

The first survey on defensive medicine among Iranian surgeons: prevalence and its related factors

Ehsan Zarei (✉ zare_i_1980@yahoo.com)

Shahid Beheshti University of Medical Sciences School of Public Health <https://orcid.org/0000-0002-5115-1795>

Faezeh Ashtar-Nakhaei

Shaheed Beheshti University of Medical Sciences

Abbas Daneshkohan

Shaheed Beheshti University of Medical Sciences

Alireza Zali

Shaheed Beheshti University of Medical Sciences

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Abstract

Introduction Defensive medicine (DM) is defined as the deviation of a physician from normal behavior or what is good practice aimed at decreasing or preventing from the complaints and criticism by the patients or their families. The current study aimed at examining DM behaviors in a sample of Iranian surgeons. **Methods** In this cross-sectional study, 235 surgeons were selected by systematic random sampling method. The data gathering tool was a researcher-made questionnaire which its validity and reliability were confirmed. For data analysis, Fisher's exact test, Kruskal-Wallis test, Chi-square and logistic regression tests were used in SPSS 21 software. **Results** The most common positive DM behaviors including unnecessary biopsy (78.7%), imaging and laboratory tests (72.3% and 70.6%), and refusing to accept high-risk patients (61.7%) was also the most common negative DM behavior among surgeons. The likelihood of DM behaviors was more in young and less experienced surgeons. Other variables such as gender, specialty and complaint history also had a positive effect on some DM behaviors ($p < 0.05$). **Conclusion** Strategies such as reforming the rules and regulations for medical errors and patient complaints, increasing monitoring of service delivery, developing and implementing medical guidelines and evidence-based medicine, and reforming medical liability insurance system are effective to reduce DM behaviors in order to prevent its adverse effects on the health system and patients.

Introduction

Defensive medicine (DM) is defined as the deviation of a physician from normal behavior or what is good practice aimed at decreasing or preventing from the complaints and criticism by the patients or their families[1]. In other words, defensive medicine is the protection of physician through prescription of certain treatments, medical tests, and additional procedures against the patient's criticism in relation to diagnosis or treatment [1-3] . What lies behind this idea is that if the patient complains, the physician has the necessary documentations to defend him/herself.

DM behaviors are classified as positive or assurance behaviors, and negative or avoidance behaviors. Positive behaviors are primarily performed to minimize the malpractice liability including unnecessary prescriptions of drugs and diagnosis tests, unnecessary referral of patients to other specialists, etc. Negative DM preserves physicians from risk sources such as avoiding the prescription of dangerous procedures, while these may be helpful for the patient, as well as avoiding the treatment of high-risk patients[4-7]. Throughout the world, due to increased medical claims, the culture of defensive medicine is growing [4]. In the United States, about 93% of the physicians make DM behaviors[8] while 78% and 56% of the physicians in the UK[1] and Italy[9] hospitals, respectively, use some kind of defensive behaviors in their medical practice.

Harming patients is unethical when performing unnecessary tests to protect the physician against potential complaints; therefore, defensive medicine is considered immoral [10]. Damage to the physician-patient's relationship, the unnecessary use of scarce health care resources, the increase in the length of stay in the hospital, the inability of other patients to receive health care, and as a result, higher costs of

patient care are also other negative consequences of DM[11-14]. DM behaviors may endanger the patient's safety as well. For example, unnecessary use of magnetic resonance imaging (MRI), computed tomography (CT) scan, biopsy, and other invasive and noninvasive interventions, in addition to increasing the treatment costs, can be risky for the patients' health by placing patients at risk of radiation or infections.

Some of the probable reasons for DM identified in previous studies are as follows: Concerns about the claim for compensation of injuries imposed on a patient following failure, concerns about legal actions taken by the patients, fear of disciplinary actions by the Medical Councils, fear of negative publicity and damage to reputation, having previous medical lawsuit, lack of liability insurance, compliance with clinical standards, and increased patient's awareness[15-17].

Few studies are conducted on the physicians DM behaviors in Iran. Findings of a study in Mashhad, Iran showed that the DM behaviors are highly prevalent among residents[18]; another study found that almost all general practitioners in Kerman, Iran, performed some kind of DM behaviors[15]. Since surgery and anesthesia management are invasive in nature, the physicians face a high risk of medical errors. Therefore, the current study aimed at examining defensive medical behaviors in a sample of Iranian surgeons.

Methods

The current cross sectional study was conducted in Tehran, 2017 and the study population included the surgeons participating in the 41st Iranian Association of Surgeons congress. Based on the previous studies, the prevalence of DM behaviors was estimated 80%[1, 9]. Therefore, taking into account $p=0.8$ and $d =0.05$, the sample size was estimated 245.

A systematic random sampling method was used and the sampling frame was the list of participating surgeons in the congress. The researcher attended the congress site and after explaining the subject matter of the study and its objectives, the oral consent was obtained from the surgeons in order to participate in the study. They were assured that the questionnaires were anonymous and the findings of the study were reported in general. The questionnaires were distributed, completed, and collected on the same day. A total of 250 questionnaires were distributed among the participants from which 235 questionnaires were completed and returned (response rate= 94%).

The data collection tool was a researcher-made questionnaire developed based on previous studies [1, 6, 7, 15]. The questionnaire consisted of three parts: the first part included demographic data, and the second part contained 13 questions on the amount and type of DM behaviors. The five-option Likert scale (always, often, sometimes, rarely, and never) was used to score the scale items. The third part included seven questions on surgeons' perceptions and views on defense medicine, with yes/no responses.

The validity of the questionnaire was confirmed using the qualitative content validity. The primary questionnaire was presented to five experts in the field medical ethics and five responsible physicians in

the Medical Council of Iran, and their comments were used to modify the questions. To evaluate the reliability of the questionnaire, the Cronbach's alpha coefficient was measured and $\alpha = 0.805$ indicated the stability and reliability of the tool.

Data analysis was performed using descriptive statistics and the Fisher exact test, Chi-square, and Kruskal–Wallis test with SPSS. To investigate the relationship between DM behaviors and demographic variables, the logistic regression test was used. To this end, the five options to deal with DM behaviors were converted to two-fold (done / not done); options rarely and never were considered as "not done" and options always, often, and sometimes as "done". A separate regression test was conducted for each DM practice. In the regression model, only variables with a significant level of $p < 0.2$ in the bivariate analysis were included. The current study protocol was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences.

Results

Based on the findings, the mean (\pm standard deviation; SD) age of the surgeons was 49.8 ± 12.1 years. About 77.5% of the surgeons were male, 90% were graduates of the Iranian universities, 55% had below 15 years surgery experience, and 41.5% worked for both public and private sectors, simultaneously.

Findings of the study showed that 74.4% of the surgeons believed that each patient could be a threat for medical lawsuits. Also 96.3% of the surgeons believed that the rate of complaints in recent years increased. Most of the surgeons believed that DM behaviors resulted in less accessibility of the people to the health services, increased costs of the health services, and weakened physician- patient relationship. Moreover, 67.5% of the surgeons believed that DM behaviors may be risky for patient safety (Table 1). Some 93 people (58.1%) were familiar with the DM concept and 57.7% of the surgeons had a history of medical lawsuits by the patient.

[Table 1]

Table 2 represents the frequency of DM behaviors. The highest rate of DM behaviors is attributed to the description of details and patient participation in treatment selection (94.3%), followed by emphasis on recording the treatment process details and the patient's specific statements in his/her file (88.9%), biopsy ordering (78.8), imaging tests ordering (72.2%), and order for laboratory tests (70.5%). The lowest rate of DM behavior was related to unnecessary transfer of patient to the emergency room (14.7%), prescription of unnecessary drugs (18.1%) and emphasis on unnecessary and frequent visits in health care centers (23.2%).

[Table 2]

In the current study, the relationship between demographic and DM behaviors was examined separately (bivariate analysis) and then the significant variables were included in the logistic regression model. Table 3 shows the variables effective on the DM behaviors of the Iranian surgeons. Due to lack of space,

only significant variables ($p < 0.05$) are shown. According to regression analysis findings, the likelihood of applying laboratory tests by female surgeons was 4.6 times more than that of male surgeons. The likelihood of applying imaging in female surgeons was 3.8 times greater than the male surgeons; in surgeons of younger than 50 years old, it was 1.5 times higher than that of the older surgeons and in specialist surgeons the same likelihood was higher than the fellowship and subspecialist surgeons. The biopsy order rate was 1.1 times higher by general surgeons than other surgeons and the chance for prescription of unnecessary drugs was 2.9 times greater in younger surgeons than the older ones. Surgeons with a medical lawsuit history had a 3.4 times more chance of unnecessary hospitalization of the patient than other surgeons. Furthermore, the likelihood of unnecessary hospitalization was 2.9 times more by the less experienced surgeons than the experienced ones. Also, the less experienced (odds ratio; $OR=4.6$) and older surgeons ($OR=1.5$) were more likely to order unnecessary consultation. Failure to perform risky intervention was more by neurosurgeons, female surgeons, and less experienced surgeons. In addition, the likelihood of avoiding the acceptance of the high-risk patients was greater in less experienced ($OR=1.5$) and younger ($OR=1.7$) surgeons.

[Table 3]

Discussion

The current study was the first study on the DM behaviors among Iranian surgeons and the findings showed that all the studied surgeons experienced at least one type of DM behavior. The prevalence of DM behaviors in the world is reported from 56% in Italy[9] to 98% in Iran[15]. The increased amount of complaints and the costs of liability insurance put the physicians subject to the fear from the medical malpractice, which may force them to take defensive medicine to avoid the risks of complaints[19, 20]. The current study findings confirmed this claim. In the current study, 74% of surgeons believed that every patient had the potential threat to complain, and almost all of them believed that the rate of complaints from physicians in recent years increased. Evidence suggested that the number of complaints against physicians in Iran rose due to increased awareness of patients over the recent years[21].

About 91.1% of surgeons believed that DM behaviors, especially diagnostic tests, led to higher health costs, which may reduce the referrals[22] and lead to discontinuation of treatment, or even may put patients at high risk including exposure to radiation. In addition, 58.1% of Iranian surgeons were aware of the DM, which was consistent with the findings of study from Sudan[23].

According to findings, 70.5% and 72.2% of surgeons ordered more laboratory tests and imaging for more accurate diagnosis, similar to those of the previous studies [1, 11, 24]. Appropriate care and treatment and clinical judgment require diagnostic tests, which in turn needs the knowledge, skills, and responsibility of the physician[25]. The likelihood of laboratory tests and imaging orders in female surgeons was more than that of male surgeons, which was consistent with the findings of previous studies[15, 24]. The results of a study showed that female physicians ordered more laboratory tests than the male ones, resulting in more costs in this area[26]. It seems that gender differences in practice

approaches affected this behavior[27]. In addition, the imaging order was more in younger surgeons. The findings of the previous studies coincided with the findings of the current study on the effect of age on the DM behavior [1, 16, 28]. Older and, of course, experienced physicians rely heavily on the first clinical impressions and therefore, they may use less diagnostic tests for their patients[29]. In addition, the imaging orders by the specialist surgeons were more than the subspecialists and fellowship surgeons. This finding can be attributed to the knowledge of specialist surgeons and fellowship, since they have higher levels of education and skills, and therefore, have more confidence in their skills, which can help them in diagnoses and less need to additional imaging[27].

According to the findings of the current study, about 80% of surgeons ordered additional biopsy, in which, given the invasive nature of the procedure, the patient was prone to further risks. The biopsy order by general surgeons was higher than other specialties. General surgeons faced with a wide range of diseases and conducted many surgical procedures for cancer such as breast cancer that requires biopsy for the diagnosis. Our findings showed 18.1% of surgeons prescribed unnecessary drugs. Irrational and unnecessary prescription of drugs is one of the most common problems in the health systems, which, in addition to financial costs, has adverse effects on the patient. The World Health Organization (WHO) estimated that about half of the prescribed medications were irrational[30]. The probability of prescribing unnecessary drugs in younger surgeons was higher, which seems to be due to less experience of surgeons to avoid liability arising from medical malpractice.

About 30.8% of the surgeons unnecessarily referred the patients to the hospitals for hospitalization. Unnecessary hospitalization, in addition to imposing financial burden to the health system, can put the patient at risks such as nosocomial infections. The implementation of the standard clinical guidelines and the control of hospital admissions can control this behavior. There was a significant relationship between the history of medical lawsuits, work experience, and unnecessary referral to the hospital. Physicians with previous medical lawsuits may lose their confidence or fear of being sued[16], which could distort their image and reputation. The likelihood of unnecessary patient referral for hospitalization was lower in experienced surgeons, which was consistent with the findings of previous studies [15, 16, 28]. Technical skills are one of the four components of successful surgical procedures, and experienced surgeons had more technical skills[27].

About 43% of surgeons experienced unnecessary counseling for their patients. The likelihood of unnecessary counseling in less experienced surgeons was higher, consistent with the findings of previous studies [15, 16, 28]. It seems that the experience of these surgeons led to a cautious approach to medicine, and therefore, the number of additional advice was particularly required in complex cases. The order of unnecessary advice was higher by older surgeons. Older surgeons may not have the update knowledge, given the increasing professionalization of medicine and the creation of specialized disciplines; therefore, more advice may be needed to fill this gap.

The current study findings showed that 44% of surgeons had the experience of avoiding risky interventions and procedures for their patients, which was higher in neurosurgeons than other disciplines.

This can be attributed to the nature of the neurosurgery that deals with the vital organs of the human body such as the brain and the nervous system. Therefore, given the elegance and the risk of some brain surgeries that affect movement and speech, these surgeons are more cautious about performing risky procedures. The likelihood of avoiding risky interventions was higher in female surgeons. In general, the approach of males to solving complex problems was less thoughtful[31] and the females were less risk takers than males[32].

Additionally, the likelihood of avoiding risky interventions was higher in less-experienced surgeons, consistent with the findings of the studies in Iran and Turkey[15, 28]. Lack of experience may lead to a cautious approach to medicine, and less experienced surgeons preferred to avoid risky interventions as they refused to hurt their own image in their early years.

About 61.6% of the surgeons had an experience of refusing to accept high-risk patients. Mortality is very common in high-risk patients, especially in older patients with co-morbidity undergoing major surgeries[33]. A study in the UK showed that 80% of post-operative mortalities were related to the high-risk group[33]. Therefore, it seems that the main reason for the rejection of high-risk patients was the treatment results and consequences. A study in Norway showed that gynecologists were susceptible to exposure to media since they cared for their reputation. These surgeons tended to be more likely to pursue defensive behaviors when the probability of negative promotions increased[34]. A good reputation is important to establish a reliable patient-physician relationship, which is a good basis for efficient medical practice. Denial to help patients is not compatible with the ethical principle of usefulness, since according to this principle, the patient's welfare is a priority and care providers have a professional commitment to care for the patient. In Iran, according to the general guidelines on professional ethics of Iran Medical Council, refusal to accept high-risk patients is prohibited because of fears of legal consequences and possible damages. The probability of refusing high-risk patients was more in younger and less experienced surgeons. Previous studies also reported similar results [15, 16, 28]. The treatment of high-risk patients may not be successful, and therefore, young surgeons prefer to record fewer unsuccessful operations in their career profile. Due to less experience, they may also have less ability to manage complex conditions in such patients and have less willingness to accept high-risk patients.

Limitations

According to the nature of the study, the conservatism of some surgeons to respond to the questionnaire was anticipated; the researcher, through justifying the study objectives, tried to assure them in respect with the confidentiality of the participants' information. Second, the response to the questions was based on self-reporting and hence the findings included the bias of the self-reported data. Third, it should be noted that making decisions on the appropriateness or inappropriateness of a procedure or medical care is very difficult in many clinical conditions, especially where intervention is required. Hence, it is hard to determine whether or not the provision of a care or procedure is considered a DM behavior and every physician may have its own judgment on the issue [28].

Conclusions

The results of the current study showed that the concept of defensive medicine is not well known and there is a need for educational programs to explain this issue among physicians. In addition, the probability of performing DM behavior among the female, younger, and less experienced surgeons was higher. Strategies such as reforming the rules and regulations for medical errors and patient complaints, increasing monitoring of service delivery, developing and implementing medical guidelines and evidence-based medicine, and reforming medical liability insurance system are effective to reduce defensive medical behaviors in order to prevent its adverse effects on the health system and patients.

Abbreviations

DM: Defensive medicine; MRI: magnetic resonance imaging; CT: computed tomography; WHO: World Health Organization.

Declarations

Ethics and Consent to Participate statement

The Ethics Committee of Shahid Beheshti University of Medical Sciences approved the current study protocol (Code: IR.SBMU.PHNS.REC.1396.14).

Consent for publication

Not applicable.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author.

Competing Interest statement

The authors have no conflict of interest to declare.

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Authors' contributions (if there is more than one author)

EZ- Selected the topic and designed the study, analyzed the data, interpreted the findings, wrote the first draft of the manuscript and revised the manuscript; FA- Selected the topic and designed the study, analyzed the data, interpreted the findings and commented on the first draft of the manuscript; AD- Analyzed the data, interpreted the findings, commented on the first draft of the manuscript and revised the manuscript; AZ- Analyzed the data, interpreted the findings and commented on the first draft of the manuscript.

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Tables

Table 1. Perspective of Iranian surgeons to Defensive Medicine

Statements	Yes		No	
	N	%	N	%
Any patient can potentially be a threat to sue?	119	74.4	40	25
The number of patient's complaints against the physicians increased in the recent years?	154	96.3	3	1.9
DM practices can lead to fewer people access to health services?	132	82.5	22	13.8
DM behaviors lead to increased health care costs?	144	90	14	8.8
DM behaviors (including MRI, CT scan, biopsy, etc.) can be risky for patient safety?	108	67.5	49	30.6
DM behaviors can affect the physician- patient relationship?	145	90.6	9	5.6

Table 2. Frequency of medical defensive behaviors

	DM behaviors	Done		Not done	
		N	%	N	%
1	Unnecessary Laboratory tests	110	70.5	46	29.5
2	Unnecessary Imaging	114	72.2	44	27.8
3	Unnecessary Biopsy	119	78.8	32	21.2
4	Unnecessary drug prescription	28	18.1	127	81.9
5	Use of multiple treatment procedures	52	34.4	99	65.6
6	Unnecessary hospitalization	48	30.8	108	69.2
7	Unnecessary transfer of patient to emergency room	23	14.7	133	85.3
8	Emphasis on unnecessary and frequent visits in health care centers	35	23.2	116	76.8
9	Emphasis on recording the treatment process details and the patient's specific statements in his/her file	136	88.9	17	11.1
10	Description of details and patient participation in treatment selection	150	94.3	9	5.7
11	Unnecessary counseling	65	42.8	87	57.2
12	Avoiding to perform risky intervention	66	44.0	84	56.0
13	Refusing to accept high-risk patients	98	61.6	61	38.4

Table 3. Logistic Regression Results: Factors Affecting Medical Defensive Behaviors

DM Behaviors	Demographic variables		regression results		
			OR	SE	<i>p</i>
Unnecessary Laboratory tests	Gender	Female	4.6	0.657	0.004
		Male	-	-	
Unnecessary Imaging	Age	50>	1.6	0.424	0.041
		50≤	-	-	
	Gender	Female	3.8	0.659	0.013
		Male	-	-	
	Education level	Specialist	1.4	0.791	0.033
		Fellowship	0.7	0.823	
Sub-specialist		-	-		
Unnecessary Biopsy	Specialty	General surgery	1.2	0.706	0.019
		Gynecology	0.5	0.736	
		Orthopedic	0.3	0.656	
		Neurosurgery	0.2	0.710	
		Others	-	-	
Unnecessary drug prescription	Age	50>	2.9	-	0.038
		50≤	-	-	
Unnecessary hospitalization	Previous medical lawsuits	Yes	3.5	0.408	0.008
		No	-	-	
	Work experience	15>	2.9	0.397	0.025
		15≤	-	-	
Unnecessary specialist consultations	Age	50>	-	-	0.031
		50≤	1.5	0.527	
	Work experience	15>	4.6	0.544	0.000
		15≤	-	-	
Avoiding to perform risky intervention	Gender	Female	3.9	0.570	0.003
		Male	-	-	
	Work experience	15>	3.9	0.595	0.01
		15≤	-	-	
	Specialty	General surgery	2.0	0.530	0.011
		Gynecology	0.4	0.805	
		Orthopedic	1.5	0.594	
		Neurosurgery	2.2	0.631	
Others		-	-		
Refusing to accept high-risk	Age	50>	1.76	0.470	0.009

patients		50 \leq	-	-	
	Work experience	15 $>$	1.5	0.470	0.011
		15 \leq	-	-	