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Medical Malpractice Risk Factors: An Economic Perspective of Closed Claims Experience

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Abstract

Context: Recent research in Europe and the USA revealed that the number of patients who have experienced a medical error in healthcare has increased worryingly since the last decade, while over half of harm refers to medical errors reasonably preventable. At the same time, surveys indicate that medical errors constitute a significant financial burden on Health Care Systems.

Objectives: The aim of this paper is to present the current situation regarding the medical errors in Greece and to identify the underlying factor contributing to their presence.

Method: We performed an extensive analysis of 287 cases of medical malpractice presented in front of the Greek courts over the last 15 years. The research process included a detailed review of the case while economic and other data where recorded. Then simple descriptive statistical analysis, cross-tabs analysis, ANOVA and logistic regression analysis was applied to unveil information relevant to our research.

Results: The findings from our analysis showed that some 45% of medical errors occur during treatment while most incidents of medical error related to death (37%) or permanent disability (36%). Further, the analysis unveiled that on top of the list of specialties who are involved in cases of medical errors and with higher awarded compensation are those of General Surgery and Obstetrics - Gynecology. In Greece, unlike other countries in the world, the assessment of an overall burden of medical errors is not achievable, mainly due to the absence of any medical error reporting system.

Keywords: Medical errors; Healthcare costs; Patient safety; Health care quality

Introduction

For several years, medical errors are a very common phenomenon, in worldwide which can cause temporary or permanent harm to patients when receiving healthcare. At the same time, the economic burden on the Health Care Systems seems to be very high [1].

The Quality Interagency Coordination Task Force [2] presents the definition for medical error, as follows: “An error is defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. Errors can include problems in practice, products, procedures, and Systems”.

In To Err is Human, the IOM [3] sets the definition for an adverse event, as follows: “An adverse event is defined as an injury caused by medical management rather than by the underlying disease or condition of the patient”.

In U.S.A., 98,000 deaths occur annually in hospital care due to medical errors [4] and in U.K. between 20,000 to 30,000 patients die each year, as a consequence of adverse events while a greater proportion of patients is suffered by health complications [5,6]. In Germany, 30,000 patients die every year [4] and in New Zealand, over 50,000 hospitalized patients have harmed by one or more medical errors [7]. In Greece, there are no official statistics for the current situation regarding the medical errors due to an absence of any medical error reporting system which obstructs any attempt of recording and analysis of adverse events and medical errors in Greece. The detection of adverse events and medical errors is through spontaneous reporting and thus finally identified, only a small number of them [1]. However, informal Greek statistics mention that between 20 to 30 patients die every day and about 200 patients daily suffer from serious medical errors, many of which could have been prevented [8].

The aim of this paper is to present the current situation regarding the medical errors in Greece through Greek courts’ judgments and also to display the main characteristics of Medical Error Reporting Information System (MERIS) which used to identify, collect, report and analyze medical errors and

patient adverse events, for enhancing the patient safety and health care quality.

Materials and Methods

Our research was conducted through Greek courts' judgments with a sample of 287 cases, associated with medical malpractice, over the last 10 years. The research process includes a detailed overview of the content of legal cases and the establishment of a database that records encoded data related to (e.g.): (a) Type of Health Care Unit, (b) Medical Specialty, (c) Description of case, (d) Phase of care, (e) Severity of Medical Error, (f) Amount of financial compensation. Following, the classification of medical errors' types, deals with [9]:

Diagnostic Errors

Treatment Errors

Preventive Errors

Other

The National Coordinating Council for Medication Error Reporting and Prevention [10] displays the following categories of severity, in case medical errors do cause harm:

Category E (Temporary harm to the patient and required intervention)

Category F (Temporary harm to the patient and required initial or prolonged hospitalization)

Category G (Permanent patient harm)

Category H (Intervention required to sustain life)

Category I (Patient death)

Then, simple descriptive statistical analysis, cross-tabs analysis, ANOVA and logistic regression analysis was applied to unveil information relevant to our survey.

Results

In public hospitals seem to occur more medical errors (67.94%) than in private health sector, but this is normally due to the fact that a large proportion of sample coming from Administrative Courts (Figure 1). Most medical errors happen during the Treatment with 44.25%, followed by errors at phase of Diagnosis with 32.40% (Figure 2). The 36.93% of medical errors resulted in death and 35.89% permanent disability (Figure 3). The interventional specialties of Obstetrics and Gynecology and General Surgery gather more incidents of medical errors (Figure 4). The "responsible" medical specialties for the highest financial compensations are again all surgical specialties and follow Anesthesiologists (Figure 5). The highest mean compensation awarded by courts in patient death (Figure 6).

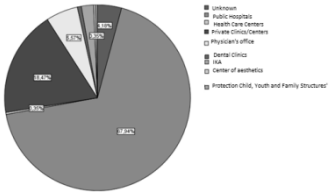

Figure 1: Medical errors by healthcare type.

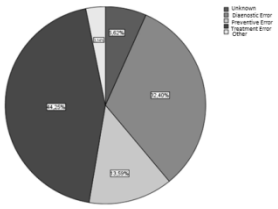

Figure 2: Types of medical errors.

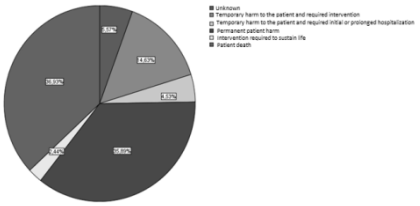

Figure 3: Types of medical errors severity.

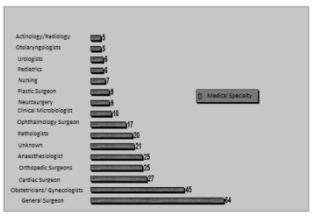

Figure 4: Frequency of medical errors by specialty.

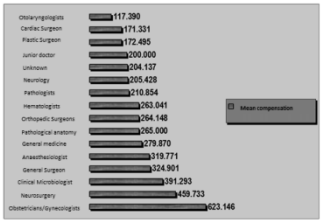

Figure 5: Mean compensation by specialty (>100.000 €).

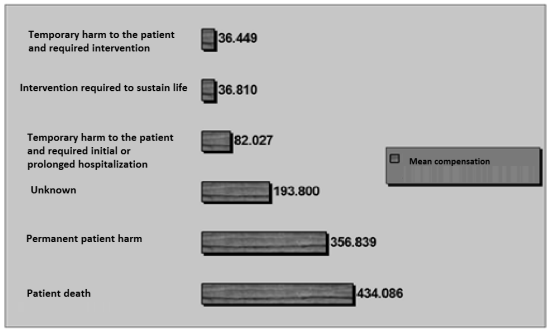

Figure 6: Mean compensation by severity.

According to preliminary newer findings from the analysis of 680 cases of awarded compensations, we applied a logistic regression model for the modelling of the medical errors' severity contributing factors.

So, we set two levels of medical errors severity:

$$code = \begin{cases} 1, & for \text{ the categories } G, H, I \\ 0, & for \text{ all other categories} \end{cases}$$

We modelled the probability p of the onset of medical error of high severity (meaning any medical error falling in the categories G, H, I). Using the variables analysis as in Table 1, we incorporated in the regression equation the variables Specialty, Type of Medical Error, ICD-10 Code and Type of Care (Pathological or Surgical), that are statistically significant.

Table 1: Variables in the model.

	B	S.E.	Wald	df	Sig.	Exp(B)
TYPE OF MEDICAL ERROR			0,96	4	0,916	
TYPE OF MEDICAL ERROR(1)	-154,453	16986,046	0	1	0,993	0
TYPE OF MEDICAL ERROR(2)	-17,233	15209,012	0	1	0,999	0
TYPE OF MEDICAL ERROR(3)	-47,317	15438,361	0	1	0,998	0
TYPE OF MEDICAL ERROR(4)	-16,357	15209,012	0	1	0,999	0
SPECIALTY			1,616	28	1	
SPECIALTY(1)	-89,666	100485,099	0	1	0,999	0
SPECIALTY(2)	-17,679	94033,124	0	1	1	0
SPECIALTY(3)	-64,452	114852,129	0	1	1	0
SPECIALTY(4)	8,928	93459,776	0	1	1	#######
SPECIALTY(5)	47,841	101851,942	0	1	1	5,99E+20
SPECIALTY(6)	-11,655	93626,129	0	1	1	0
SPECIALTY(7)	-45,896	94060,1	0	1	1	0
SPECIALTY(8)	-42,034	105107,382	0	1	1	0
SPECIALTY(9)	-0,894	74601,08	0	1	1	0,409
SPECIALTY(10)	23,896	93611,82	0	1	1	2,39E+10
SPECIALTY(11)	7,103	93459,776	0	1	1	#######
SPECIALTY(12)	-47,369	145681,831	0	1	1	0
SPECIALTY(13)	-12,866	93709,058	0	1	1	0
SPECIALTY(14)	-85,166	102488,278	0	1	0,999	0
SPECIALTY(15)	-14,124	101735,951	0	1	1	0
SPECIALTY(16)	-68,359	93546,736	0	1	0,999	0
SPECIALTY(17)	-53,258	93513,278	0	1	1	0
SPECIALTY(18)	25,47	94095,863	0	1	1	1,15E+11
SPECIALTY(19)	86,476	102298,712	0	1	0,999	3,60E+37
SPECIALTY(20)	27,337	99472,535	0	1	1	7,46E+11
SPECIALTY(21)	5,881	93459,776	0	1	1	358,151

SPECIALTY(22)	26,522	95264,807	0	1	1	3,30E+11
SPECIALTY(23)	-48,714	93846,831	0	1	1	0
SPECIALTY(24)	42,981	133561,607	0	1	1	4,64E+18
SPECIALTY(25)	90,001	116007,584	0	1	0,999	1,22E+39
SPECIALTY(26)	42,166	273394,117	0	1	1	2,05E+18
SPECIALTY(27)	-31,968	67506,37	0	1	1	0
SPECIALTY(28)	26,533	94157,902	0	1	1	3,34E+11
ICD-10 CODE			1,151	19	1	
ICD-10 CODE(1)	38,938	67489,548	0	1	1	8,14E+16
ICD-10 CODE(2)	3,526	55112,097	0	1	1	33,979
ICD-10 CODE(3)	150,086	69711,942	0	1	0,998	1,52E+65
ICD-10 CODE(4)	-31,688	55452,663	0	1	1	0
ICD-10 CODE(5)	-18,009	88637,218	0	1	1	0
ICD-10 CODE(6)	37,221	60906,558	0	1	1	1,46E+16
ICD-10 CODE(7)	-11,57	68487,018	0	1	1	0
ICD-10 CODE(8)	-33,358	55452,663	0	1	1	0
ICD-10 CODE(9)	42,16	55473,917	0	1	0,999	2,04E+18
ICD-10 CODE(10)	-32,669	55452,663	0	1	1	0
ICD-10 CODE(11)	0,937	55883,802	0	1	1	2,551
ICD-10 CODE(12)	37,071	56629,548	0	1	0,999	1,26E+16
ICD-10 CODE(13)	44,805	67803,266	0	1	0,999	2,88E+19
ICD-10 CODE(14)	24,724	54766,301	0	1	1	5,46E+10
				1	1	0
ICD-10 CODE(16)	-31,927	74588,272	0	1	1	0
ICD-10 CODE(17)	-33,858	55452,663	0	1	1	0
ICD-10 CODE(18)	1,795	55331,554	0	1	1	6,02
ICD-10 CODE(19)	59,787	56282,973	ICD-10 CODE(15)	-29,658	60820,429	0
TYPE OF CARE(1)	44,173	3173,311	0	1	0,989	1,53E+19
Constant	43,249	107589,67	0	1	1	6,07E+18

a. Variable(s) entered on step 1: TYPE OF MEDICAL ERROR.

b. Variable(s) entered on step 2: ICD-10 CODE.

c. Variable(s) entered on step 3: TYPE OF CARE.

d. Variable(s) entered on step 4: SPECIALTY.

The predictive function incorporates the 4 contributing variables (factors) and estimates the probability p. More specifically, we have:

$$\ln\frac{p}{1-p} = A + \sum_{i=1}^{4} a_i X_i + \sum_{j=1}^{28} b_j Y_j + \sum_{k=1}^{19} c_k Z_k + d_1 W_1$$

Where,

- $A=43, 249$
- The X_i, $i=1,2,3,4$ are indicative variables, referring to the contributing factor TYPE OF MEDICAL ERROR
- The Y_j, $j=1,2,\ldots,28$ are indicative variables, referring to the contributing factor SPECIALTY
- The Z_k, $k=1,2,\ldots,19$ are indicative variables, referring to the contributing factor ICD-10 CODE
- The W refers to the contributing factor TYPE OF CARE

The medical error severity seems also to be statistically significant for the awarded compensation amount (Table 2).

Table 2: Test of between-subjects effects.

Tests of Between-Subjects Effects Dependent Variable: Awarded Compensation Amount					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	8,496E12	6	1,416E12	5,071	0,000
Intercept	2,331E12	1	2,331E12	8,348	0,004
Medical Error Severity	8,496E12	6	1,416E12	5,071	0,000
Error	5,892E13	211	2,792E11		
Total	8,712E13	218			
Corrected Total	6,741E13	217			
a, R Squared = 0,126 (Adjusted R Squared = 0,101)					

Moreover (as shown in Table 3) the higher awarded compensation amounts are related to the severity categories I and G.

Table 3: Estimates test of between-subjects effects.

			95% Confidence Interval	
Medical error severity	Mean	Std, Error	Lower Bound	Upper Bound
	9176,905	115310,078	-218130,467	236484,277
Unknown	177649,787	152540,895	-123049,602	478349,176
Category E	42927,524	90622,796	-135714,533	221569,580
Category F	152265,487	176139,054	-194952,260	499483,233
Category G	333195,515	59831,462	215251,511	451139,519
Category H	98938,000	373647,358	-637622,069	835498,069
Category I	551762,133	67109,047	419472,039	684052,227

Discussion and Practical Implications

Our research findings are consistent and agree with the findings of other surveys, according to the literature [11]. In a survey of USA the specialties of General Surgery and Obstetrics and Gynecology occurred in the first two positions as responsible for causing harm due to medical malpractice [12]. Same findings for Greece are presented by other similar research studies [13,14].

In the very recent 2016 Medical Malpractice Annual Report, General Surgery and Obstetrics and Gynecology are the physician specialties that had the largest number of claims with paid indemnity, while Pediatrics and Obstetrics and gynecology had the higher Median paid indemnity [15].

In a similar study, among medical specialties, obstetricians were again involved in the most cases, as well as the highest total and average awards followed by Anesthesiologists [16].

In another study, the results highlight the frequency and severity problems plaguing the Obstetrics and Gynecology specialty. Higher frequencies and severities are also seen in neurosurgery, while neurology – invasive shows a high severity but a low frequency [17]. These, results to the malpractice insurance fees for obstetricians are set to increase. The major hike in fees is directly related to the number of claims and level of awards by the courts in cases taken by parents, mainly over brain damaged babies [18].

At this point, it should be clarified that medical errors and adverse events mainly occurred as a consequence of systemic problems in a healthcare [1]. In specific, the medical understaffing in hospitals, the unsafe working environment, the severity of the patients' disease, the increased workload, the circular time, the inadequate staff in nursing and the burnout of health professionals, are the most important root causes of medical errors. Especially in Greece, as economic crisis has caused dramatic significant budget cuts in the financing of the National Health System for years, health indicators may not have a rapid recovery and thus public health may be a real "chronic patient" [19].

This is more obvious, taking in consideration the strong positive association between low patient satisfaction level in Greece and healthcare provision indicators that are worsening in the last 7 years [20].

So as an added value policy proposal, the MERIS, a blame-free system, implemented in a protected environment that encourages the systematic recording and reporting of adverse events and medical errors, may contribute to enrich the knowledge for the contributing factors of medical errors [21].

Some basic recommendations for a successful reporting system, may incorporate the following characteristics:

- Building stakeholders' awareness of medical errors
- Mapping out a national-wide strategy with the usage of Health Information Technology
- Promoting quality assurance practices, patient safety standards and decision making process in reducing the adverse events and medical errors
- Educating health professionals and patients in patient safety reporting system

To sum up, this paper has not at all the tension to blame any health professionals, but only to raise the awareness to all stakeholders for taking preventive actions for reducing medical errors and adverse events.

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