

# A Questionnaire Based on A Sub-Regional Hierarchical Level Showed the Following: Application of Medical Accident Insurance is Suitable in Shanghai, China

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## Research Article

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## Abstract

**Background:** The application of medical accident insurance could not only cover parts of patients' property loss caused by non-medical negligence, but also reduce the risks of medical staff during medical services. However, the compensation mechanism for medical accidents is unsound in China.

**Methods:** In order to figure out the awareness and acceptance of the medical accident insurance in Shanghai medical institutions, medical staff and patients, a questionnaire survey was conducted. The feedback, which in total came from 22 medical institutions, 1,689 medical staff and 1,342 patients, was statistically analyzed by chi-square test.

**Results:** Only 22.72% of the 22 hospitals in this questionnaire survey purchased medical accident insurance. As a result, medical accident insurance only accounts for 3.13% of medical compensation, which was far lower than the negotiated compensation ratio (61.25%) and the medical liability insurance compensation ratio (14.38%). This may be due to the low awareness of medical accident insurance, and our survey also proves this phenomenon. In this survey, we find that only a small proportion (22.73%) of medical institutions purchase medical accident insurance. What is more unexpected is that the vast majorities of patients (50.00%) and medical workers (64.00%) have only heard of it and are not aware of it. Although nearly half of the patients (45.16%) and medical workers (58.26%) are willing to buy medical accident insurance, there were still some patients and medical workers who were uncertain (32.80% and 38.82%, respectively) or unwilling to buy it (8.94% and 16.02%, respectively). The reason is nothing more than that no benefits will occur while the cost is high. Among those willing to buy, the majority of the patients (58.19%) and medical workers (54.39%) only accept the amount of insurance less than RMB 200 yuan.

**Conclusions:** The acceptability and cognition of medical accident insurance in medical workers and patients are still at a low level in Shanghai. In addition, preliminary data from medical institutions purchasing medical accident insurance shows that the insurance can effectively reduce medical disputes and ease economic burden. To sum up, medical accident insurance has good application prospect and space in Shanghai, China.

## Background

Medicine is a high-risk practical science, because it usually combines with unpredictable and unpreventable medical accidents, the causes of which are very complex while the consequences are harmful. The losses caused by medical accidents, including physical injuries and economic depletion, patients and their families are difficult to face and bear, which would result in a strong emotional stress of patients as well as their family members[1, 2]. Eventually, the explanation of medical staff was unacceptable and the conflicts between doctors and patients would become more and more deteriorated[3]. Therefore, to decrease the losses and adverse social consequences caused by medical accidents, the current risk sharing mode in China is an insurance mechanism, which is also widely adopted by the international community[4]. In the current practice of China, the majority of medical insurance claims are only provided for injuries caused by medical fault, that is, medical liability insurance. However, only about 40% of medical disputes could be put down to medical liability [5, 6]. A considerable proportion of medical disputes can't be attributed to the responsibility of the medical party, which in most cases belongs to the medical accident [7, 8]. In fact, people understanding of medicine is also the tip of the iceberg, as Dr Trudeau said: To Cure Sometimes, To Relieve Often, To Comfort Always[9].

How to solve the medical accidental losses caused by a large proportion of non-medical faults during the medical therapeutic process has become an urgent problem in China. A complete medical risk insurance system shouldn't only include the medical liability insurance, should also include the medical accident insurance and medical personnel practice insurance[10]. Although the Chinese law has always encouraged the establishment of medical accident insurance, it is still blank or at the exploring stage in the most regions of China[11]. In China, voluntary or semi-compulsory insurance has been implemented in the transportation, tourism and other industries. For example, a certain amount of basic accident insurance is provided along with train or airline tickets. In addition, advanced accident insurance products with comprehensive insurance coverage are also provided to choose. The accident risk in the medical industry is not lower than that in the above-mentioned industries[12], therefore a corresponding medical accident insurance system should also be established, which could not only compensate the suffering of patients and their family from medical accident in time and provide economic basis for the follow-up treatment and rehabilitation, but also effectively alleviate the conflicts between doctors and patients[13].

As the largest and most developed city, Shanghai has most advanced medical resource, however, it is also the city with the largest number of medical accidents, which caused the high rate of doctor-patient disputes in China[14]. How to resolve the harmful consequences for both side of medical staff and patients and achieve medical safety by the establishment of constructing and perfecting insurance mechanism has become an important topic for the health administration departments and local governments. This paper intends to investigate the understanding and acceptance of medical accident insurance from 1689 medical managers and staff as well as 1342 patients in 22 secondary and above medical institutions, which may provide decision-making basis for the implementation of medical accident insurance policy in the next step.

## Methods

### Samples and data collection

This research is a data analysis research based on one stratified online questionnaire survey, which is mainly to investigate the cognition and attitude of related groups in the hospital towards medical accident insurance. The medical managers and staff as well as the corresponding patients from 22 secondary Grade and above medical institutions distributed in different regions of Shanghai were involved in the related groups and participated in our questionnaire survey. The study protocol was carried out in accordance with relevant guidelines and regulations.

The data on medical accident insurance from 1689 medical staff and 1342 patients were obtained. These data include the characteristics of the hospital (the hospital's location, level and accident insurance purchases), the demographic characteristics of the survey respondents (the gender, age, education, job title, per capita annual income, and department of the medical staff and patients), as well as the cognition and attitude of the relevant population towards the medical accident insurance (whether understand medical accident insurance, whether willing to purchase it, acceptable premiums, and the reasons why unwilling to purchase it.). The flow charts were described in Fig. 1.

## Data analysis

Statistical analysis was performed by chi-square test using SPSS18.0 software between different groups. Pie chart and histogram were made by GraphPad Prism 5 software. P value < 0.05 was considered statistically significant.

## Results

### Samples distribution in this questionnaire survey

To better understand the current doctor-patient relationship and the mechanisms by which hospitals respond to medical incidents, 22 medical institutions in Shanghai were randomly selected to conduct a questionnaire survey. Of which, 10 were secondary hospitals and 12 were tertiary hospitals (table.1). As shown in table 1, 22 hospitals were distributed in different regions of Shanghai, including 8 hospitals from urban, 10 from suburb and 4 from suburban combination. Meanwhile, in this questionnaire survey, we selected 1689 medical staff and 1342 patients to conduct questionnaires among different groups (table.1).

### Investigation on the occurrence of medical malpractice and the way of compensation

Following, we did a survey on the current situation of medical disputes in those 22 hospitals. The results of the questionnaire survey showed that 9.47% of the surveyed medical staff had personally experienced medical disputes (Fig.2A). As for medical accidents, 3.61% of medical staff had ever had one (Fig.2B). In case a medical accident happens, the main way of compensation is the negotiation between doctor and patient, accounting for 61.24%, followed by the medical liability insurance, accounting for 14.38%. Surprisingly, only 3.13% of the compensation events were covered by medical accident insurance (Fig.2C).

### Investigation on the purchase of medical accident insurance

In view of the low proportion of medical accident insurance in medical accident compensation, we investigated the purchase of medical accident insurance in 22 hospitals. The results revealed that only five (22.73%) institutions had purchased medical accident insurance among the 22 hospitals surveyed in this survey (Fig.3A). Regarding the insured, two (40.00%) of them covered all employees of the hospitals, two (40.00%) covered only medical staff, and one (20.00%) covered only nurses (Fig.3B). As for the source of insurance premiums, three (60.00%) of them were borne by the hospital and medical staff in a certain proportion, one (20.00%) was borne by the hospital, and the other (20.00%) was borne by the medical staff (Fig.3C). Among the institution not purchasing medical accident insurance, 10 were willing to purchase in the future. Among them, five (50.00%) were willing to cover all medical staff, three (30.00%) were willing to cover only the medical staff in high-risk departments, and two (20.00%) were willing to cover all employees in the hospital (Fig.3D). In terms of the source of funds, five hospitals (50.00%) thought that the hospital and medical staff could share in a certain proportion, three hospitals (30.00%) thought that both doctors and patients could share in a certain proportion, one hospital (10.00%) hoped that the medical staff would bear it personally and one hospital (10.00%) thought that the patients would bear it personally (Fig.3E). From the perspective of the benefits rooting in promoting and implementing of medical accident insurance, 15 hospitals believed that medical accident insurance could help to reduce medical disputes, 14 hospitals believed that medical accident insurance could help to guide patients to carefully choose treatment methods, and 11 believed that the financial risks caused by surgical accidents could be transferred (Fig.3F).

### Investigation on cognition of medical accident insurance

From the above survey, we knew that the rate of the purchase and application of medical accident insurance was very low under the existing circumstances. Therefore, we conducted another survey on the attitude of the doctor-patient relationship and the cognition of medical accident insurance among medical staff and patients.

For the doctor-patient relationship, a small number (24.63%) of medical workers thought that it was very harmonious, nearly half of them think it is relatively harmonious, accounting for 48.02%, and 20.67% thought it was tense (Fig.4A). However, in patients, the vast majority thought that the doctor-patient relationship was harmonious, accounting for 77.87%, and only 1.94% of the patients thought that it was disharmonious (Fig.4A). In the hierarchical analysis of demography, statistical significance ( $P < 0.05$ ) were presented between cognition of doctor-patient relationship and most parameters, such as age, education background, professional title and department of the medical staff, whether in medical staff or patients (table 2).

Regarding the degree in understanding the medical accident insurance, only 21.85% of the medical staff knew it, 64.00% heard of it only without knowing the specifics, and 14.15% had never heard of it. Among patients, the proportion of patients who understand medical accident insurance was slightly higher than that of medical staff, accounting for 33.98% (Fig.4B). In addition, there was a statistical significance in the perceptions of medical accident insurance between medical staff and patients ( $P < 0.001$ ). In the hierarchical analysis of demography, statistical significance ( $P < 0.05$ ) were presented between the degree of understanding the medical accident insurance and merely some parameters, such as gender, age and professional title in medical staff, as well as hospital area, education background and annual per capita income in patients (table 3).

Subsequently, we analyzed the willingness of people to purchase medical accident insurance in both medical staff and patients. The results showed that 58.26% of medical staff was willing to buy, 32.80% were uncertain, and 8.94% were unwilling to buy (Fig.4C). Among those who were unwilling to buy, 37.75%

thought that it was of little significance to alleviate medical disputes, 33.77% had no purchase awareness, and 18.54% thought that the cost was too high (Fig.4D). Among the patients, 45.16% were willing to buy, 16.02% were unwilling, and 38.82% were not sure whether to buy (Fig.4C). Among the patients who were unwilling to purchase, 36.74% had no purchase awareness, 20.00% said that there were not many actual benefits to them after purchasing, and not knowing how to buy and thinking that the cost is too high accounted for 17.21%, respectively (Fig.4D). In addition, there was a statistical significance in the willingness of people to purchase medical accident insurance between medical staff and patients ( $P < 0.001$ ). In the hierarchical analysis of demography, statistical significance ( $P < 0.05$ ) were presented between the willingness of people to purchase medical accident insurance and most parameters, such as gender, age, education background, professional title / annual per capita income and department of the medical staff, whether in medical staff or patients (table 4).

As some respondents thought that the purchase cost of medical accident insurance was too high, we set five levels of payment amount and analyzed their acceptance. The results showed that 30.75% accepted below 100 yuan, 27.44% accepted 100-200 yuan, 16.38% accepted 200-300 yuan, 15.02% accepted 300-500 yuan, and 10.40% accepted 500 yuan or more among medical workers (Fig.4E). In patients, it was similar to medical staff, accounting for 27.42%, 26.97%, 15.71%, 17.13%, 12.78% respectively (Fig.4E). Hence, no statistical significance was established in the amount of contributions acceptable for medical accident insurance between medical staff and patients ( $P = 0.102$ ). In the hierarchical analysis of demography, statistical significance ( $P < 0.05$ ) were presented between the amount of contributions acceptable for medical accident insurance and some parameters, such as gender, education background and professional title in medical staff, as well as hospital area, education background and annual per capita income in patients (table5).

## Discussion

### Medical accidents are objective and prone to serious consequences

Medical accident represents an objective adverse consequence, which is caused by current limitations of medicine technology and some unpredictable and unpreventable status of patients' body or disease[10, 15]. At the same time, medicine science is a sophisticated discipline that integrates check-up, diagnosis, therapy, and recovery, which combines with multivariate and complex uncertain factors[16]. Therefore, the reasons causing medical accidents could be pathological, psychological and environmental factors, individual differences in patients, side effects of medication and surgical treatment, restrictions on the level of medical development, clinical experience of medical staff, and so on[17]. Because of these reasons, it is not surprising that medical accidents are still difficult to be predicted and prevented, even under mature and advanced diagnosis and treatment technology in the future.

The direct adverse consequences of medical accidents usually are physical injuries of patients and different degrees of economic losses. However, serious medical accidents would further tend to result in psychological pressures for both patients and their family members[17]. Importantly, no matter direct or indirect consequences of medical accidents, both are hard to be accepted and born by patients and their families, particularly when they were explained there was no direct fault and responsibility of medical staff, which in fact really happened within medical accidents[18, 19]. As a result, in order to get compensation, the patients can only emphasize the fault of the medical behaviors and, which leads to the deterioration of the doctor-patient relationship. To sum up, it is urgent to build up one high-efficiency compensation mechanism for medical accidents in China, which could protect corresponding patients and medical staff without medical negligence, and greatly ease the contradiction between doctors and patients[20].

### The applications of insurance mechanism of medical accidents worldwide

Insurance has an extraordinary meaning to resolve and resist risks. The development of medical insurance, such as medical accident insurance, not only satisfies with demands of the medical and insurance markets, but also meets the needs of social development. Using of medical accident insurance could largely bear the economic losses caused by medical accidents[21]. In addition, the promulgation of relevant laws has provided a legal basis for handling medical accidents. In 1972, New Zealand promulgated an accident compensation law, which stipulates that patients suffering medical accidents could obtain compensation from the accident compensation committee established by the state without the need to sue the court or the tort liability law[22]. Sweden established the patient compensation insurance system in 1975[23]. In this system, if patients suffered injury while seeking medical care in a public hospital, the insurance would compensate the patient regardless of the negligence of the medical personnel or the medical institution. In 2002, France promulgated the "Patient Rights and Health System Quality Law", stipulating medical accidents caused by pure medical risks, such as nosocomial infections, no-fault blood transfusions, anesthesia accidents, etc., are compensated by the medical accident compensation fund established by the state[24] [1].

However, in China, no unified medical accident compensation system has yet been formed guided by the nation, even in the medical accident insurance industry itself [20]. It was exciting that somewhere in China had made preliminary attempts to provide financial assistance for no-fault medical malpractice. Such as, Zhenjiang municipal government of Jiangsu Province had passed the "no fault medical damage relief measures of Zhenjiang City" in 2014, which stipulated that a certain amount of economic assistance would be given to patients who suffered serious consequences of medical accidents [25]. This was the first no fault medical injury relief system funded by local government in China, but it was not to adopt insurance mechanism and has no sustainability.

### It is difficult for policies and laws to fundamentally promote the development of medical accident insurance

The establishment of medical accident insurance system would free the medical institutions from complicated medical disputes and avoid paying huge compensation, which could concentrate their energy and financial resources promoting the healthy development of medical and health services[26]. On the other hand, patients suffered medical accidents could be provided material basis for the follow-up treatment and recovery via insurance compensation, which would effectively alleviate the contradiction between doctors and patients[27]. In view of this, a number of policies have been successively formulated by the state. For example, the "Regulations on the Prevention and Treatment of Medical Disputes" and "Measures for the Protection of the Rights and Interests of Medical and Health Personnel in Shanghai" respectively implemented in 2018 and 2021 both have provisions in the medical risk sharing clauses, which encourage patients to participate in medical accident insurance[20, 28]. However, there is still no supporting implementation strategy to carry out these

existing policies and laws in China. Therefore, medical accident insurance products have not fully entered into medical institutions and the original intention of guaranteeing medical accident is difficult to be fulfilled. Medical insurance which should have been popular is difficult to popularize.

In the present survey, only a few hospitals believe that medical accident insurance contribute to reduce medical disputes and alleviate the financial risks caused by medical accidents. The majority of the medical staff and patients involved in this questionnaire survey do not fundamentally realize the role and significance of medical accident insurance in handling medical accidents. In addition, the propaganda and popularization of medical accident insurance was underestimated by the hospital and patients. Therefore, what urgently needs to be solved in the next step is to increase the publicity and the awareness of medical accident insurance among medical staff and patients, which would help to understand the role and importance of medical accident insurance, thus promoting medical safety and building doctor-patient harmony.

Meanwhile, the development model of medical accident insurance is still in the exploratory stage. In view of this, the inclusive medical insurance products—HuHuiBao, an exclusive inclusive commercial supplementary health insurance for the public, launched in Shanghai in 2021<sup>[10]</sup> which can be used as a reference. It is specially developed for Shanghai Medical Insurance participants, and the government departments unify the premium standard, treatment standard and coverage, in order to meet the multi-level medical needs of citizens and realize the effective connection between social medical insurance and commercial health insurance. As a supplement to medical liability insurance, medical accident insurance can reduce the loss which is not due to the medical negligence. It can be linked to medical liability insurance through effective guidance and active promotion by the government, which can benefit all patients and improve the medical risk sharing mechanism.

## Conclusions

This research is carried out for the first time in the form of a questionnaire in diverse regions and hierarchies, which finds out that the acceptability and the cognition of medical accident insurance in medical workers and patients are still at a low level in Shanghai. Hence, it is necessary to strengthen the publicity of medical accident insurance, expand people's cognition of medical accident insurance, and make it better serve for the medical cause. In addition, preliminary data from medical institutions purchasing medical accident insurance shows that the insurance can effectively reduce medical disputes and ease economic burden. To sum up, medical accident insurance has good application prospect and space in Shanghai, China.

## Declarations

### Ethics approval and consent to participate

Ethics approval of the study protocol was granted by the Human Research Ethics Committee of Fudan University. The study protocol was carried out in accordance with relevant guidelines and regulations. All of the survey participants provided written informed consent prior to survey completion.

### Consent for publication

Not Applicable

### Availability of data and material

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

### Competing interests

All authors declare no conflicts of interest.

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### Authors' contributions

Both authors contributed to the study design. LW was responsible for data acquisition. GC analysed and interpreted the data. LW drafted the manuscript, and GC contributed to its revision. Both authors read and approved the final manuscript.

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## Tables

Table 1. Distribution of hospitals participated in the survey in Shanghai

Parameter		Hospital		Interviewee			
				Medical staff		Patient	
		N	%	N	%	N	%
Hospital grade	III	12	54.55	932	55.18	806	60.06
	II	10	45.45	757	44.82	536	39.94
Area	urban	8	36.37	769	45.53	716	53.35
	Suburb	10	45.45	790	46.77	519	38.68
	Suburban combination	4	18.18	130	7.70	107	7.97
Total		22	100	1689	100	1342	100

Table 2. Attitudes towards the doctor-patient relationship between medical staff and patient

parameter	Medical staff				statistics	Patient				statistic
	Harmony	General	Disharmony	Unclear		Harmony	General	Disharmony	Unclear	
	N(%)	N(%)	N(%)	N(%)		N(%)	N(%)	N(%)	N(%)	
Area										
suburban combination	26(20.00)	63(48.46)	31(23.85)	10(7.69)	$\chi^2=16.715$	79(73.83)	26(24.30)	1(0.93)	1(0.93)	$\chi^2=3.3$
suburb	170(21.52)	383(48.48)	181(22.91)	56(7.09)	P=0.033	412(79.38)	91(17.53)	11(2.12)	5(0.96)	P=0.76
urban	220(28.61)	365(47.46)	137(17.81)	47(6.11)		554(77.37)	141(19.69)	14(1.96)	7(0.98)	
Gender										
male	71(17.75)	183(45.75)	127(31.75)	19(4.75)	$\chi^2=45.276$	388(80.33)	86(17.81)	6(1.24)	3(0.62)	$\chi^2=4.2$
female	345(26.76)	628(48.72)	222(17.22)	94(7.29)	P< 0.001	657(76.48)	172(20.02)	20(2.33)	10(1.16)	P=0.24
Age										
18-30	124(38.39)	150(46.44)	32(9.91)	17(5.26)	$\chi^2=87.621$	211(72.76)	71(24.48)	5(1.72)	3(1.03)	$\chi^2=23.1$
31-45	181(24.04)	381(50.60)	137(18.19)	54(7.17)	P < 0.001	519(77.69)	124(18.56)	19(2.84)	6(0.91)	P=0.02
46-60	80(19.09)	193(46.06)	122(29.11)	24(5.73)		148(79.14)	36(19.25)	2(1.07)	1(0.53)	
> 61	31(15.98)	87(44.85)	58(29.90)	18(9.28)		167(84.77)	27(13.71)	0(0.00)	3(1.52)	
Education										
postgraduate	56(16.47)	165(48.53)	97(28.53)	22(6.47)	$\chi^2=60.312$	41(70.69)	12(20.69)	5(8.62)	0(0.00)	$\chi^2=46.1$
undergraduate	186(22.55)	402(48.73)	183(22.18)	54(6.55)	P < 0.001	471(72.35)	157(24.12)	16(2.46)	7(1.08)	P < 0.001
short-cycle Courses	163(33.33)	226(46.22)	67(13.70)	33(6.75)		263(80.92)	55(16.92)	3(0.92)	4(1.23)	
short-cycle Courses and Under	11(31.43)	18(51.43)	2(5.71)	4(11.43)		270(87.66)	34(11.04)	2(0.65)	2(0.65)	
Title*/Income**										
professor/> 10	4(18.18)	11(50.00)	6(27.27)	1(4.55)	$\chi^2=102.767$	173(74.89)	49(21.21)	9(3.90)	0(0.00)	$\chi^2=23.1$
associate professor /5.1-10	15(12.61)	46(38.66)	46(38.65)	12(10.08)	P < 0.001	341(76.12)	97(21.65)	5(1.12)	5(1.12)	P=0.02
middle title /3.1-5	99(18.00)	258(46.91)	155(28.18)	38(6.91)		245(82.49)	45(15.15)	3(1.01)	4(1.35)	
primary/1.1-3	214(28.19)	377(49.67)	122(16.08)	46(6.06)		155(83.33)	27(14.52)	3(1.61)	1(0.54)	
no title/0-1	84(35.15)	119(49.79)	20(8.37)	16(6.69)		131(72.78)	40(22.22)	6(3.33)	3(1.67)	
Departments										
obstetrics-Gynecology	98(21.12)	226(48.71)	104(22.41)	36(7.76)	$\chi^2=31.197$	242(77.32)	63(20.13)	5(1.60)	3(0.96)	$\chi^2=18.1$
orthopedics	60(22.22)	131(48.52)	66(24.45)	13(4.81)	P=0.013	203(77.19)	54(20.53)	3(1.14)	3(1.14)	P=0.11
General surgery	132(25.34)	249(47.79)	107(20.54)	33(6.33)		321(74.31)	93(21.53)	13(3.01)	5(1.16)	
neurosurgery	91(33.33)	116(42.49)	47(17.22)	19(6.96)		163(84.02)	30(15.46)	0(0.00)	1(0.52)	
Cardio-Thoracic Surgery	35(21.74)	89(55.28)	25(15.53)	12(7.45)		116(82.86)	18(12.86)	5(3.57)	1(0.71)	
Total	416(24.63)	811(48.02)	349(20.66)	113(6.69)		1045(77.87)	258(19.23)	26(1.94)	13(0.97)	

\* represent professional title in medical staff

\*\*represent annual per capita income in patients

Table 3. Knowledge of medical accident insurance between medical staff and patient

parameter	Medical staff			statistics	Patient			statistics
	Understand	Heard	Unknown		Understand	Heard	Unknown	
	N(%)	N(%)	N(%)		N(%)	N(%)	N(%)	
Area								
suburban combination	32(24.62)	79(60.77)	19(14.62)	$\chi^2=2.279$	27(25.23)	51(47.66)	29(27.10)	$\chi^2=19.864$
suburb	172(21.77)	515(65.19)	103(13.04)	P=0.685	158(30.44)	283(54.53)	78(15.03)	P=0.001
urban	165(21.46)	487(63.33)	117(15.21)		271(37.85)	337(47.07)	108(15.08)	
Gender								
male	94(23.50)	272(68.00)	34(8.50)	$\chi^2=13.79$	150(31.06)	250(51.76)	83(17.18)	$\chi^2=3.003$
female	275(21.33)	809(62.76)	205(15.90)	P=0.001	306(35.62)	421(49.01)	132(15.37)	P=0.223
Age								
18-30	76(23.53)	197(60.99)	50(15.48)	$\chi^2=17.521$	99(34.14)	151(52.07)	40(13.79)	$\chi^2=8.218$
31-45	140(18.59)	488(64.81)	125(16.60)	P=0.008	224(33.53)	345(51.65)	99(14.82)	P=0.412
46-60	107(25.54)	271(64.68)	41(9.79)		61(32.62)	88(47.06)	38(20.32)	
> 61	46(23.71)	125(64.43)	23(11.86)		72(36.55)	87(44.16)	38(19.29)	
Education								
postgraduate	70(20.59)	231(67.94)	39(11.47)	$\chi^2=12.222$	28(48.28)	25(43.10)	5(8.62)	$\chi^2=25.23$
undergraduate	166(20.12)	543(65.82)	116(14.06)	P=0.142	243(37.33)	327(50.23)	81(12.44)	P<0.001
short-cycle Courses	123(25.15)	289(59.10)	77(15.75)		93(28.62)	165(50.77)	67(20.62)	
short-cycle Courses and Under	10(28.57)	18(51.43)	7(20.00)		92(29.87)	154(50.00)	62(20.13)	
Title*/Income**								
professor/> 10	8(36.36)	13(59.09)	1(4.55)	$\chi^2=16.427$	96(41.56)	113(48.92)	22(9.52)	$\chi^2=16.33$
associate professor /5.1-10	28(23.53)	79(66.39)	12(10.08)	P=0.037	149(33.26)	225(50.22)	74(16.52)	P=0.038
middle title /3.1-5	130(23.64)	360(65.45)	60(10.91)		97(32.66)	149(50.17)	51(17.17)	
primary/1.1-3	151(19.89)	483(63.64)	125(16.47)		55(29.57)	90(48.39)	41(22.04)	
no title/0-1	52(21.76)	146(61.09)	41(17.15)		59(32.78)	94(52.22)	27(15.00)	
Departments								
obstetrics-Gynecology	84(18.10)	310(66.81)	70(15.09)	$\chi^2=10.142$	108(34.50)	145(46.33)	60(19.17)	$\chi^2=11.919$
orthopedics	62(22.96)	179(66.30)	29(10.74)	P=0.255	102(38.78)	127(48.29)	34(12.93)	P=0.155
General surgery	113(21.69)	331(63.53)	77(14.78)		143(33.10)	229(53.01)	60(13.89)	
neurosurgery	70(25.64)	164(60.07)	39(14.29)		57(29.38)	104(53.61)	33(17.01)	
Cardio-Thoracic Surgery	40(24.84)	97(60.25)	24(14.91)		46(32.86)	66(47.14)	28(20.00)	
Total	369(21.85)	1081(64.00)	239(14.15)		456(33.98)	671(50.00)	215(16.02)	

\* represent professional title in medical staff

\*\*represent annual per capita income in patients

Table 4. Intention to purchase medical accident insurance between medical staff and patient



parameter	Medical staff			statistics	Patient			statistics
	Willingness	Unwillingness	Uncertainty		Willingness	UnwillingnessN(%)	Uncertainty	
	N(%)	N(%)	N(%)		N(%)		N(%)	
Area								
suburban combination	75(57.69)	45(34.62)	10(7.69)	χ²=9.631	43(40.19)	22(20.56)	42(39.25)	χ²=3.46
suburb	487(61.65)	230(29.11)	73(9.24)	P=0.047	229(44.12)	79(15.22)	211(40.66)	P=0.484
urban	422(54.88)	279(36.28)	68(8.84)		334(46.65)	114(15.92)	268(37.43)	
Gender								
male	283(70.75)	88(22.00)	29(7.25)	χ²=34.351	197(40.79)	84(17.39)	202(41.82)	χ²=5.824
female	701(54.38)	466(36.15)	122(9.46)	P < 0.001	409(47.61)	131(15.25)	319(37.14)	P=0.054
Age								
18-30	165(51.08)	127(39.32)	31(9.60)	χ²=51.49	154(53.10)	32(11.03)	104(35.86)	χ²=27.52
31-45	396(52.59)	274(36.39)	83(11.02)	P < 0.001	296(44.31)	108(16.17)	264(39.52)	P=0.001
46-60	300(71.60)	94(22.43)	25(5.97)		79(42.25)	26(13.90)	82(43.85)	
> 61	123(63.40)	59(30.41)	12(6.19)		77(39.09)	49(24.87)	71(36.04)	
Education								
postgraduate	239(70.29)	83(24.41)	18(5.30)	χ²=53.755	32(55.17)	6(10.34)	20(34.48)	χ²=35.776
undergraduate	497(60.24)	251(30.42)	77(9.33)	P < 0.001	340(52.23)	91(13.98)	220(33.79)	P < 0.001
short-cycle Courses	234(47.85)	201(41.10)	54(11.04)		111(34.15)	60(18.46)	154(47.38)	
short-cycle Courses and Under	14(40.00)	19(54.29)	2(5.71)		123(39.94)	58(18.83)	127(41.23)	
Title*/Income**								
professor/> 10	15(68.18)	6(27.27)	1(4.55)	χ²=75.525	124(53.68)	26(11.26)	81(35.06)	χ²=21.628
associate professor /5.1-10	95(79.83)	20(16.81)	4(3.36)	P < 0.001	199(44.42)	74(16.52)	175(39.06)	P=0.006
middle title /3.1-5	371(67.45)	142(25.82)	37(6.73)		121(40.74)	48(16.16)	128(43.10)	
primary/1.1-3	396(52.17)	277(36.50)	86(11.33)		68(36.56)	36(19.35)	82(44.09)	
no title/0-1	107(44.77)	109(45.61)	23(9.62)		94(52.22)	31(17.22)	55(30.56)	
Departments								
obstetrics-Gynecology	270(58.19)	160(34.48)	34(7.33)	χ²=20.194	124(39.62)	49(15.65)	140(44.73)	χ²=17.054
orthopedics	177(65.56)	78(28.89)	15(5.56)	P=0.010	128(48.67)	43(16.35)	92(34.98)	P=0.030
General surgery	305(58.54)	155(29.75)	61(11.71)		200(46.30)	74(17.13)	158(36.57)	
neurosurgery	149(54.58)	101(37.00)	23(8.42)		99(51.03)	32(16.49)	63(32.47)	
Cardio-Thoracic Surgery	83(51.55)	60(37.27)	18(11.18)		55(39.29)	17(12.14)	68(48.57)	
Total	984(58.26)	554(32.80)	151(8.94)		606(45.16)	215(16.02)	521(38.82)	

\* represent professional title in medical staff

\*\*represent annual per capita income in patients

Table 5. The range of acceptable contributions for medical accident insurance between medical staff and patient

parameter	Medical staff					statistics	Patient			
	≤100	100-200	200-300	300-500	> 500		Harmony	General	Disharmony	Unclear
	N(%)	N(%)	N(%)	N(%)	N(%)		N(%)	N(%)	N(%)	N(%)
Area										
suburban combination	33(27.50)	36(30.00)	24(20.00)	15(12.50)	12(10.00)	χ <sup>2</sup> =4.447	23(27.06)	14(16.47)	11(12.94)	26(30.00)
suburb	226(31.52)	192(26.78)	119(16.60)	102(14.23)	78(10.88)	P=0.925	134(30.45)	116(26.36)	65(14.77)	70(15.42)
urban	214(30.53)	194(27.67)	109(15.55)	114(16.26)	70(9.99)		152(25.25)	174(28.90)	101(16.78)	97(16.27)
Gender										
male	89(23.99)	81(21.83)	67(18.06)	62(16.71)	72(19.41)	χ <sup>2</sup> =55.255	110(27.57)	109(27.32)	57(14.29)	71(17.31)
female	384(32.90)	341(29.22)	185(15.85)	169(14.48)	88(7.54)	P < 0.001	199(27.34)	195(26.79)	120(16.48)	122(16.93)
Age										
18-30	90(30.82)	86(29.45)	43(14.73)	44(15.07)	29(9.93)	χ <sup>2</sup> =12.794	60(23.26)	77(29.84)	44(17.05)	40(15.95)
31-45	201(30.00)	183(27.31)	111(16.57)	102(15.22)	73(10.90)	P=0.618	146(26.07)	144(25.71)	84(15.00)	107(19.28)
46-60	125(31.73)	104(26.40)	65(16.50)	60(15.23)	40(10.15)		52(32.30)	44(27.33)	28(17.39)	19(11.76)
> 61	57(31.32)	49(26.92)	33(18.13)	25(13.74)	18(9.89)		51(34.46)	39(26.35)	21(14.19)	27(18.75)
Education										
postgraduate	71(22.05)	85(26.40)	53(16.46)	58(18.01)	55(17.08)	χ <sup>2</sup> =58.253	14(26.92)	7(13.46)	9(17.31)	9(17.31)
undergraduate	224(29.95)	205(27.41)	138(18.45)	111(14.84)	70(9.36)	P < 0.001	125(22.32)	160(28.57)	89(15.89)	100(17.31)
short-cycle Courses	166(38.16)	124(28.51)	58(13.33)	56(12.87)	31(7.13)		83(31.32)	70(26.42)	44(16.60)	47(17.67)
short-cycle Courses and Under	12(36.36)	8(24.24)	3(9.09)	6(18.18)	4(12.12)		87(34.80)	67(26.80)	35(14.00)	37(14.93)
Title*/Income**										
professor/> 10	5(23.81)	5(23.81)	4(19.05)	4(19.05)	3(14.29)	χ <sup>2</sup> =35.645	40(19.51)	45(21.95)	35(17.07)	44(21.95)
associate professor /5.1-10	25(21.74)	34(29.57)	21(18.26)	18(15.65)	17(14.78)	P=0.017	97(25.94)	98(26.20)	53(14.17)	78(20.00)
middle title /3.1-5	159(30.99)	132(25.73)	89(17.35)	75(14.62)	58(11.31)		74(29.72)	74(29.72)	38(15.26)	36(14.93)
primary/1.1-3	231(34.32)	190(28.23)	104(15.45)	90(13.37)	58(8.62)		49(32.67)	43(28.67)	24(16.00)	18(12.00)
no title/0-1	53(24.54)	61(28.24)	34(15.74)	44(20.37)	24(11.11)		49(32.89)	44(29.53)	27(18.12)	17(11.35)
Departments										
obstetrics-Gynecology	141(32.79)	126(29.30)	59(13.72)	65(15.12)	39(9.07)	χ <sup>2</sup> =26.378	65(24.62)	80(30.30)	40(15.15)	42(15.95)
orthopedics	72(28.24)	65(25.49)	47(18.43)	38(14.90)	33(12.94)	P=0.154	60(27.27)	56(25.45)	35(15.91)	40(18.18)
General surgery	144(31.30)	117(25.43)	80(17.39)	72(15.65)	47(10.22)		98(27.37)	91(25.42)	63(17.60)	61(17.31)
neurosurgery	69(27.60)	80(32.00)	42(16.80)	30(12.00)	29(11.60)		56(34.57)	40(24.69)	22(13.58)	23(14.93)
Cardio-Thoracic Surgery	47(32.87)	34(23.78)	24(16.78)	26(18.18)	12(8.39)		30(24.39)	37(30.08)	17(13.82)	27(21.88)
Total	473(30.75)	422(27.44)	252(16.38)	231(15.02)	160(10.40)		309(27.42)	304(26.97)	177(15.71)	193(17.31)

\* represent professional title in medical staff

\*\*represent annual per capita income in patients

## Figures

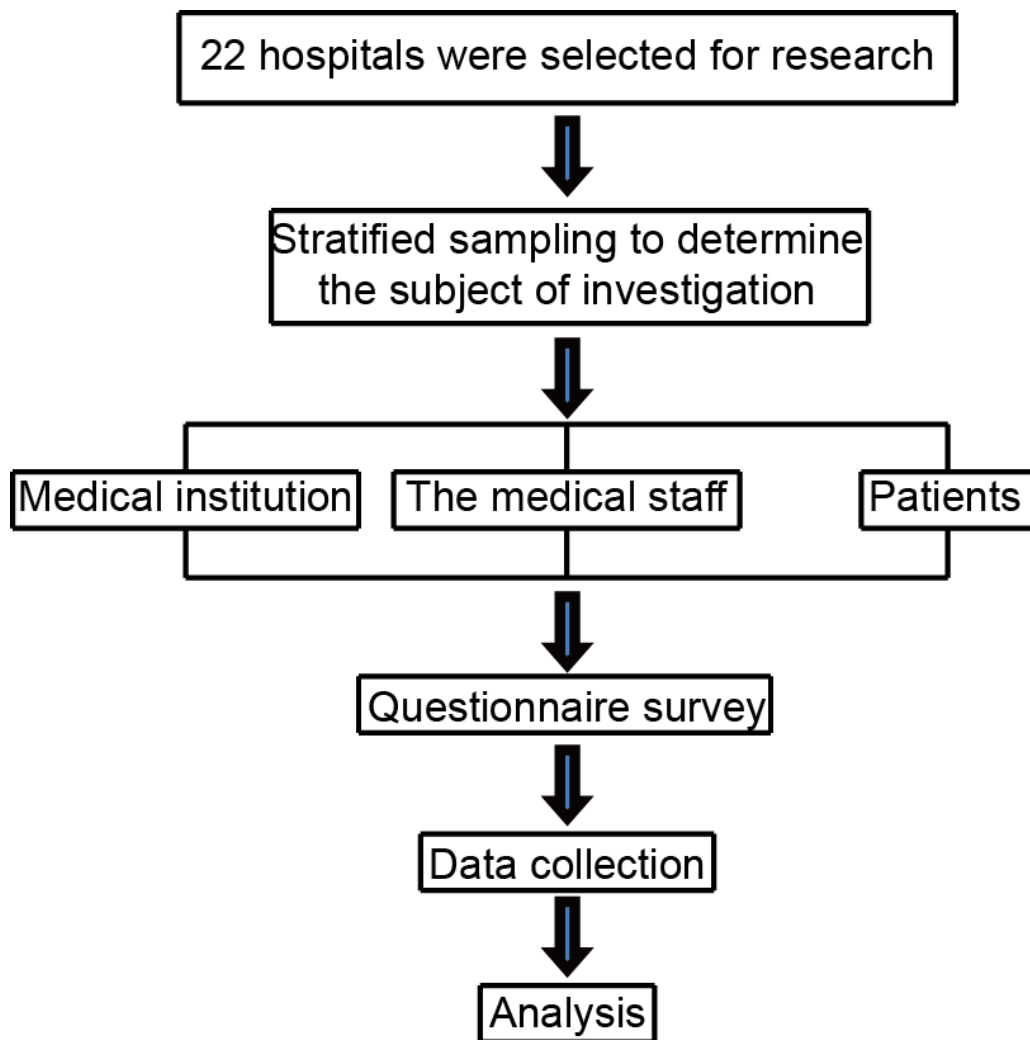


Figure 1

Flow chart of respondents' selection in this questionnaire survey.

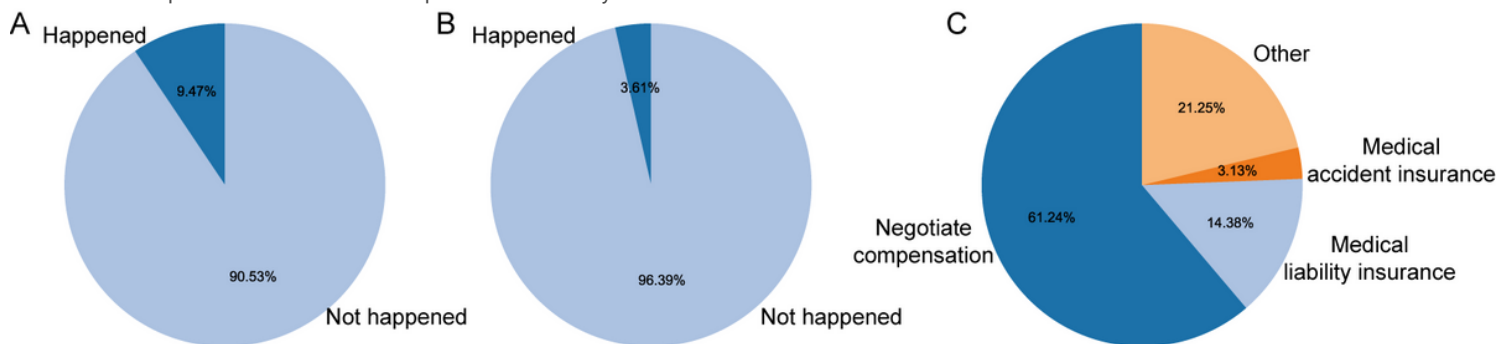


Figure 2

The occurrence frequency of medical malpractice and its compensation method.

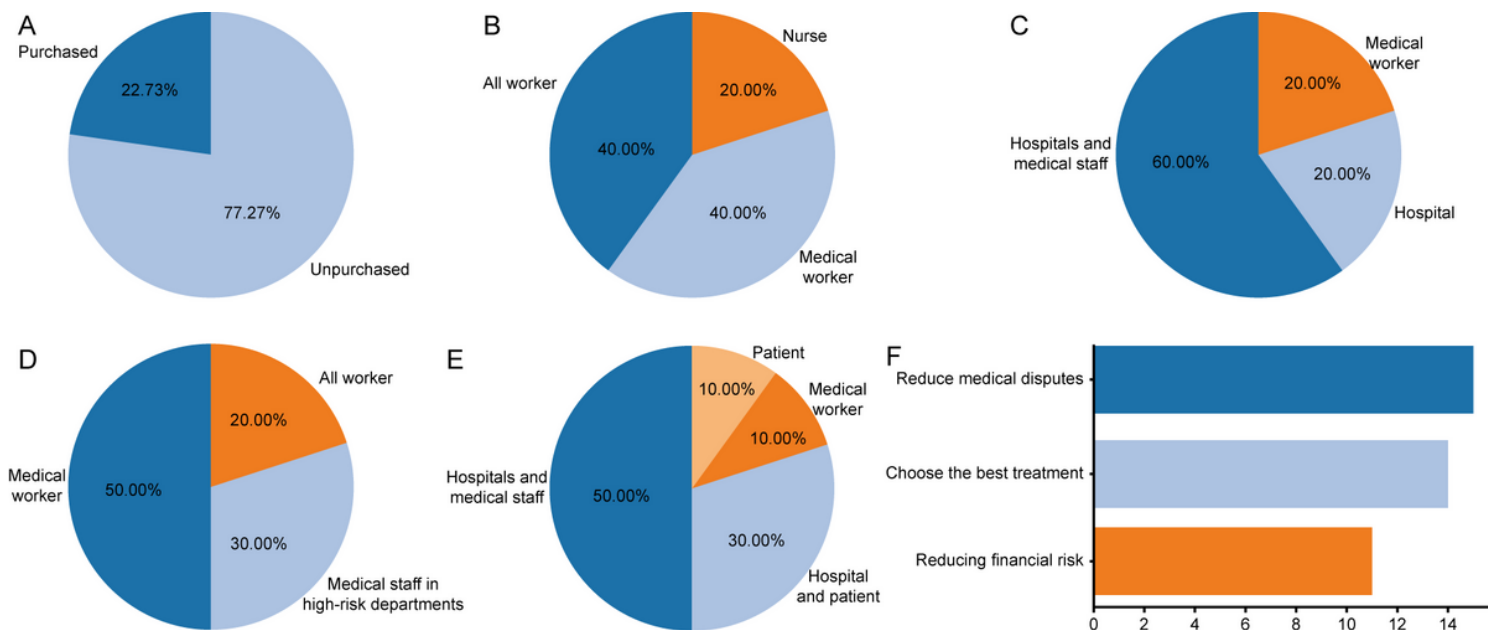


Figure 3

The purchase status quo of medical accident insurance.

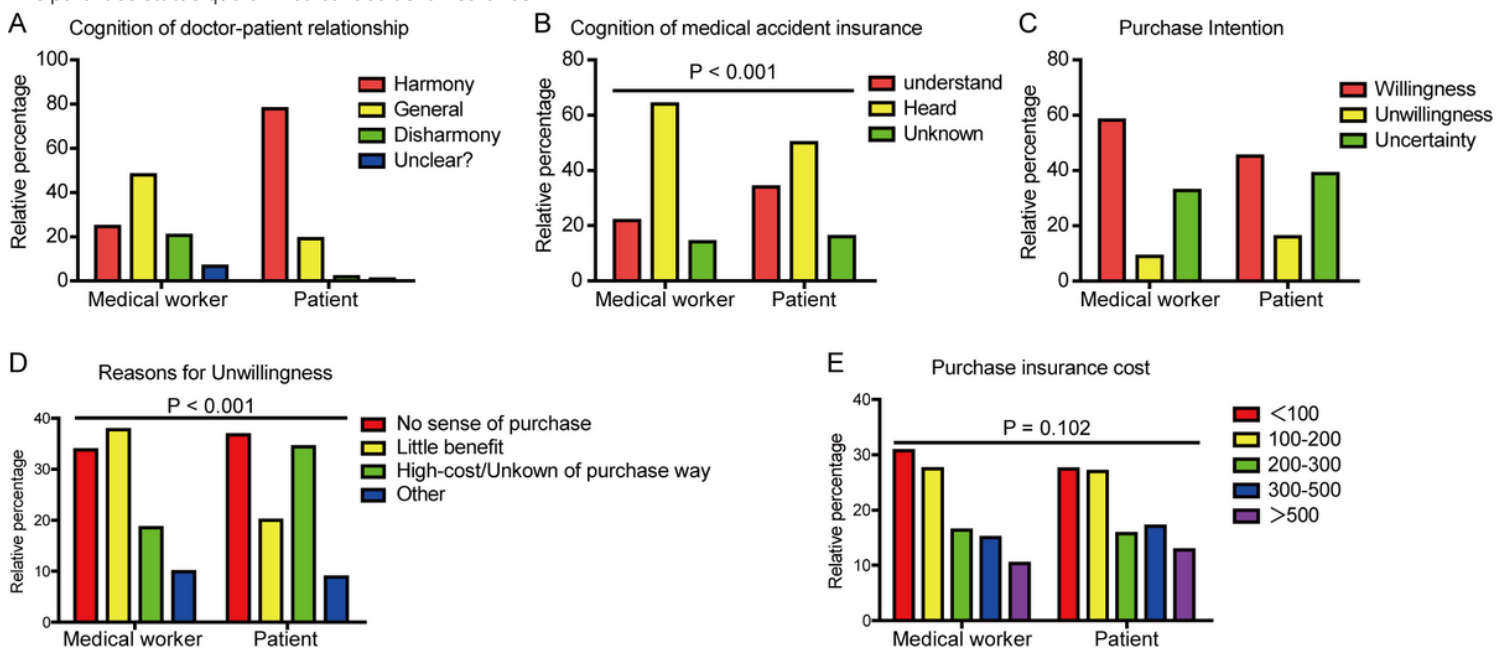


Figure 4

The cognition of medical accident insurance and purchase intention.