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ORIGINAL ARTICLE

Knowledge, Attitude, and Practices of Defensive Medicine Among Junior Physicians; A Cross-sectional Study at Zagazig University Hospitals

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ABSTRACT

Background: Defensive medicine (DM) is a practice where healthcare providers request tests, make procedures, or avoid high-risk patients to protect themselves from potential litigation, has significant implications for healthcare systems globally with serious consequences for patients, and doctors. We aimed in this research to assess knowledge, attitude, and practice pattern (KAP) of defensive medicine among the junior physicians at Zagazig University Hospitals during the year 2023-2024. **Methods:** We performed this cross-sectional research among all (323) junior physicians working at Zagazig University Hospital during the year 2023-2024. Evaluation of KAP about defensive medicine was done by interviewing them using a semi-structured questionnaire. **Results:** Only 12.1% have satisfactory knowledge about defensive medicine. The number of physicians perform at least 1 form of defensive medicine was 306 (94.7%) while 17 (5.3%) did not perform any form of defensive medicine. Negative behavior in the form of avoiding high-risk procedures and avoiding high-risk patients was the most common form of practicing DM revealed. The most common reason for practicing DM was "fear of legal claim" followed by "patient pressure and relief of doctor's anxiety" and "Following clinical standard, ethics. Also, DM practice was found highly affected by the socio-demographic characteristics of studied individuals. **Conclusion:** Defensive medicine is highly prevalent among junior physicians. It is crucial to establish a comprehensive national medical liability framework.

Keywords: defensive medicine, litigation, medical liability, physicians, knowledge.

INTRODUCTION

Instead of putting the patient's needs first, doctors who practice what is known as "defensive medicine" overuse resources like prescriptions, investigations, and treatments to shield themselves against litigation [1]. Defensive medicine (DM) can be categorized into two types, negative type, and positive type, depending on the condition. Avoiding patients with serious conditions or high-risk health services are examples of negative actions; As a result, patients are deprived of proper treatment and hospitalization [2]. The positive defensive actions include prescribing drugs and performing procedures that are not needed [3], whereas the main motivation is to avoid potential malpractice responsibility [4].

Many healthcare providers especially clinicians and emergency room doctors use DM as a preventative strategy against the patient being a prospective plaintiff as well as to defend themselves from lawsuits and malpractice claims [5]. If physicians feel a high level of insecurity, their concern about the possibility of litigation, and their fear of negative consequences for their reputation that could affect their professional standing and respect led to a shift in their attitude, which led them to practice defensive medicine [6]. The expense of health care goes up due to malpractice, and when funds are tight, cutting back in one area must happen. This means that funding one patient's treatment will inevitably come at the

expense of another [7]. DM also puts patients at risk by exposing them to unnecessary procedures or treatments, such as prescribing antibiotics [8,9].

The management plan may also backfire if an unnecessary test comes back with a false positive. As a result, patients are less likely to follow management's orders, which is bad for their health and, worse, breaks the doctor-patient connection [7]. Practices related to DM in healthcare systems have been on the rise recently [1], with variations among countries influenced by a variety of factors [10]. The work aims to enhance the quality of healthcare services through physicians. The Objectives are to assess knowledge, attitude, and practice patterns of DM among the junior physicians at Zagazig University Hospitals by exploring reasons and types of DM practices among junior physicians.

METHODS

A cross-sectional study was carried out among all 323 junior physicians in clinical departments at Zagazig University Hospitals, Sharkia Governorate, during the year 2023-2024. The study utilized a comprehensive sample that included all junior physicians at these hospitals. The residency program at Zagazig University spans 5 years.

For this study, the first year was excluded according to the inclusion criteria, leaving 323 residents in the remaining four years. At the start of the study in 2023, there were 323 residents in these four years, and 85% of them were included in the sample while the remaining 15% refused to participate or were on vacation. By the end of the study in 2024, a certain number of residents who were initially excluded (those in their first year) had progressed into the remaining four years of residency. This resulted in 15% of them being added to the sample. Physicians of both sexes who worked for at least one year at their current position were included. Doctors who didn't agree to participate in the study were excluded.

The study received approval from the Department of Public Health and Community Medicine at the Faculty of Medicine, Zagazig University, and the Institutional Review Board (IRB) of the Faculty of Medicine, Zagazig University, with approval number #10475. Participants were informed about the study's purpose, and verbal consent was obtained. All participant data were kept confidential.

Data were collected using a semi-structured questionnaire comprised of 2 parts. The first part included questions about socio-demographic characteristics such as age, sex, marital status, specialty, sub-specialty, years of residency, and private work. The second part included questions about knowledge, attitudes, and perceptions about defensive medicine practices, The questionnaire was valid for use with Cronbach's $\alpha > 0.600$ [11].

A pilot study was conducted on 10 physicians, to evaluate the content of the tool, as well as to estimate the time needed for data collection and clarity of the tools, the necessary modifications were done, regarding the name of participants it was excluded to keep confidentiality, and the 10 participants were included in the studied sample.

The knowledge section included questions about the definition, types, and sources of information related to defensive medicine. Responses were scored with 1 point for correct answers and 0 for incorrect or unknown answers. Total knowledge scores were classified as satisfactory (50-100%) or unsatisfactory (less than 50%) based on the median cutoff point [12].

Medical litigation experience included six questions about whether the participant or their colleagues had been involved in litigation, willingness to accept patients involved in litigation, reactions to patient complaints, reporting of mistakes to seniors, and perceived support from seniors [11].

Defensive medicine behaviors included eight questions with response options None, sometimes, or always about taking extra details about the disease, giving more details about the way of taking medication properly, unnecessary medication, investigation or referral, avoiding high-risk Patients and procedures. Reasons for practicing defensive medicine included three questions with response options None, sometimes, or always about following clinical standards, concern for legal action by patient, patient pressure, and relief of anxiety [11].

The harm of defensive medicine included three questions with response options agree, disagree, or neutral about the impact of defensive medicine on physician-patient relationships, patient health, and physicians' creativity and progression. The role of physicians in defensive medicine included four questions with response options agree, disagree, or neutral about whether physicians were seeking protection through using defensive medicine for rights, physicians were managing the patient as a potential threat, physicians stick to guidelines, doctors whose whole focus is on their patient's well-being, regardless of the cost [11].

STATISTICAL ANALYSIS

Results were displayed in tables and graphs as percentages and frequencies after SPSS version 22 processed the obtained data. To compare categorical variables across various groups, the Chi-square test was employed, with a significance level of $P < 0.05$ being utilized for statistical analysis.

RESULTS

Table (1) demonstrates that the mean age of the study participant is (28.4±1) years old, ranging from 26-31 years. Of the participants, 53.9% are male, and more than half (57%) are single. Regarding years of residency, the majority have been residents for two years (43.7%). Additionally, 63.2%of them work in a medical specialty, while 36.8% work in the surgical field. Figure (1) shows that only 12.1% have satisfactory knowledge about defensive medicine.

Doctors were asked to identify the most typical triggers for their defensive behavior. The most common reason was "fear of legal claim" (96.6%) followed by "patient pressure & relief of doctor's anxiety" (87%) and "Following the clinical standard, ethics" (74.9%) as presented in Table (2). The number of physicians perform at least 1 form of defensive medicine was 306 (94.7%) while 17 (5.3%) did not perform any form of defensive medicine.

Figure (2) shows that negative behavior in the form of avoiding high-risk procedures and avoiding high-risk patients was the most common form of practicing DM.

The majority of physicians didn't engage in ordering unnecessary medication (77.70%) and to a lesser extent, unnecessary investigations (48.30%) and referrals (54.20%), while (57%) sometimes avoid high-risk patients and (52 %) sometimes avoid high-risk procedures.

Table (3) shows that out of all the participants, just 18% have experience with medical litigation, but 76.8% of their colleagues do, 51.1% of participants would accept patients who were previously involved in medical litigation while 17.3% of participants would refuse to treat patients who complained against them, 64.1% of participants sometimes report their own mistakes freely & 55.4% of participants often feel supported in their medical decision by their staff.

Physicians with longer years of residency have more satisfactory knowledge about Defensive medicine than physicians in the first 2 years of residency where satisfactory knowledge is 23% in four years of residency vs. 5.1% among physicians of one year of residency as shown in Table (4).

There is a statistically significant difference between defensive medicine practices and sex. Females are less likely to order unnecessary medication ($p = 0.014$), unnecessary investigations ($p = 0.001$), and unnecessary referrals ($p = 0.00$) compared to males. However, females are more likely to avoid high-risk procedures ($p = 0.001$) as shown in table (5).

Physicians with longer duration in practicing medicine were significantly less likely to practice defensive medicine with first-year residents most likely to order unnecessary medication ($p = 0.007$) as demonstrated in Table (5).

A highly statistically significant difference was revealed between defensive medicine practice and specialty as regards: Ordering unnecessary investigations ($p = 0.00$) & ordering unnecessary referrals ($p = 0.00$), with non-surgical specialties less likely to order unnecessary investigations and referrals. And avoiding high-risk procedures: ($p = 0.001$), with non-surgical specialists more likely to avoid high-risk procedures as shown in Table (5).

Table (1): Socio-demographic characteristics of the study participants (junior physicians in Zagazig university hospital) (N=323).

Socio-demographic characters		Total (323)	
		No.	%
Age (years)	Mean ± SD. Range	28.46 ± 1.040 26-31	
Sex	• Male • Female	174 149	53.9% 46.1%
Marital status	• Married • Single	139 184	43% 57%
Specialty	• Surgical • Non-Surgical	119 204	36.8% 63.2%
Years of residency	• Mean ± SD. • Range	2.51 ± 0.934 1-4	

Socio-demographic characters		Total (323)	
		No.	%
Years of residency	• One • Two • Three • Four	39 141 82 61	12.1 43.7 25.4 18.9
Private work	• Private hospital • Clinic • No private work	120 40 163	37.2 12.4 50.5

Table (2): Defensive medicine attitude among study participants(N=323).

Defensive medicine attitude	participants (323)					
	agree		disagree		Neutral	
	No.	%	No.	%	No.	%
Harm of defensive medicine.						
Defensive medicine impairs physician-patient relationship and induce new conflicts	96	%29.7	107	%33.1	120	%37.2
Defensive medicine impairs patients' physical and psychological health	77	%23.8	157	%48.6	89	%27.6
Defensive medicine restricts physicians' mentality, creativity, and medical progression	104	%32.2	121	%37.5	98	%30.3
Physicians' roles in defensive medicine.						
Physicians should seek protection by defensive medicine for rights, interests and security.	231	%71.5	9	%2.8	83	%25.7
Physicians should treat the patient as potential threat of a medical lawsuit	110	%34.1	99	%30.7	114	%35.3
Physicians should stick to guidelines and basic principles in daily practice	280	%86.7	23	%7.1	20	%6.2
Physicians should be solely devoted to patients' best interests even if that is expensive	169	%52.3	78	%24.1	76	%23.5
Reasons for practicing defensive medicine.						
	none		sometimes		Always	
Doctors use defensive medicine to Follow clinical standard and ethics during the treatment of their patients?	81	%25.1	216	%66.9	26	%8
Doctors use defensive medicine to protect them from Legal concern by patients?	11	%3.4	175	%54.2	137	%42.4
Doctors use defensive medicine because of Patient pressure and to relief patients' anxiety?	42	%13	249	%77.1	32	%9.9

Table (3): Experience with medical litigation among the study participants (N=323).

Participants' experience		Participants (323)	
		No.	%
Have you been involved in medical litigation?	Yes No	58 265	18% 82%
Has anyone of your colleagues ever been involved in medical litigations?	Yes No	248 75	76.8% 23.2%

Participants' experience		Participants (323)	
		%	%
Are you willing to accept patients who were previously involved in medical litigation?	Yes No	165 158	51.1% 48.9%
If a patient complained against you, what is your reaction?	Complete his management. Refer him to another doctor. Refuse to treat him.	89 178 56	27.6% 55.1% 17.3%
Do you freely report your own mistakes to your seniors?	None Sometimes Always	20 207 96	6.2% 64.1% 29.7%
Do you feel supported in your medical decision by your senior staff?	None Sometimes Always	70 179 74	21.7% 55.4% 22.9%

Table (4): Knowledge about defensive medicine in relation to sociodemographic characteristics of study participants(N=323).

Factors affecting knowledge	Un-satisfactory (284)		Satisfactory (39)		test of sig. ($\chi 2$)	p-value
	No	%	No	%		
Sex • Male • female	 152 132	 87.4% 88.6%	 22 17	 12.6% 11.4%	0.115	0.734
Specialty • Surgical • Un-surgical	 105 179	 88.2% 87.7%	 14 25	 11.8% 12.3%	0.017	0.896
Years of residency • One • Two • Three • four	 37 138 62 47	 94.9% 97.9% 75.6% 77.0%	 2 3 20 14	 5.1% 2.1% 24.4% 23.0%	33.425	**0.00* (HS)**

Table (5): Defensive medicine practice in relation to Socio-demographic characteristics among study participants (N=323).

Defensive medicine practice	Sex (N=323)					
	Male (174)		Female (149)		Test of sig.($\chi 2$)	p-value
	No.	%	No.	%		
Order unnecessary medication?						
None Sometimes Always	126 43 5	72.4% 24.7% 2.9%	125 24 0	83.9% 16.1% 0.0%	8.508	**0.014***
Order unnecessary investigation?						
None Sometimes Always	67 96 11	38.5% 55.2% 6.3%	89 53 7	59.7% 35.6% 4.7%	14.553	**0.001***
Order unnecessary refer?						
None Sometimes Always	69 78 27	39.7% 44.8% 15.5%	106 42 1	71.1% 28.2% 0.7%	41.077	**0.00*** (HS)
Avoid high-risk patient?						
None Sometimes Always	68 99 7	39.1% 56.9% 4.0%	53 85 11	35.6% 57.0% 7.4%	1.890	0.389

Avoid high-risk procedure?						
Defensive medicine practice	**Specialty (N=323)**	**Defensive medicine practice**	**Specialty (N=323)**	**Defensive medicine practice**		
None	75	43.1%	39	26.2%		
Sometimes	86	49.4%	82	55.0%	15.107	**0.001***
Always	13	7.5%	28	18.8%		
Order unnecessary medication?						
None	90	75.6%	161	78.9%		
Sometimes	26	21.8%	41	20.1%	1.368	0.505
Always	3	2.5%	2	1.0%		
Order unnecessary investigation?						
None	42	35.3%	114	55.9%		
Sometimes	72	60.5%	77	37.7%	15.671	**0.000* (HS)**
Always	5	4.2%	13	6.4%		
Order unnecessary refer?						
None	43	36.1%	132	64.7%		
Sometimes	56	47.1%	64	31.4%	30.696	**0.000* (HS)**
Always	20	16.8%	8	3.9%		
Avoid high-risk patient?						
None	49	41.2%	72	35.3%		
Sometimes	64	53.8%	120	58.8%	1.125	0.570
Always	6	5.0%	12	5.9%		
Avoid high-risk procedure?						
None	51	42.9%	63	30.9%		
Sometimes	63	52.9%	105	51.5%	13.789	**0.001***
Always	5	4.2%	36	17.6%		

Defensive medicine practice	**years of residency (N=323)**								**Test of sig. (χ2)**	**p-value**
	one (39)		**Two (141)**		**Three (82)**		**four (61)**			
	No.	%	No.	%	No.	%	No.	%		
Order unnecessary medication?										
None	24	61.5%	107	75.9%	72	87.8%	48	78.7%		
Sometimes	15	38.5%	29	20.6%	10	12.2%	13	21.3%	17.712	**0.007**
Always	0	0.0%	5	3.5%	0	0.0%	0	0.0%		
Order unnecessary investigation?										
None	11	28.2%	74	52.5%	37	45.1%	34	55.7%		
Sometimes	26	66.7%	58	41.1%	42	51.2%	23	37.7%	11.194	0.083
Always	2	5.1%	9	6.4%	3	3.7%	4	6.6%		
Order unnecessary refer?										
None	23	59.0%	70	49.6%	48	58.5%	34	55.7%		
Sometimes	14	35.9%	64	45.4%	20	24.4%	22	36.1%	16.714	**0.010**
Always	2	5.1%	7	5.0%	14	17.1%	5	8.2%		
Avoid high-risk patient?										
None	15	38.5%	62	44.0%	24	29.3%	20	32.8%		
Sometimes	20	51.3%	76	53.9%	52	63.4%	36	59.0%	10.268	0.114
Always	4	10.3%	3	2.1%	6	7.3%	5	8.2%		
Avoid high-risk procedure?										
None	15	38.5%	55	39.0%	22	26.8%	22	36.1%		
Sometimes	17	43.6%	67	47.5%	51	62.2%	33	54.1%	6.601	0.359
Always	7	17.9%	19	13.5%	9	11.0%	6	9.8%		

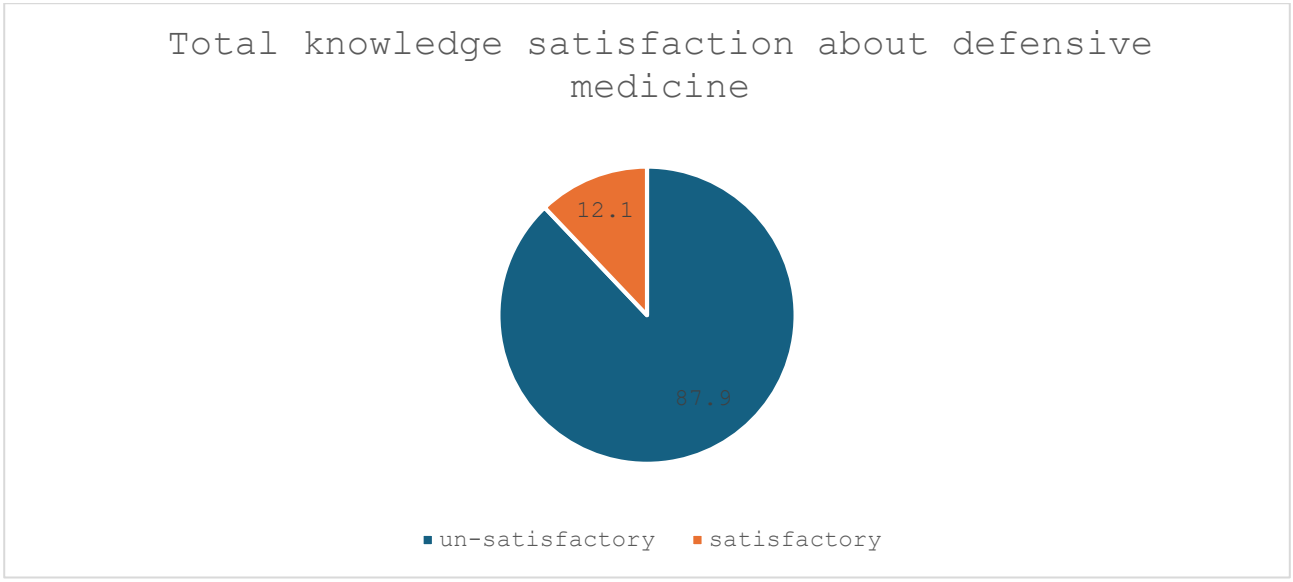

Figure (1): Pie diagram showing percentage of total knowledge satisfaction about defensive medicine among the studied physicians (N=323).

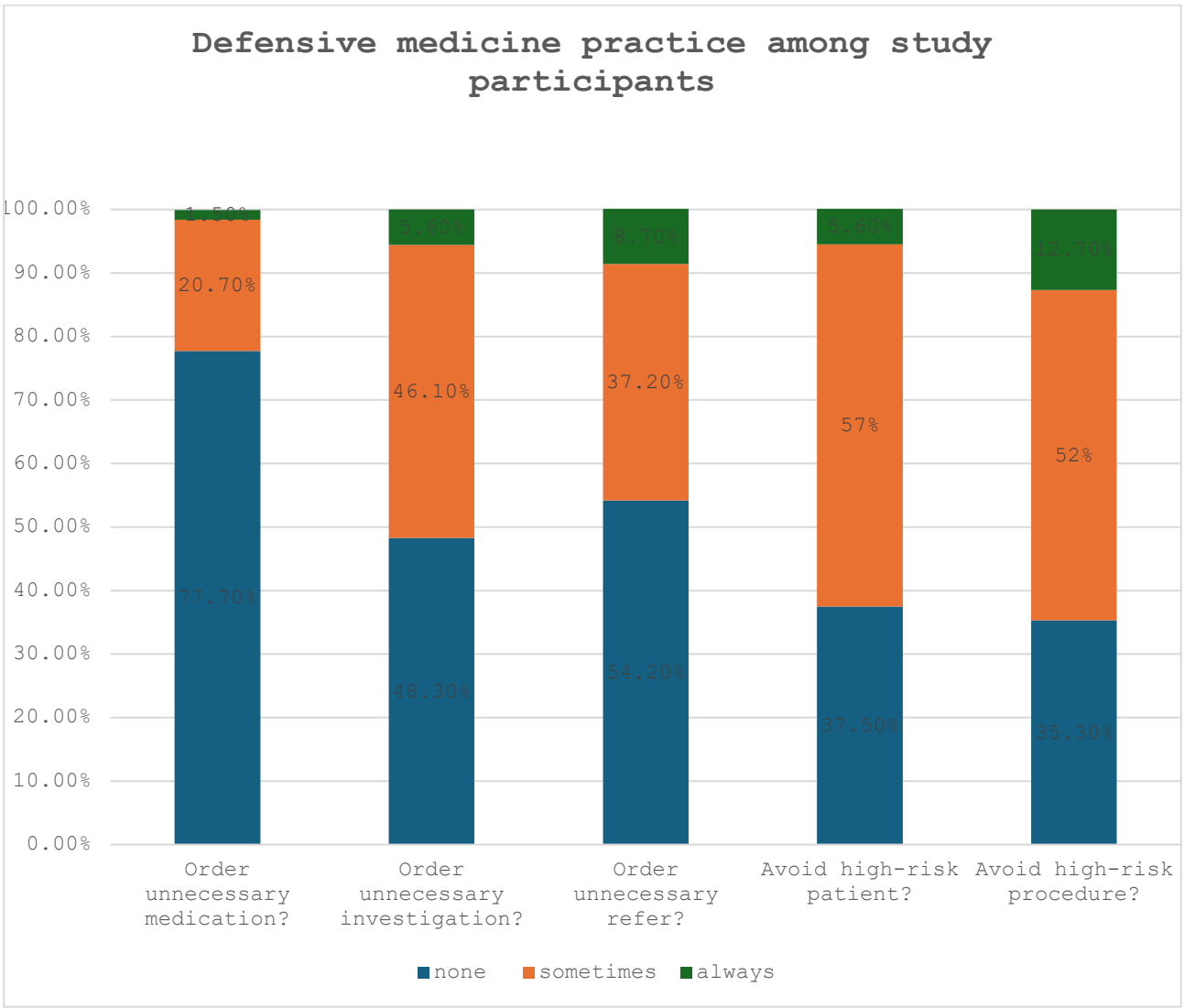

Figure (2): Bar chart showing DM practice among the studied participants (n=323).

DISCUSSION

Defensive medicine is a phenomenon affecting diagnostic-therapeutic areas, leading to a waste of human, organizational, and economic resources. It includes both assurance behavior in the form of excessive ordering of extra investigations, medication, and referrals and avoidance behavior when the doctor is working with patients or performing procedures that could put them in danger [13].

In this study, 87.9% of participants had unsatisfactory knowledge of defensive medicine, while 94.7% practiced at least one form. This aligns with research at Kasr Alainy Hospitals, where most junior doctors were unaware of the term but 90% engaged in defensive medicine practices [14]. Conversely, a study in Sudan found that 42.7% of doctors understood the concept, and 71.8% practiced it [15], while a study in Ethiopia, 51.7% were aware of defensive medicine [16]. The variation in awareness about defensive medicine could be attributed to differences in medical education and training programs across regions. The current study also indicated that knowledge of defensive medicine improved with residency years. Senior residents had more satisfactory knowledge, this was most likely due to increased clinical experience, advanced training, legal and ethical awareness, better decision-making, and continuous learning.

The most common reason for practicing defensive medicine among the participants in our study was "fear of legal claim" (96.6%) followed by "patient pressure & relief of doctor's anxiety" (87%) and "Following clinical standard, ethics" (74.9%), this is concordant with Catino *et al*. [17] who reported that fear of legal complaints (80.4%), knowing about colleagues' lawsuits (65.7%), compensation (59.8%), having a prior lawsuit (51.8%), negative publicity (43.5%), disciplinary measures (15%), and loss of reputation were the most important reasons for defensive medical practices. Ali *et al*. [15] also found that the potential consequences of doctors' judgments about their patients have a significant impact on these decisions. Nearly 90% of people think that lawsuits filed against doctors are on the rise, and 27% have been the target of such actions themselves. Another study conducted in Turkey revealed that fear of malpractice suits was the most common form of defensive medicine, Patients and caregivers dealing with cancer in Turkey have the right to file complaints with the relevant administrative management. [18]. Also, Jordanian physicians cited troublesome legal legislation and high patient expectations as key reasons for practicing defensive medicine [19]. Arafa *et a*l. [20] also claimed that defensive medicine was positively connected with having experience with malpractice cases. Given that defensive medicine is primarily motivated by the fear of litigation**.** However, just 11.1% of Iranian doctors used defense medicine due to fear of legal action, according to a survey [21].

Also, our study was in contrast with Kasr Alainy's study where the most common reason for practicing DM among physicians was "Following clinical standard, ethics" (93.1%) followed by "fear of legal claim" (84.7%) [14], and a study conducted in Bahrain showed that the most common reason for practicing DM was "patient pressure" 86.4% followed by "relieve of doctor's anxiety" 65% and "fear of legal claim" 61% [10].

In the current study, 86.7% of the participants were against practicing DM even though 71.5% of them agreed to seek protection for their rights, interests, and security through defensive medicine, they insisted that they should adhere to standards and fundamental principles in their daily practice. Findings are in line with a Chinese study on obstetrics and gynecology, in which over 50% of participants were opposed to defensive medicine (arguing that they should adhere to basic principles and guidelines in their daily practice) while over 50% were in favor of the concept (contributing to seek protection for their rights, interests, and security through defensive medicine) [11]. Healthcare reformers and administrators should be concerned about this contradiction since it likely emerged from the conflict between doctors' professional idealism and the demanding nature of their relationships with patients.

Only 29% of surveyed doctors agree that Defensive medicine impairs physician-patient relationships and induces new conflicts, this is inconsistent with a survey that was carried out in Shenzhen City, in December 2013 where Descriptive studies indicated high dissatisfaction with salary and workload as well as severe conflicts between doctors and patients [22].

In the present study, the prevalence of practicing defensive medicine (94.7%) is higher than the rates reported by the studies conducted in Italy, China, Jordan, and Ethiopia. In these studies, the rates were (59.8%, 62.9%, 68%, 74.2%), respectively [23,11,19,16]. While its high research conducted on gastroenterologists in Japan reported a defensive medicine rate of 98% [24] and, Turkey where the majority of defensive medicine's positive and unfavorable aspects were used at least once in 94.2% of cases [3]. This is similar to the percentage of general practitioners in Southeast Iran who

practice negative defensive medicine was 79.2% and the percentage who practice positive defensive medicine was 99.8% [21]. The global variation in the prevalence of defensive medicine could be attributed to differences in legal environments, medical cultures, specific specialty practices, healthcare systems, and the levels of physician training and ethics.

The current study revealed that of the 323 respondents who practiced defensive medicine, the most common form of DM was negative behavior in the form of avoiding high-risk procedures (64.7%) where 12.7% of doctors always & 52% of doctors sometimes avoid high-risk procedures then avoiding high-risk patients (62.5%) where 5.6% of doctors always and 57% of doctors sometimes avoid high-risk patients. The most common form of practicing positive defensive medicine was Ordering unnecessary investigation (51.7%) followed by Ordering unnecessary referral (45.8%), the least common form was Ordering unnecessary medications (22.3%).

Interestingly, this study found that assurance practice was lower than avoidance practice. In contrast, a study in Italy found that active DM was more common than passive DM [23], and a study in the United States among residents of three internal medicine residency programs in the 2018-2019 academic cycle indicated that assurance defensive practices were more common than avoidance practice [25].

Also, on Contrary to the present study, research conducted in Turkey found that although both forms of defensive medicine are common, negative defensive practices were slightly less prevalent but still significant. The prevalence of negative defensive medicine was 75.6%, compared to 79.7% for positive defensive medicine [3]. Contrary to what was found in a 2016 study by Ali *et al*. [15] and colleagues in Sudan, 41% of obstetrics and gynecology doctors reported positively using defensive medicine, while 30.8% reported negatively using defensive medicine. The findings of this study align with a study conducted in Egypt which assessed the prevalence of defensive medicine practices, where 89.6% of physicians reported avoiding high-risk procedures, and 87.8% avoided high-risk patients [20]. Similarly, a study at Kasr Alainy Hospitals and among surgeons in Ethiopia found that avoiding high-risk procedures was the most common defensive behavior [14,16].

The higher prevalence of negative defensive medicine in this study could be attributed to the lack of support, advanced medical equipment, and clear guidelines for managing high-risk patients. Younger physicians, with an average age of 28.46 years, might be concerned about their experience and ability to handle complex cases. Regarding positive defensive practices, ordering unnecessary referrals and tests was more common than unnecessary medications, likely because medications carry higher risks of adverse effects.

The study found a significant correlation between defensive medicine practices and gender. Male doctors were more likely to perform positive defensive medicine in the form of ordering unnecessary medications, investigations, and referrals, while female doctors were more likely to perform negative defensive medicine by avoiding high-risk procedures, as shown in Table (5). This aligns with a 2014 study from Iran where women practiced more negative defensive medicine than men (83.6% vs. 76%) [21] and a 2018 study in Bahrain where females engaged in defensive medicine more frequently than their male counterparts [10]. Men were more likely to employ defensive medicine practices than women, according to an Egyptian study. The gender distribution across different fields of study may account for this discrepancy. Some high-risk medical fields, such as orthopedics, obstetrics & gynecology, and general surgery, may be off-limits to Egyptian women due to cultural norms that discourage them from taking risks [20]. A study conducted in England found no statistical relevance between defensive medicine practice and gender, which contradicts the conclusions of the current study [5].

We revealed that defensive medicine was far less common among doctors who had been practicing for more years. These findings are in line with the study carried out in the Kingdom of Bahrain, which found that doctors were 4% less likely to use defensive medicine for every additional year of clinical experience [10].and a study conducted among hospital doctors in the United Kingdom. This could be explained as more experienced physicians tend to have greater clinical confidence and judgment, reducing the need for excessive tests and procedures to avoid errors, they also gain a better understanding of the legal environment and how to avoid defensive medicine [5]. A study conducted among surgeons in Ethiopia didn't show any correlation between age, year of experience, and rate of defensive practice [16]. The lack of expertise among younger medical professionals is likely responsible for these results. To avoid legal trouble or to give their patients the best treatment possible, younger doctors may feel pushed to order unneeded tests or medications.

Forceps and vacuum-assisted vaginal delivery are two procedures that residents may never learn how to do because of defensive medicine practices [26]. The present study showed that doctors working in surgery are more likely or perform positive defensive medicine in the form of Ordering unnecessary investigations& ordering unnecessary referrals. Doctors working in specialties other than surgery are more likely to perform negative defensive medicine in the form of avoiding high-risk procedures. A study carried out in the United Kingdom found no statistically significant variation in the use of defensive medicine across medical subspecialties, which runs counter to our findings [5].

Residents of surgical specialties may be more susceptible to psychological burden and mental stress than residents of nonsurgical specialties since 88.9% of respondents in a cross-sectional study including Kasr Alainy hospital residents reported feeling insecure during their medical practice [27].

Additionally, an Italian study found that defensive medicine was more common in certain medical fields than others. This was especially true in gynecology (97% prevalence), gastroenterology (94% prevalence), and traumatology and orthopedics (96% prevalence) [23]. Other studies came in line and found that obstetricians reported the highest frequency of defensive medicine practices in Egypt, Brazil, the United Kingdom, and Sudan [20,26,28,29]. The rate of cesarean sections performed in Egypt is among the highest globally. Nearly a third of Egyptian OB/GYNs were the subjects of allegations of malpractice, according to recent research [31].

Government and legal authorities should implement tort reform to establish clear medical liability standards, provide affordable malpractice insurance with incentives for doctors who have low litigation rates, criminalize violence against healthcare professionals, and ensure that medical syndicates are represented in juries to judge doctors based on the information available at the time of care. Healthcare organizations should develop evidence-based clinical guidelines, establish support systems, offer continuous training for junior physicians, and promote patient advocacy. Healthcare providers should improve communication with patients, ensure informed consent, and adhere to medical guidelines and evidence-based practices to protect against malpractice. Further studies about defensive medicine practices and medical litigation among senior health care workers are recommended.

Limitations:

Data were obtained from self-reported questionnaires. Additionally, the recall factor could have influenced participants' responses. The study was conducted in a single hospital, specifically Zagazig University Hospital, limiting the generalizability of the findings to other hospitals both within Egypt and internationally. Furthermore, the study focused exclusively on junior physicians, not all doctors.

Declaration of interest:

The authors report no conflicts of interest.

Funding information:

This study was not supported by any source of finding.

CONCLUSION

Only 12.1% of junior physicians at Zagazig University Hospital have satisfactory knowledge of defensive medicine. The prevalence of practicing at least one form of defensive medicine was (94.7%) in the form of avoiding high-risk procedures and avoiding high-risk patients. Defensive medicine is highly prevalent among junior physicians. It is crucial to establish a comprehensive national medical liability framework.

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