, 2014). Insufficient patient health literacy is likely to invoke unrealistic expectations for doctors (Hu and Zhang, 2015; Nutbeam, 2000), which can turn into animosity and desperation if expectations are not met. When dissatisfied and indignant patients confront exhausted and impatient doctors, the likelihood of conflicts increases.

For the causes of medical disputes, existing discussions heavily weighted the supply- and demand-side factors. However, we posit that an important factor has currently been overlooked. In China, the government plays an important role in settling medical disputes. Utilizing in-depth interviews, Chen and Zhang (2019) reveal that the Chinese government decides whether and how to intervene in a medical dispute based on an evaluation of the nature of disputes and the influence of patients. When patients show signs of a strong capacity to create chaos, the nature of a medical dispute becomes less important, and the government will simply invest more administrative and financial resources into resolving the dispute. Lee and Zhang (2013) identified protest bargaining as one of the three micro-foundations of Chinese authoritarianism. The strategy of "buying stability" is frequently employed to pacify aggrieved citizens. This line of argument suggests that the Chinese government is strategic in addressing disputes, with the most attention being drawn to cases that concern the government. However, this practice may produce negative effects. As Zhang and Cai (2018) put it, "the accommodation of citizens' demands—especially unreasonable ones—may raise citizens' expectations of more government intervention in the future." This article aims to explore the role of government intervention in dispute resolution. More specifically, we examine whether disruptive behaviors are associated with dispute outcomes, and if so, how government intervention mediates such a relationship.

## 3. Materials and methods

### 3.1. Data source

Z city, alias in this paper due to privacy agreements, is a metropolitan city and is considered one of the medical centers in China. Our dataset was derived from an official survey conducted by Z city's Bureau of Health in 2014. In China, healthcare providers are required

to report every case of hospital violence to the local health bureau. Structured questionnaires were sent out to all hospitals within Z city's jurisdiction, except for those that are military-owned. The Department of Medical Services, a hospital body in charge of resolving medical disputes, is responsible for reporting information about medical disputes to the local health bureau. The questions covered the incidences and resulting settlements for hospital violence that took place from 2012 to 2013. Quantitative information collected from the survey was extracted as the variables, including outcome (whether paid or not, and if so, the amount of compensation), claimed amount of compensation, the stability pressure, and the involvement of professional protestors. The text information describing the process of medical disputes was coded to generate the number of participants, duration of the protest, hospital administrative rank, and the treatment outcome (whether the patient died or not). Also, we coded different disruptive behaviors to produce a bar plot showing the frequency distribution of patients' disruptive behaviors. In the interest of patient privacy, information on patients' identities and medical expenditures were not available in the dataset. The coding scheme is available upon request.

Generalizability is a big challenge in this study. Admittedly, the data on hospital violence drawn from Z city is not a random sample of the population involved in China's medical disputes. It should be noted that when studying hospital violence, it is almost impossible to obtain the sampling frame at the national level (Hall et al., 2018). Most existing studies on hospital violence tend to collect data either by surveying healthcare practitioners (Wu et al., 2014; Jiao et al., 2015; Xing et al., 2016; Sun et al., 2017a, 2017b), by conducting in-depth interviews (Cai et al., 2011; Chen and Zhang, 2019), or by coding hospital violence cases covered by the media (Pan et al., 2015; Yao et al., 2017). This study, in contrast, utilizes a new source of data—government archived data obtained through administrative surveys.

The data used in this study had several advantages over the sources mentioned above. First, as of 2018, Z city is a populous metropolitan city with over 10 million residents, and it is also an important medical center with 269 hospitals. With such a huge population base and rich medical resources, we anticipate that hospital violence common in other areas is very likely to occur in Z city as well. Second, due to administrative regulations, the hospital violence survey conducted by the local health bureau was theoretically able to capture most medical disputes. Although minor disputes (e.g., squabbles) may be overlooked in the surveys, the resulting dataset can avoid the selection bias that is inevitable when collecting hospital violence cases through media reports. Additionally, the dataset under investigation can be fairly representative of Chinese metropolitan cities, even if it fails to represent the entire country. Third, the Chinese political system is characterized by a similar institutional structure across geographic areas and hierarchical levels. Hence, the logic of governing reflected in this study will likely apply to other large cities. More specifically, although the dataset under investigation is not a nationally representative sample, it does provide rich and relatively verifiable information regarding China's hospital violence in general. By examining hospital violence in Z city, we can map the landscape of patient-physician conflicts in the metropolitan context of China.

## 3.2. Measures

### 3.2.1. Outcome variables

We focus on two types of outcomes: (1) whether or not a protest resulted in a compensation award, and (2) the compensation amount if awarded. The first outcome, *paid or not paid*, is a binary variable, with 1 indicating that an incidence resulted in financial gains and 0 indicating that it did not. The second outcome, *amount of compensation awarded*, is a continuous variable derived from hospital reports on how much patients were paid in each case. In both of the two outcome variables, there are 22 observations with missing values because the medical disputes were still ongoing when the hospital violence survey was

conducted. If listwise deletion had been used, whereby observations with missing data for any variable in the models were deleted, we would have eliminated over 10% of the 225 cases in our analysis. Because listwise deletion may result in biased results if missing values are not missing in a completely random manner, we imputed these missing values with the average amount of compensation and recoded the first outcome variable accordingly. The robustness check in the appendix confirms the soundness of our analysis approach to missing values, although the statistical significance is affected.

### 3.2.2. Predictors

We focused on the extent of disruptive behaviors, which are measured through two indicators: (1) The *number of protest participants*. Chen (2009) reveals that the *xinfa* bureau (*xinfaqban*), a Chinese government agency specializing in addressing civil petitions, is sensitive to the number of petitioners, defining petitions involving over 5 participants as collective petitions and enacting special procedures to address petitions with over 100 participants. We hypothesize that the greater the number of people attending a protest, the higher the likelihood that protestors will be compensated and the higher the award amount is likely to be. The logic behind this hypothesis is that the number of participants is positively correlated with the pressure exerted on hospitals (Chen and Zhang, 2019). (2) The *length of protest*. We hypothesize that the longer the protest lasts, the better chance protestors have of receiving compensation and the greater the restitution. This hypothesis follows a similar logic to the first hypothesis because the length of protest can also influence hospital operation. Smaller ongoing or daily protests may cause more trouble for hospitals than a massive but rare protest. To maintain medical order, hospitals may make concessions and award a payment.

**Hypothesis 1.** Both the number of protest participants and the length of a protest are positively correlated with the two outcomes of compensation being awarded and the amount of compensation awarded.

We also considered the role of government involvement. Hospital violence sometimes can involve a large number of participants or last a long time. Cai (2010) points out three factors that make state involvement more likely, including casualties from the resistance, media exposure, and the number of participants. While the number of people indicates the scope of resentment and the potentially disruptive consequences, the duration of a protest may be associated with the likelihood of media coverage. Therefore, we anticipate that both the number of participants and the duration of protest will predict the probability of the state involvement.

In the questionnaire, interviewees indicated whether or not they paid perpetrators to assist with stability maintenance. We use this piece of information to generate the *state involvement* variable. In analyzing hospital violence cases with detailed information on dispute resolution, we identified various government agencies, including the local health bureau, arbitration bureau, police station (*paichusuo*), stability maintenance office (*weibenban*), comprehensive governance office (*zongzhiban*), emergency management office (*yingjiban*), etc. We use the state involvement to refer to the intervention of those agencies. Thus, *state involvement*, a binary variable, was used to examine the mechanism through which the compensation for a medical dispute emerges. We linked state involvement to the two key independent variables.

**Hypothesis 2.** Both the number of protest participants and the length of a protest are positively correlated with the likelihood of state involvement.

### 3.2.3. Control variables

We included a set of controls: (1) *Death*. This binary variable indicates whether a patient died in a case. The loss of a family member invokes an intense emotional reaction and, therefore, can lead to disruptive behaviors. (2) *Amount of claim*. This variable is used to control

for the anchoring effect. A claim not only reflects a patient's estimation of loss but also usually starts as the reference point for compensation in the ensuing negotiation. (3) *Hospital rank*. Chinese hospitals are classified into three ranks and 10 categories. Different ranks of the hospital have different medical resources and highly ranked hospitals are more likely to suffer violence than those of lower ranks. We ascertain each hospital's rank and separate them into four categories: primary, secondary, tertiary, and non-specified. (4) *Involvement of professional protestors*. Professional protestors, also called professional hospital violators (Xu, 2013) or Yi Nao in Chinese, are probably most identified with China, if not unique to China. Although sometimes equivalent to medical disputes (Zhang et al., 2017), Yi Nao refers to criminal gangs who cause trouble for and claim compensation from hospitals on behalf of patients in return for financial benefits (Hesketh et al., 2012). This variable is binary, with 1 indexing the presence of professional protestors and 0 indicating their absence. It is coded based on interviewees' judgments and is used to gauge the influence of professional protestors who may be considered of greater concern because of repeated experience interacting with hospitals.

### 3.3. Models

Conventionally, the logistic method has been widely used to model categorical variables. Our analysis includes two binary outcomes (*paid or not* and *state involvement*). The model formulation can be expressed as follows:

$$\ln\left(\frac{P(Y_i = 1)}{1 - P(Y_i = 1)}\right) = \beta_0 + \beta_1 \times \text{Participants} + \beta_2 \times \text{Duration} + Z_i \times X_i \quad (1)$$

In formula (1),  $P(Y_i = 1)$  refers to the probability that a patient is awarded compensation in a medical dispute. *Participants* and *Duration* are two key independent variables in the model, with the former denoting the number of participants and the latter representing the duration of a protest. The bold  $X_i$  represents a set of the aforementioned control variables, with subscript  $i$  indexing the number of observations.  $Z_i$  refers to a vector of parameters for  $X_i$ .

Our second outcome, *amount of compensation* awarded, is a continuous variable and thus should be analyzed using the ordinary least square method. Due to the non-normality of the outcome variable in terms of distribution, we took the logarithm of the dependent variable. In doing so, we could estimate a log-level model in which the dependent variable takes the logarithm while the independent variables do not. Therefore, the coefficient of an independent variable can be explained as the percentage change in the amount of compensation when there is a one-unit change in the independent variable. The regression results were expressed as percentages or odds ratios (the ratio of the probability of success to the probability of failure), with standard errors included.

## 4. Results

### 4.1. The landscape of hospital violence

The ten most frequently used forms of hospital violence are presented in Fig. 1, demonstrating the environment facing Chinese doctors. In almost half of the 225 cases, protestors assembled to place pressure on medical professionals. Gathering protestors and congregating can disrupt hospitals by creating an atmosphere of anxiety, which also can undermine a hospital's workflow and reputation. A physical attack is the second most frequent form of disruptive behavior, present in over one third of cases. In the 76 cases involving a physical attack, 20% (15 cases) reported the presence of intoxicated individuals. The remaining forms of hospital violence have a lower frequency, which however should not be neglected. In almost 17% of those conflicts, medical

professionals were threatened by patients or their families. Abusive language against medical staff occurred in 13% of cases. Protestors also hung banners (15% of cases) and cried or made noises in hospitals (14% of cases). Some protestors reviled medical workers (almost 13% of cases), and others even took extreme measures such as blocking the hospital and assaulting department personnel (12% of cases) such as the ICUs and operation rooms, causing serious safety issues for other patients. In over 10% of the disputes, protestors held funerals in hospitals by, for instance, wearing mourning attire or setting up a mourning hall.

Table 1 presents the descriptive statistics of variables. When it comes to the number of protest participants, the median is 6.5 (because the middle two numbers are 6 and 7 respectively), with a maximum of 300. Three days is the median length of protest, with an extreme case exceeding one year (370 days). The median of protestors' claims was 19,096.80 USD, with a maximum of 806,451.60 USD. In 53% of 202 cases, hospitals were under government pressure to maintain social stability. Over 20% of 209 identifiable cases were perceived to include the involvement of professional protestors. In almost 43% (42.6%) of the cases, patients were deceased, which may account for the intensity of disruptive behaviors. Almost half of the cases happened in secondary hospitals.

With regard to outcomes, almost 62% of all cases ended with some form of compensation, suggesting a relatively high probability of getting compensation. The median amount of compensation was 1612.90 USD, and the maximum payment was 206,451.60 USD. The median discount rate, which is the ratio of payment to claim, was 15%, suggesting that protestors could be awarded 15% of their claimed amount if successful. Overall, the amount of compensation was not very appealing compared to their claimed compensation. We also conducted a chi-squared test between the two categorical variables: *paid or not* and *stability pressure*. The results demonstrated a strong and significant relationship between these two variables [Pearson's  $\chi^2(1) = 106.19$ ,  $p < .01$ ]. Approximately 88% of the cases under government pressure to maintain stability ended in compensation.

### 4.2. Who gets what?

The most interesting question addressed by this research is as follows: is the outcome of protest related to disruptive behaviors? Two multivariate regressions were conducted separately. The first was a logit regression, which used *paid or not* as an outcome. The second was an OLS regression, which used *amount of payment* as an outcome. We examined the relationship between the two outcomes and the number of protestors, the length of protest, and other factors.

As Table 2 shows, the two violence-related indicators are positively associated with payment. Other things being equal, a one-person increase in the number of participants is associated with an increase in the odds of compensation by 3.94% [i.e.,  $(1.0394-1)*100\%$ ]. The length of protest had a significant effect as well. All else being equal, if the protest lasted one day longer, the odds of being compensated increased by 1.03% [i.e.,  $(1.0103-1)*100\%$ ]. The pressure from the government to maintain social stability had both a positive and significant relationship with the outcome variables: holding other factors constant, when the government intervened in a dispute, the odds of winning a compensation were 24.58 times greater than when the government did not. This is a dramatic change and confirms the aforementioned chi-squared test results. As hypothesized, the death of a patient is associated with a higher probability of getting paid, and the involvement of professional protestors is associated with a tremendous increase in the likelihood of compensation. Specifically, if other factors are held constant, the odds of the family of the deceased being compensated are 3.14 times as likely as for those who are alive. There is no significant difference in the probability of compensation for hospitals with different administrative ranks.

Since the logit regression models a non-linear relationship, the

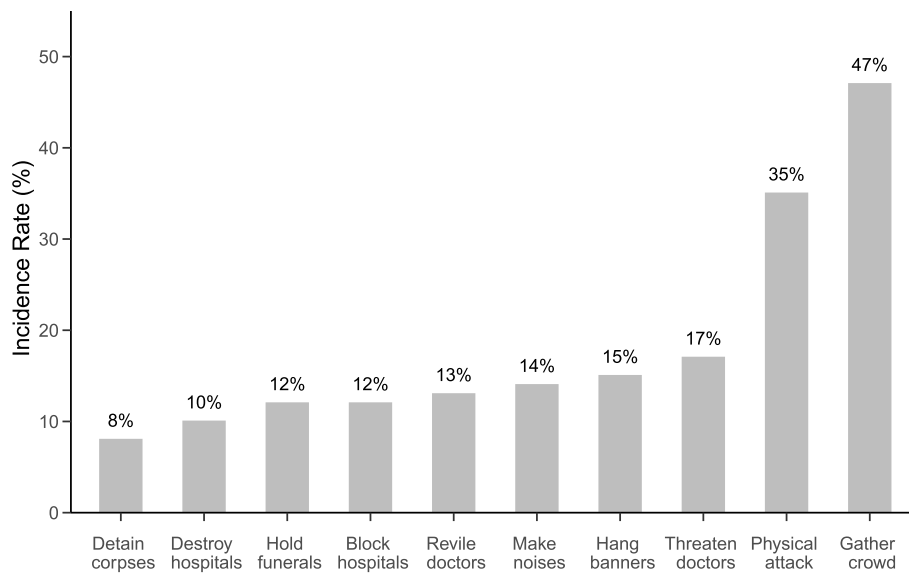


Fig. 1. The frequency distribution of patients' disruptive behaviors in 225 medical disputes in China's Z city (2012–2013).

Table 1  
The descriptive statistics of variables.

Variables	Medians/ Percentages	Standard Deviations	Min	Max	N
Participants (persons)	6.50	28.03	1	300	216
Duration (days)	3	48.61	1	370	219
Claim (1000 USD)	19.10	103.34	0	806.45	225
State involvement	52.97%		0	1	202
0 = no state involvement					
Professional	20.10%		0	1	209
0 = no professional protestor					
Death	42.60%		0	1	223
0 = no patient death					
Rank1 (primary)	12.05%		0	1	224
Rank2 (secondary)	48.66%		0	1	224
Rank3 (tertiary)	8.48%		0	1	224
0 = not ranked					
Paid or not	57.64%		0	1	203
0 = no compensation					
Compensation (1000 USD)	1.61	24.44	0	206.45	225
Discount rate	15%	0.27	0	1	148

Note: # in USD, converted based on the official currency exchange rate 6.20 in 2013 obtained from the World Bank (<https://data.worldbank.org/indicator/PA.NUS.FCRF>).

predicted probability can illustrate the net effect of a variable better than the marginal effects and odds ratios. Fixing other variables at their medians (because they are binary), the predicted probability of compensation was plotted in Fig. 2 based on the number of participants and length of protest. Although both of the two variables show a positive effect on the predicted probability of compensation, the number of participants was associated with a more rapid increase in compensation probability when participants increase from 0 to 50. The length of protest, in contrast, carries a much milder increase in the compensation probability. This figure suggests that, when controlling for other variables at their medians, China's hospitals are very likely to award compensation to patients ( $p > .65$ ), and the number of participants and length of protest make the probability greater.

If we look further into the determinants of the amount of compensation awarded, similar patterns were identified. As shown in Table 3, disruptive behaviors still have positive effects on the amount of compensation awarded. Controlling for other factors, a one-person increase

Table 2  
The logit regression on *paid or not*.

Variables	Adjusted Odds Ratios	Standard Errors
Number of participants	1.04*	(0.02)
Length of protest	1.01**	(0.005)
State involvement (Ref: 0 = no)	24.58***	(0.51)
Involvement of professional protestors (Ref: 0 = no)	10.72***	(1.13)
Patient death (Ref: 0 = no)	3.14*	(0.60)
Hospital rank (Ref: 0 = not ranked)		
Primary	0.59	(0.77)
Secondary	0.49	(0.62)
Tertiary	0.20	(1.40)
Intercept	0.12***	(0.63)
Log likelihood	-54.35	
N	179	

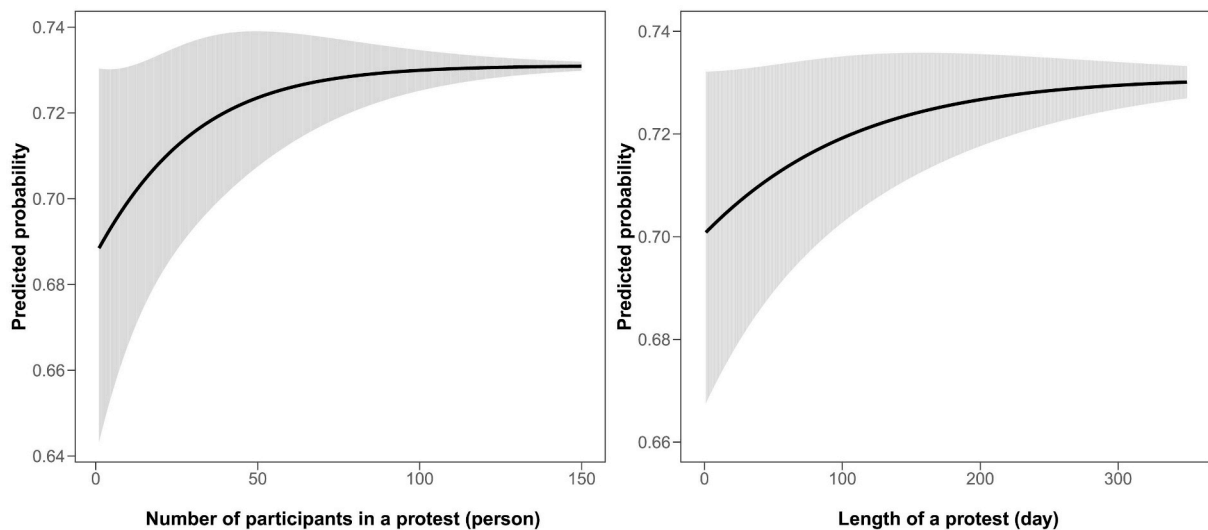
Note: \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ . The standard errors correspond to coefficients rather than odds ratios. All tests are two-tailed tests.

in the number of participants is associated with an increase in the final compensation by 2.37% ( $0.0237 \times 100\%$ , log-level model), and a one-day increase in the length of protest is associated with 0.93% higher compensation ( $0.0093 \times 100\%$ , log-level model). The effect of protest participants and protest lengths are both statistically significant at conventional significance levels.

Similar to the analysis of *paid or not paid*, the stability pressure has a sizable and significant effect on the amount of compensation. If the government intervened due to stability concerns, the awarded amount would be 3.16 times greater than if it did not. This suggests that governments do not only pressure hospitals to award compensation but also force them to settle at a higher level of compensation. Therefore, the state involvement gives leverage to protestors. We also found that the death of a patient and the involvement of protestors are related to higher payments. However, the effect of professional protestors is not statistically significant. Protestors' claims also have a positive relationship with the amount of compensation awarded (although the effect size is minor), which confirms the existence of anchoring effects.

#### 4.3. The role of the state involvement

With government pressure playing an important role in protest outcomes, the following question arises: when should the state



**Fig. 2.** The predicted probability of compensation based on the number of participants and length of protest in 225 medical disputes in China's Z city (2012–2013). Note: 95% confidence intervals are presented.

**Table 3**  
The OLS regression on the amount of payment.

Variables	Coefficients	Standard Errors
Number of participants	0.02**	(0.01)
Duration of protests	0.01***	(0.003)
Claimed compensation	0.001***	(0.0003)
State involvement (Ref: 0 = no)	3.16***	(0.33)
Involvement of professional protesters (Ref: 0 = no)	0.67	(0.46)
Patient death (Ref: 0 = no)	1.44***	(0.36)
Hospital rank (Ref: 0 = not ranked)		
Primary	-0.51	(0.51)
Secondary	-0.46	(0.37)
Tertiary	-0.65	(0.60)
Intercept	-3.91***	(0.38)
Adjusted R <sup>2</sup>	0.67	
N	179	

Note: \*p < .1; \*\*p < .05; \*\*\*p < .01. All tests are two-tailed tests.

intervene? Answers to this question will help explore the underlying mechanism of dispute settlements. In Table 4, it is shown that disruptive behaviors prove somewhat predictive of the state involvement. The state is more likely to place pressure on hospitals when more protesters are present and when the protest lasts for a longer period of time. Specifically, a one-person increase in the number of participants

**Table 4**  
The logit regression on state involvement.

Variables	Adjusted Odds Ratios	Standard Errors
Number of participants	1.02*	(0.01)
Length of protest	1.01	(0.003)
Involvement of professional protesters (Ref: 0 = no)	5.03***	(0.58)
Patient death (Ref: 0 = no)	1.44	(0.40)
Hospital rank (Ref: 0 = not ranked)		
Primary	1.97	(0.57)
Secondary	1.48	(0.42)
Tertiary	0.35	(0.80)
Intercept	0.38**	(0.41)
Log Likelihood	-103.23	
N	179	

Note: \*p < .1; \*\*p < .05; \*\*\*p < .01. The standard errors correspond to coefficients rather than odds ratios. All tests are two-tailed tests.

will be associated with an increase in the odds of the state involvement by 2.45% [i.e., (1.0245–1)\*100%]. Additionally, a one-day increase in the length of a protest will be associated with 0.50% higher odds of state involvement [i.e., (1.0050–1)\*100%]. Similar to the analysis of the payment amount, the effect of protest length is insignificant. As for professional protesters, they have a very significant and sizable effect on the probability of the state involvement. Other things being equal, the presence of professional protesters is associated with an increase in the odds of the state involvement by a factor of 5.03. Again, there is no significant difference in the probability of compensation among hospitals with different administrative ranks. Finally, although the death of patients appears to stimulate state involvement, from a statistical perspective, government agencies will intervene regardless of whether there has been a patient death.

### 5. Discussion

Safety in medicine is not merely a concern of patients. This article contributes to the literature by emphasizing an important but understudied aspect of safety issues in medicine: the safety of doctors. We delineated the forms and distribution of patients' disruptive behaviors, and thereby offered a picture of the work environment in which Chinese physicians sometimes have to operate. The various forms of hospital violence constitute a worldwide issue endangering doctors' safety, inducing defensive medicine, and harming patients' interests. Despite its critical importance, much remains to be explored regarding how hospital violence occurs, proceeds, and ends. Drawing on data on hospital violence from a Chinese city, our analysis demonstrates that Chinese doctors are facing various disruptive behaviors when involved in medical disputes. We mapped the mobbing and disruptive behaviors that occurred in nearly half of the 225 cases. Doctors were attacked in more than one-third of cases. Other disruptive behaviors included blocking hospitals and holding funerals. These behaviors exerted pressure on doctors, hospitals, and the government.

In addition to the descriptive analysis, we also attempted to reveal the relationship between disruptive behaviors and protest outcomes further. Regression results demonstrated that the extent of violence, measured by the number of participants and the duration of a protest, is positively associated with protest outcomes. Specifically, the higher the number of protest participants and the longer a medical dispute lasted, the more likely it was for protesters to be compensated and the greater the amount awarded. The crux in this relationship was the Chinese government, which tended to intervene in more violent protests and

press hospitals to appease riots with compensation. The government's sensitivity to mass incidents has given leverage to protestors, echoing the American proverb that "the squeaky wheel gets the grease." But this approach to dispute resolution breeds more violence in the future when protestors anticipate the preference of the government. Thus, the sensitivity to social instability becomes a weakness of strong state governance.

This research raises serious questions about the Chinese government's dispute resolution mechanisms. Although we did not examine the effects of hospital violence on doctors' behaviors, evidence shows that defensive medicine becomes prevalent and physicians tend to avoid high-risk patients when hospital violence occurs (He, 2014). Some doctors choose to quit and transfer to more lucrative positions, such as pharmaceutical marketing. Applications for medical schools declined in 2007 and 2012, although higher education, in general, is still expanding in China (National Health and Family Planning Commission, 2014). It threatens both the inflow and stock of health professionals. Some high-risk specialties face severe shortages of doctors. Data show that there is a hiring gap of 200,000 pediatricians across China (Hu et al., 2014). The State Committee on Health and Family Planning, the highest administrative body on healthcare in China before 2018, had to lower its standards for the qualification examination for pediatricians. Without effective intervention, Chinese physicians will continue to work under low morale.

What can we do to make a difference? Suggestions for change should include three stakeholders: the government, health professionals, and patients. First, the quick "paying for peace" solution encourages more conflict as it forms a destructive incentive structure. The government should cut the link between disruptive behaviors and protest outcomes. We suggest that the safety of medical staff should be guaranteed first and foremost and that the police department takes a stronger position on protesters (especially professional protesters), which may deter unreasonable riots. Medical disputes should be channeled into mechanisms that have third-party arbitrators (i.e., litigators and mediators), which may reduce the incidence and scale of violence. The Chinese government has widely promulgated administrative regulations to deal with medical disputes, with some documents stipulating a specific threshold, above which a medical dispute must not be settled through direct negotiations between the hospital and patients. With these efforts, the extreme forms of hospital violence revealed in this study have become increasingly infrequent in recent years.

Second, providers have much to do to improve patient safety and satisfaction as well as physician-patient communication. Quality control should be strengthened to reduce adverse events from which medical disputes originate. To align the incentives of each level within hospitals, quality and safety indicators can be incorporated in performance evaluation systems. As for physicians, their working hours should be curbed to reduce medical errors and improve patient satisfaction. Medical humanity course training should be enhanced in medical degree programs and continuing education. In particular, doctors shall be provided with training to improve their communication skills with patients.

Third, as for people, health education and the referral system should work together to manage the flow of patients. Improving public health literacy can adjust patient expectations to a more reasonable range. Health education may raise people's health awareness and promote the widespread adoption of healthy lifestyles. Meanwhile, improved primary healthcare services may help keep patients at a grass-root level, which will alleviate the heavy burden of tertiary hospitals.

Several limitations of this study warrant attention. First, official surveys may suffer from underreporting bias. Although health bureaus require providers to report each case of hospital violence, there is no strict definition of hospital violence. However, given the observation that in 34% of cases, patients did not claim compensation, we surmised that the survey had already captured many less serious disputes,

assuming that patients did not demand payment on the grounds of these lesser skirmishes. Second, we had no information regarding the actual medical errors committed in each case. Therefore, we could not determine whether the final compensation resulting from each protest bore legal merit or not. Third, the data utilized in this study were not perfect, and the nature of observational small sample surveys prevents us from making strong causal claims. We hope that an improved research design enabled by better quantitative data will be available in the future to examine this question in a more compelling manner.

## Declarations of interest

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## Author contribution statement

Junqiang LIU: Conceptualization, funding acquisition, writing - original draft preparation; Hui ZHOU: Methodology - data curation, software, writing - review and editing, especially finished the revised version; Lingrui LIU: Writing - Review and editing of the manuscript; Chunxiao WANG: Methodology - data collection.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2019.112717>.

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