

BMJ Open The attitudes towards defensive medicine among physicians of obstetrics and gynaecology in China: a questionnaire survey in a national congress

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ABSTRACT

Objective The study aimed to determine prevalence, patterns and risk factors of defensive medicine by obstetricians and gynaecologists across China.

Design This is a questionnaire survey by written and on-line interview for participants.

Participants Among 1804 registered physicians participating at the 2017 Congress of Chinese Obstetricians and Gynecologists Association in Chengdu City, Sichuan Province, China, from 17 to 20 August 2017, 1486 participants (82.4%) responded the survey.

Main outcome measures Participants' strongly disagreed/disagreed and strongly agreed/agreed options were compared to determine specific factors contributing to their preferences towards defensive medicine.

Results In the whole cohort of 1486 participants, 903/1486 (60.8%), 283/1486 (19.0%) and 170/283 (60.1%) participants had experienced at least one medical dispute, lawsuit or loss of a lawsuit, respectively; and 1284 (86.4%) participants had witnessed their colleagues exposed to medical disputes, lawsuits or loss of a lawsuit. Generally, 62.9% of the participants strongly agreed or agreed with defensive medicine. Gender, administration duty, employment hospital, education status, subspecialty, exposure to any medical disputes, lawsuits or loss of a lawsuit, and colleagues' experiences were independent risk factors relevant to participants' preferences about defensive medicine in a multivariate model. Participants were more prone to accept or endorse defensive medicine if they were female physicians; without administrative duties; working in non-tertiary hospitals; with an undergraduate degree; with any exposure to medical disputes, lawsuits or loss of a lawsuit; or having witnessed colleagues' similar experiences.

Conclusions About two-thirds of Chinese physicians practising obstetrics and gynaecology in our survey agreed with the practice of defensive medicine, but they had diverse preferences and understanding of specific practices, harms of defensive medicine and physician's roles.

BACKGROUND

The concept of defensive medicine appeared in 1978,¹ and is defined as 'medical actions performed mainly to prevent being sued

Strengths and limitations of this study

- To our knowledge this is the first report about defensive medicine in a large cohort of Chinese physicians with high correspondence rate.
- We acquired practical data about Chinese physicians' preference in deciding strategies of diagnosis and treatment, which would provide foundations for further analysis of health economics of defensive medicine.
- The main drawback of our study is the bias from sampling, which had a negative impact on credibility and repeatability.

rather than actually to aid the patient' by the US Congress's Office of Technology Assessment.² Defensive medicine is also one of the Mesh terms of PubMed, 'the alterations of modes of medical practice, induced by the threat of liability, for the principal purposes of forestalling lawsuits by patients as well as providing good legal defense in the event that such lawsuits are instituted'.³ Concerns and perceptions about medical liability lead practitioners to practice defensive medicine. In a national survey of neurosurgeons, 69% participants strongly agreed or agreed with 'I view every patient as a potential lawsuit'.⁴ As a result, diagnostic testing, consultations and imaging studies are ordered to satisfy a perceived legal risk, resulting in higher healthcare expenditures. According to the report by the Institute of Medicine, the lower-bound totals of estimates of excess expenditures identified from workshop discussions would amount to about \$765 billion in 2009, of which the costs of defensive medicine were estimated to be \$210 billion.⁵ In the report by Jackson Healthcare, physicians attributed 34% of overall healthcare costs to defensive medicine. Among physicians who reported



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practising defensive medicine, an estimated 35% of diagnostic tests, 29% of lab tests, 19% of hospitalisations, 14% of prescriptions and 8% of surgeries were ordered to avoid lawsuits.⁶ However, little is known about the definite prevalence and characteristics of defensive medicine by Obstetrics and Gynecology (OB/GYN) physicians. In the 2017 Congress of Chinese Obstetricians and Gynecologists Association (COGA), we initiated a questionnaire survey among registered physicians of OB/GYN to analyse prevalence, patterns and risk factors of practising and endorsing defensive medicine.

METHODS

Design

At the 2017 Congress of COGA in Chengdu City, Sichuan Province, China, from 17 to 20 August 2017, at check-in reception of the Congress, we sent out printed and on-line questionnaires to every participant, and asked for on-site retrieve to ensure proper corresponding rate. On-line questionnaires were sent out by social media of WeChat and data were retrieved by a background database. All questionnaires were checked by LL and LZ. Data were included only if all items were specifically addressed.

Questionnaire

The items about defensive medicine were primarily derived from previous reports and studies. For validation of the questionnaire, a preliminary study was conducted among 50 physicians of the Department of Obstetrics and Gynecology in Peking Union Medical College Hospital. After discussion and modification, the final version of the questionnaire was approved with total and separate Cronbach's $\alpha > 0.600$, and Kaiser-Meyer-Olkin

measures > 0.700 . None of the 50 physicians validating the questionnaire participated in the study.

There is a brief, clear and neutral introduction about the definition, origin and prevalence of defensive medicine at the beginning of the questionnaire, which then consists of 25 items: 8 items relevant to participants' epidemiological characteristics (gender, age, subspecialty, education status, professional title, employment hospital and employment period), 4 items relevant to adverse exposures (medical dispute, medical lawsuits or loss of a lawsuit ever, and colleagues' experiences), 13 items surveying participants' preferences about general agreement (1 item), *practice* in the past 12 months (4 items), and *harm* (4 items) of defensive medicine and physicians' *role* in defensive medicine (4 items) (table 1).

Participants

Participants came from across China. They registered in the Congress by means of on-line or post registration forms, and their certification as obstetricians and/or gynaecologists were identified and confirmed by submitted materials to the Congress.

Measures

Epidemiological characteristics, exposure to disputes and lawsuits, and preferences were described as figures and percentages. Participants with strongly disagreed/disagreed and strongly agreed/agreed propensities were compared to determine specific factors contributing to their preferences towards defensive medicine.

Statistical analysis

Statistical analyses were carried out using SPSS statistical software (V.19.0, SPSS, Chicago, Illinois, USA).

Table 1 Items of questionnaire about defensive medicine

General agreement about defensive medicine

Practices of defensive medicine in the past 12 months

Practice 1	Refusing to provide treatment for critically ill patients
Practice 2	Prescription for unnecessary examinations/tests/recipes/consultations
Practice 3	Arrangements for unnecessary hospital administration/surgeries
Practice 4	Caesarean section without indications (not equal to 'cesarean delivery on maternal request')

Harm of defensive medicine

Harm 1	Defensive medicine would impair physician-patient relationship and induce new conflicts
Harm 2	Defensive medicine would impair patients' physical and psychological health
Harm 3	Defensive medicine would restrict physicians' mentality, creativity and medical progression
Harm 4	Defensive medicine would protect physicians/patients from harm despite its defects

Physicians' roles in defensive medicine

Role 1	Physicians shouldn't seek protection by defensive medicine for rights, interests and security
Role 2	Physicians shouldn't treat the patient as potential threat of a medical lawsuit
Role 3	Physicians should stick to guidelines and basic principles in daily practice
Role 4	Physicians should be solely devoted to patients' best interests even if that is expensive

Participants respond to each item with preferences of 'strongly disagreed', 'disagreed', 'neutral', 'agreed' or 'strongly agreed'.

Comparison of variables was by non-parametrical χ^2 test or Fisher's exact test, or *t*-test for independent samples. The impact of epidemiological characteristics and personal experiences on the participants' viewpoints and preferences of defensive medicine and its specific aspects were analysed in univariate analysis. Multiple-parameter analyses were performed using binary logistic analysis, calculating ORs and 95% CIs to adjust confounding factors. Reliability and validity of the questionnaire were evaluated with methods of Cronbach's α and Kaiser-Meyer-Olkin measures/Bartlett's test of sphericity for construct validity, respectively.

RESULTS

Participants

We sent out 918 printed and 886 on-line questionnaires to registered physicians of OB/GYN; respectively, 692 and 794 physicians responded with integrated information. Total responding rate was 82.4%. The average age of 1486 participants was 41.1 ± 8.2 years. There were 1337 female (90.0%) and 149 male (10.0%) physicians. For the cohort of 1486 responding participants, 483 (32.5%), 496 (33.4%), 188 (12.7%) and 223 (15.0%) participants were engaged in obstetrics, general gynaecology, reproduction/gynaecological endocrinology and gynaecological oncology, while 96 (6.4%) were without specific subspecialty. As for education status, 976 (65.7%) and 510 (34.3%) participants had undergraduate and graduate degrees, respectively. As for professional titles, 229 (15.4%), 536 (36.1%) and 721 (48.5%) participants had junior, intermediate and senior certifications, respectively. In total, 525 participants (35.3%) had administrative duties in their hospital of employment. Regarding employment status, 80 (5.4%), 32 (2.2%), 536 (36.1%), 804 (54.1%) and 34 (2.3%) participants were from private/foreign-capital healthcare services, community hospitals, referral hospitals, tertiary hospitals and other types of healthcare services. One hundred thirty-eight (9.3%), 215 (14.5%), 273 (18.4%), 218 (14.7%) and 642 (43.2%) participants had an employment period of <5 years, ≥ 5 years but <10 years, ≥ 10 years but <15 years, ≥ 15 years but <20 years and ≥ 20 years, respectively.

Reliability and validity of the questionnaire

For the reliability of total and separate items of *practice*, *harm* and *role*, the values of Cronbach's α were 0.602, 0.705, 0.650 and 0.675. For the construct validity of items of *practice*, *harm* and *role*, Kaiser-Meyer-Olkin measures were 0.711 ($P < 0.001$), 0.755 ($P < 0.001$) and 0.740 ($P < 0.001$). Printed and on-line questionnaires had similar reliability and validity (all P values > 0.05).

Experiences of lawsuits

Previous exposure to medical disputes, lawsuits, loss of a lawsuit and colleagues' experiences are listed in [table 2](#). Of the whole responding cohort of 1486 participants, 903 (60.8%), 283 (19.0%) and 170 (60.1%) participants had experienced at least one medical dispute, lawsuit and loss of a lawsuit, but most participants had just one exposure of each type. On the other hand, 1284 (86.4%) participants had witnessed their colleagues' experiences, and more than four times exposures were witnessed by almost half (41.9%) of the participants.

Participants' preference about defensive medicine

[Table 3](#) lists participants' preference about defensive medicine. Generally, 62.9% of participants strongly agreed or agreed with the practice of defensive medicine, and only 5.3% strongly disagreed or disagreed with it. More than half of the participants reached consensus in about 7 of 12 specific items: they strongly disagreed/disagreed with *practice 2* (53.9%), *practice 3* (75.1%), *practice 4* (57.8%) and *role 2* (80.8%); and strongly agreed/agreed with *harm 4* (70.8%), *role 1* (51.9%) and *role 3* (55.7%). For *practice 1*, *harm 1–3* and *role 4*, there were no predominant viewpoints in more than half participants.

Factors having impacts on participants' preference

In univariate analysis, most epidemiological characteristics and personal experiences had pertinence to participants' viewpoints and preferences of defensive medicine and its specific aspects. As shown in [table 4](#), in the multivariate regression model, independent risk factors relevant to participants' preferences included: gender; administrative duty (yes vs no); employment hospital (tertiary vs non-tertiary); education status (undergraduate vs graduate); subspecialty (gynaecological oncology

Table 2 Medical disputes, lawsuits, loss of a lawsuit experienced by physician or colleagues

	Medical disputes (n=1486)	Medical lawsuits (n=1486)	Losing a lawsuit (n=283)	Medical disputes, lawsuits, loss of a lawsuit experienced by colleagues (n=1486)
None	583 (39.2%)	1203 (81.0%)	113 (39.9%)	202 (13.6%)
Once	458 (30.8%)	193 (13.0%)	121 (42.8%)	266 (17.9%)
Twice	180 (12.1%)	41 (2.8%)	27 (9.5%)	280 (18.8%)
Three times	112 (7.5%)	25 (1.7%)	10 (3.5%)	116 (7.8%)
\geq Four times	153 (10.3%)	24 (1.6%)	12 (4.2%)	622 (41.9%)

Table 3 Participants' preference about defensive medicine and its practice and harm and their roles

	Strongly disagreed	Disagreed	Neutral	Agreed	Strongly agreed
General agreement about defensive medicine	15 (1.0%)	64 (4.3%)	472 (31.8%)	865 (58.2%)	70 (4.7%)
Practices of defensive medicine					
Practice 1	129 (8.7%)	415 (27.9%)	579 (39.0%)	284 (19.1%)	79 (5.3%)
Practice 2	189 (12.7%)	612 (41.2%)	481 (32.4%)	181 (12.2%)	23 (1.5%)
Practice 3	315 (21.2%)	801 (53.9%)	255 (17.2%)	100 (6.7%)	15 (1.0%)
Practice 4	253 (17.0%)	607 (40.8%)	504 (33.9%)	110 (7.4%)	12 (0.8%)
Harms of defensive medicine					
Harm 1	77 (5.2%)	404 (27.2%)	571 (38.4%)	387 (26.0%)	47 (3.2%)
Harm 2	97 (6.5%)	508 (34.2%)	502 (33.8%)	344 (23.1%)	35 (2.4%)
Harm 3	85 (5.7%)	468 (31.5%)	431 (29.0%)	442 (29.7%)	60 (4.0%)
Harm 4	10 (0.7%)	36 (2.4%)	388 (26.1%)	988 (66.5%)	64 (4.3%)
Physicians' roles in defensive medicine					
Role 1	38 (2.6%)	117 (7.9%)	560 (37.7%)	646 (43.5%)	125 (8.4%)
Role 2	336 (22.6%)	865 (58.2%)	205 (13.8%)	71 (4.8%)	9 (0.6%)
Role 3	35 (2.4%)	184 (12.4%)	440 (29.6%)	744 (50.1%)	83 (5.6%)
Role 4	61 (4.1%)	265 (17.8%)	478 (32.2%)	579 (39.0%)	103 (6.9%)

vs others); any exposure to medical disputes, lawsuits, loss of a lawsuit; and colleagues' experiences. In general, participants were more prone to accept or endorse defensive medicine if they were female physicians; did not have administrative duties; were working in non-tertiary hospitals; had an undergraduate degree; had had exposure to any medical disputes, lawsuits or loss of a lawsuit; or had witnessed colleagues' similar experiences. Whether forms of the questionnaire were printed or on-line, participants' age, profession title or employment period did not influence preferences or decisions about defensive medicine in multivariate analysis.

DISCUSSION

Defensive medicine is a worldwide problem beyond the bounds of countries, economics, ideology, cultures and religions. Although some authors defined defensive medicine as 'positive' (beneficial for patients) and 'negative' (detrimental for patients), defensive medicine was generally regarded as a negative behaviour. According to numerous reports, most physicians have practised or have been practising defensive medicine.⁷⁻¹¹ According to a survey of physicians in Pennsylvania, defensive medicine is highly prevalent among various specialties who pay the most for liability insurance.¹² In China, it is reported that physicians' previous experience with medical disputes is significantly associated with defensive behaviours, particularly with overprescription.¹³ To our knowledge, this is the largest survey about defensive medicine practices in China. Not surprisingly, about two-thirds of physicians strongly agreed or agreed with defensive medicine in

general; only about 5% were against it, but for specific items, more than half of the participants were against practising defensive medicine (*practice 2, practice 3, practice 4* and *role 3*), although more than half of them were in favour of the principle of defensive medicine (*role 1* and *harm 4*) and were alert to their patients (*role 2*). This contradiction probably resulted from the tension between physicians' professional idealism and stressful physician-patient relationships, which is of concern for health administrators and reformers.

Origins of defensive medicine have profound juristic, economic and cultural reasons. From a social perspective, risks should not be eliminated at all costs. When the costs of precaution are largely not borne by physicians while the costs of being found liable—in the form of reputation loss—are excessive, precaution in the form of defensive medicine is likely.¹⁴ For most people, defensive medicine is a rational selection by healthcare providers based on the economic man hypothesis and expected utility theory. Risk aversion and expected utility maximisation, uncertainty about judgement of medical malpractice and vast liability risk are economic and juristic foundations of defensive medicine, whereas non-identity of information and non-marketability of medical service are social and market-oriented causes. In USA, across all claims, 62.6% resulted in litigation against obstetricians and gynaecologists, and most (79.6%) were judged in favour of the physician.¹⁵ Nevertheless, in our study most lawsuits ended in physicians losing them (170/283, 60.1%). For most physicians, being sued has produced great pressure and severe physical and psychological torture.¹⁶

Table 4 Independent factors of defensive medicine and its practice, harm and physicians' roles in logistic regression models

OR (95% CI)	Subspecialty of								
	Female	Administration duty	Tertiary hospital	Graduate degree	gynaecological oncology	Any exposure of medical dispute	Any exposure of medical lawsuit	Any exposure of losing a lawsuit	Colleagues' experiences
General agreement	7.6 (4.6 to 12.7) P<0.001	0.6 (0.4 to 1.0) P=0.035	0.5 (0.3 to 0.9) P=0.015	Ns	Ns	Ns	Ns	Ns	Ns
Practices of defensive medicine									
Practice 1	Ns	0.4 (0.3 to 0.6) P<0.001	0.6 (0.4 to 0.8) P<0.001	0.6 (0.4 to 0.9) P=0.011	Ns	1.9 (1.4 to 2.5) P<0.001	Ns	Ns	Ns
Practice 2	Ns	Ns	Ns	Ns	Ns	1.8 (1.3 to 2.4) P=0.001	Ns	Ns	Ns
Practice 3	Ns	Ns	Ns	0.4 (0.3 to 0.7) P=0.001	Ns	Ns	Ns	Ns	Ns
Practice 4	0.3 (0.2 to 0.5) P<0.001	1.7 (1.2 to 2.5) P=0.008	Ns	Ns	Ns	Ns	Ns	Ns	3.0 (1.3 to 7.0) P=0.012
Harms of defensive medicine									
Harm 1	Ns	1.4 (1.0 to 1.8) P=0.021	1.4 (1.1 to 1.9) P=0.007	Ns	Ns	Ns	Ns	Ns	Ns
Harm 2	0.5 (0.3 to 0.7) P=0.001	1.4 (1.1 to 1.9) P=0.009	Ns	1.4 (1.0 to 1.8) P=0.035	Ns	1.4 (1.1 to 1.9) P=0.008	Ns	Ns	Ns
Harm 3	0.6 (0.4 to 1.0) P=0.031	1.6 (1.2 to 2.1) P<0.001	1.4 (1.1 to 1.9) P=0.003	Ns	Ns	Ns	Ns	Ns	Ns
Harm 4	0.6 (0.4 to 0.9) P=0.022	Ns	Ns	Ns	Ns	Ns	1.5 (1.1 to 2.1) P=0.010	Ns	Ns
Physician's roles in defensive medicine									
Role 1	0.4 (0.2 to 0.6) P<0.001	Ns	1.7 (1.2 to 2.5) P=0.004	Ns	Ns	0.6 (0.4 to 0.9) P=0.007	Ns	Ns	Ns
Role 2	0.4 (0.2 to 0.6) P=0.001	Ns	Ns	Ns	4.0 (2.4 to 6.6) P<0.001	0.4 (0.3 to 0.7) P=0.001	Ns	Ns	Ns x
Role 3	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0.2 (0.1 to 0.6) P=0.001	Ns
Role 4	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0.4 (0.2 to 0.8) P=0.015	Ns

Ns, non-significant.

Being claimed of malpractice or criticised of ‘unqualified doctors’ were regarded as personal abuse; loss of reputation is overwhelmingly a transfer payment, a private loss to the physician who bears it, so any investment by the physician taken to prevent such a loss is a waste from a social perspective.¹⁴

Despite widespread agreement that physicians who practice defensive medicine drive up healthcare costs, the extent to which defensive medicine increases costs is unclear. In USA, the 60% increase in malpractice premiums between 2000 and 2003 is associated with an increase in total Medicare spending of more than \$15 billion¹⁷. Overall annual medical liability system costs, including defensive medicine, are conservatively estimated to be \$55.6 billion in 2008 dollars, or 2.4% of total healthcare spending.¹⁸ Within specialty and after adjustment for patient characteristics, higher resource use by physicians is associated with fewer malpractice claims.¹⁹ Despite vast waste caused by defensive medicine, it will not protect patients or physicians from harm. Diagnostic tests for symptoms with a low risk of serious illness do little to reassure patients, decrease their anxiety or resolve their symptoms, although the tests may reduce further primary care visits.²⁰ However, diagnostic testing is not without its adverse effects. The testing imperative can become addictive.²¹ Excessive tests produce higher false-positive rates and more tests, which eventually result in liability problems.¹⁴ Defensive medicine also violates principles of medical ethics about rational usage of social and health resources for the best care of patients, causing further damage to the physician-patient relationship.

How to prevent or restrict practices and the waste incurred by defensive medicine is a critical problem to both physicians and public health. Better care is always the best defense. Professionalism is the basis of medicine’s contract with society. Physicians’ efforts are to ensure that the healthcare systems and the physicians working within them remain committed both to patient welfare and to the basic tenets of social justice.²² Patients want to be taken seriously and provided with proper information.²³ Preventive interventions should target common contributory factors across diagnoses, especially those that involve data gathering and synthesis in the patient-practitioner encounter.²⁴ Indeed, physicians in general acknowledge the need to follow practice guidelines and avoid unnecessary testing,²⁵ just as participants in our study do.

Obstetrics and gynaecology is always a high-risk specialty for lawsuits.¹¹ A classic example of defensive medicine is the increasing rate of caesarean sections.^{26–29} Obstetric malpractice lawsuits and frequent worries about lawsuits are associated with a higher propensity to recommend caesarean delivery in common obstetric settings of China.²⁶ In a survey of Iran, 87% of physicians are more likely to offer the caesarean section option, even in the absence of a clear medical indication.³⁰ Although debates exist,^{31 32} many studies found positive correlations between the caesarean section rate and the premium.^{33–35} Anchoring effects and priming effects of psychology may

bring about bias, which could explain why obstetricians select defensive medicine as the basis for decision making. For many obstetricians, ‘the only regrettable caesarean section is the one not done,’ but as criticism and discussion about caesarean section increases in China,^{36 37} few physicians in our study (8.2%) agreed with caesarean section without indications.

The main drawback of our study is the bias from sampling, which had a negative impact on credibility and repeatability. A more representative and straight attitude towards defensive medicine would be derived from an appropriately sampled cohort. Confounders such as economics, physician-patient relationship and culture environment were also not included in our analysis.

In conclusion, 62.9% of Chinese physicians of OB/GYN strongly agreed or agreed with the practice of defensive medicine, but there are diverse or even opposite preferences and understanding about specific practices, harm and physicians’ roles.

Contributors LL conceived of the original idea for the study, interpreted results, carried out the statistical analysis, drafted the paper and is overall guarantor. LZ designed the questionnaire, obtained ethical approval, contributed to the preparation of the data set, interpreted results and contributed to drafts of the paper. JL contributed to the study design, interpretation of results and commented on drafts of the paper.

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