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Risk of medical malpractice lawsuits, occupational stress, and the choice of medical specialization among medical students

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Summary

Aim. In recent years, there has been a decline in interest in choosing surgical specializations and those with a high risk of receiving a medical malpractice lawsuit among medical graduates. The aim of the study to assess the relationship between the estimated risk of receiving a lawsuit in individual medical specialties and the choice of specialization by medical students, as well as to assess students' knowledge of medical law and stress management techniques.

Material and Methods. The research group consisted of medical students from the fourth to sixth year of studies in Poland. The study was conducted from February to June 2024. The collected data were subjected to statistical analysis, including comparative and correlation analysis.

Results. More than half of the respondents assess their knowledge of medical errors and stress management as insufficient. Students of higher years of studies and women are less likely to consider the choice of surgical specializations that fall into the "high-risk" group. However, older students assessed their knowledge of medical law and stress management techniques more favorably.

Conclusions. Students show less interest in choosing "high-risk" specialties and emphasize the need to expand the scope of education on medical errors and stress management techniques during their studies.

Key words: medical error, stress, medical students

Introduction

The choice of future specialty is an important decision faced by medical graduates. In recent years a decreased interest in surgical specialties has been noticed. The increasingly frequent medical malpractice lawsuits seem to be not without significance for the choice of specialization. Medical errors are defined as all failures in the treatment process as a consequence of mistakes, inattention, omission, improper work organization, resulting from violation of scientifically and practically developed rules of professional conduct, leading to deterioration of the quality of life, loss of health or life of the patient [1, 2].

Depending on the risk of receiving a medical malpractice lawsuit, medical specialties have been classified as "high-risk specialties" and "low-risk specialties" in American literature. Among the "high-risk" specialties, depending on the source, there is a varying number of specific medical specializations, mainly surgical [3]. Individual authors mention six (emergency medicine, general surgery, neurosurgery, gynecology and obstetrics, orthopedics, and radiology) or five (gynecology and obstetrics, general surgery, anesthesiology, emergency medicine, and radiology) medical specialties constituting "high-risk" group [3–5]. In turn, Carroll and Buddenbaum [3] list four "high-risk" specialties (emergency medicine, general surgery, gynecology and obstetrics, and radiology), while the "low-risk" specialties include family medicine, internal diseases, and pediatrics.

From the perspective of a doctor's mental well-being, it is extremely important to prepare medical professionals for dealing with stressful situations in their professional practice, as well as to ensure their knowledge of medical law and acquiring the ability to use this information in practice. Therefore, higher education institutions offering medical education include within educational programs subjects such as medical law or medical psychology, which is regulated by the Regulation of the Minister of Science and Higher Education of September 29, 2023 on the standards of education preparing to practice the profession of doctor, dentist, pharmacist, nurse, midwife, laboratory diagnostician, physiotherapist and paramedic [6].

Aim

The aim of the study is to assess the relationship between the generally estimated risk of committing a medical error and the choice of specialty by medical students, as well as to evaluate the students' preparation for their future profession in the field of medical law and stress management techniques. Additionally, the paper discusses the issue of decreasing interest in choosing surgical specialties, which constitute the majority of "high-risk" group and at the same time, deficit specialties in Poland.

Materials

The study was conducted among students from fourth to sixth year of medical school, at distinct medical universities in Poland. The research group consisted

of 286 students: 122 fourth-year students, 80 fifth-year students, and 84 sixth-year students. The statistical study took into account the two largest age groups – the older age group (24–26 years) and the younger age group (20–23 years). The majority of respondents were women, who constituted 71.33% of respondents. When analyzing the results of the survey, the study participants were divided into residents of cities with a population of over 100,000 and those with below 100,000 inhabitants, representing 59.10% and 40.90% of respondents, respectively. The socio-demographic characteristics of the research group are demonstrated in Table 1, including the divisions adopted in the statistical analysis.

Table 1. **The demographic structure of the studied group**

Variables		**Number of respondents (N)**	**Percentage (%)**
Number of respondents		286	100
Gender	Female	204	71.33
	Male	82	28.67
Age	20-23 years	127	44.41
	24-26 years	137	47.90
	>26 years	22	7.69
Year of study	IV	122	42.66
	V	80	27.97
	VI	84	29.37
Place of residence	City with less than 100,000 inhabitants	117	40.90
	City with over 100,000 inhabitants	169	59.10

Methods

The study was conducted online using Google Forms. The anonymous survey was designed with an original questionnaire consisting of 16 questions (4 demographic questions, 3 questions regarding the respondents' choice of specialty, 4 questions relating to the issue of "high-risk" specialties, 5 questions regarding the acquired knowledge in the field of medical law and stress management techniques). The survey was prepared in electronic form, and the research sample was selected via social media. Before starting the study, a letter was sent to the Bioethics Committee of the Medical University of Silesia to obtain its opinion whether it required its consent. In response, a letter was received in which the Bioethics Committee stated that the consent in question was not required.

Statistical analysis

The statistical analysis was conducted using Statistica 13.3 and Microsoft Excel 365 programs. The Shapiro-Wilk test was used to assess the normality of the distribution of the collected data. Due to the lack of normal distribution, the assessment of correlations was conducted by using the Spearman's rank correlation test. The Mann-Whitney *U* test and Kruskal-Wallis ANOVA tests were performed in the comparative analysis. A correlation coefficient with a p-value <0.05 was considered statistically significant.

Results

About 95% of respondents have already considered their future specialization choice. The most frequently chosen specialties are pediatrics, family medicine, psychiatry, anesthesiology, obstetrics and gynecology, and internal medicine. 82.5% of respondents encountered the concept of the term "high-risk specialty". The vast majority of respondents (76.57%) are aware of the existing risk of receiving a medical malpractice lawsuit, and 12.89% admitted that this prevents them from choosing their dream specialization. In our study, 33.92% of respondents declared that they would choose a high-risk specialty. More than half of the respondents assessed their level of knowledge acquired during studies as insufficient in terms of medical errors (58.04%), and 9.09% of respondents admitted that this issue was not discussed during medical law classes.

In questions about stress management, 48.95% of respondents indicated that they had not had the opportunity to learn stress management techniques during their studies, and 38.46% of respondents who did have the opportunity during classes considered them unsatisfactory. A significant majority of the respondents indicated the need to increase the number of classes on medical errors and stress management techniques (91.26% and 88.81% of respondents, respectively). The obtained results are presented in detail below, divided into correlation analysis and comparative analysis.

Correlations

The analysis revealed a weak positive correlation between the year of study and the knowledge of the term "high-risk specialty" and taking into account the risk of a medical malpractice lawsuit when choosing a specialty. It also showed a moderately negative relationship between the year of study and the willingness to choose a "high-risk" specialty, as well as with the opinion on the need to expand the scope of knowledge about medical errors in the medical education program. Moreover, the year of study moderately positively correlates with the adequate assessment of knowledge of medical law acquired during studies and with the opportunity to learn stress management techniques. Living in an area with a population over 100,000 inhabitants weakly negatively correlates with considering the choice of a "high-risk" specialty and weakly positively correlates with the adequate assessment of the knowledge on medical errors acquired during studies. Detailed correlations for the entire study group are presented in Table 2.

Table 2. **Spearman's rank correlations between the studied variables**

Spearman's rank correlations			
Variables	**Gender**	**Year of study**	**Place of residence**
Year of study	0.127235 *	1.000000	0.178647 *
Place of residence	0.026954	0.178647 *	1.000000
Another medical profession	-0.067474	0.088782	0.079746
Choosing a medical specialization	-0.000501	0.075323	0.083188
Knowledge of the concept of "high-risk specialization"	-0.048575	0.128458 *	0.031829
Taking into account the risk of being sued when choosing a specialization	0.020950	0.170805 *	-0.000600
Willingness to choose a specialization from the "high-risk" group	-0.146934 *	-0.402234 *	-0.144481 *
Knowledge of medical law	0.030748	0.424766 *	0.165518 *
Assessment of own knowledge about medical errors	-0.027381	-0.104823	0.039773
Expanding the scope of knowledge about medical errors	-0.004069	-0.435779 *	-0.109074
Opportunity to learn stress management techniques	0.075487	0.376985 *	0.032462
Increasing the number of classes on stress management techniques	0.137228	0.099475	0.049431

* – statistically significant result (correlation coefficients with $p < 0.05000$)

Comparisons

Age

Students from the older age group (24–26 years) were less likely to declare their interest in choosing "high-risk specialties." However, this group assessed the knowledge about medical errors acquired during their studies and the opportunity to learn stress management techniques more positively than younger respondents. Respondents from the younger age group (20–23 years) more often believed that the educational program should broaden the scope of knowledge about medical errors (Table 3).

Table 3. **Comparison of the studied variables by age (Mann-Whitney *U* Test)**

Variables	20–23 years		24–26 years		Z	*p*
	N = 127		*N* = 137			
	Mean	*SD*	Mean	*SD*		
Another medical profession	1.307087	0.542069	1.291971	0.516786	0.10406	0.917125
Choosing a medical specialization	0.952756	0.213001	0.941606	0.235348	0.15568	0.876285
Knowledge of the concept of "high-risk specialization"	1.110236	0.726247	1.218978	0.614953	-1.03007	0.302978
Taking into account the risk of being sued when choosing a specialization	1.173228	0.873730	1.416058	1.438148	-0.12019	0.904334
Willingness to choose a specialization from the "high-risk" group	3.559055	2.352484	2.423358	2.540040	3.35398	0.000797*
Knowledge of medical law	0.669291	0.917684	1.240876	1.286385	-3.29671	0.000978*
Assessment of own knowledge about medical errors	2.496063	0.966700	2.350365	0.879432	0.89939	0.368443
Expanding the scope of knowledge about medical errors	1.755906	0.600483	1.554745	0.716607	2.10289	0.035476*
Opportunity to learn stress management techniques	0.674603	0.724755	1.007299	0.870229	-2.91359	0.003573*
Increasing the number of classes on stress management techniques	1.760331	0.577708	1.882979	0.460397	-1.22328	0.221226

SD – standard deviation; * – statistically significant result $p < 0.05$.

Year of study

Sixth-year students most often took into account the risk of receiving a medical malpractice lawsuit when considering a choice of a specialty (Figure 1) and declared the choice of high-risk specialty the least often (Figure 2). Moreover, they assessed the knowledge regarding medical errors achieved during their studies as sufficiently preparing them to deal with this problem (Figure 3), and they were less likely than fourth – and fifth-year students to indicate the need of expanding the scope of knowledge included in the educational program (Figure 4). Knowledge in the field of medical law acquired during their studies was evaluated highest by fifth-year students (Figure 5), while the opportunity to learn stress-management methods was rated highest by sixth-year students and lowest – by fifth-year students.

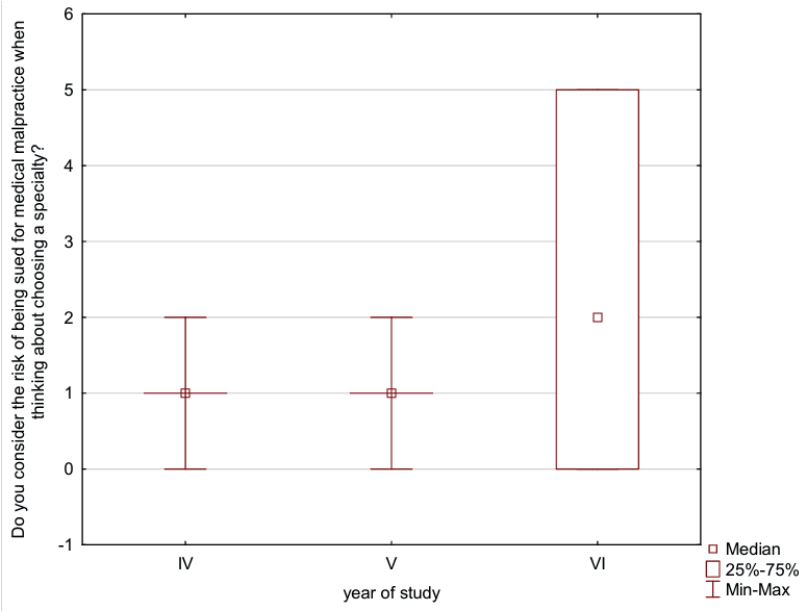


Figure 1. **Risk of receiving a medical malpractice lawsuit and choice of specialization (Kruskal-Wallis ANOVA test, p <0.01)**

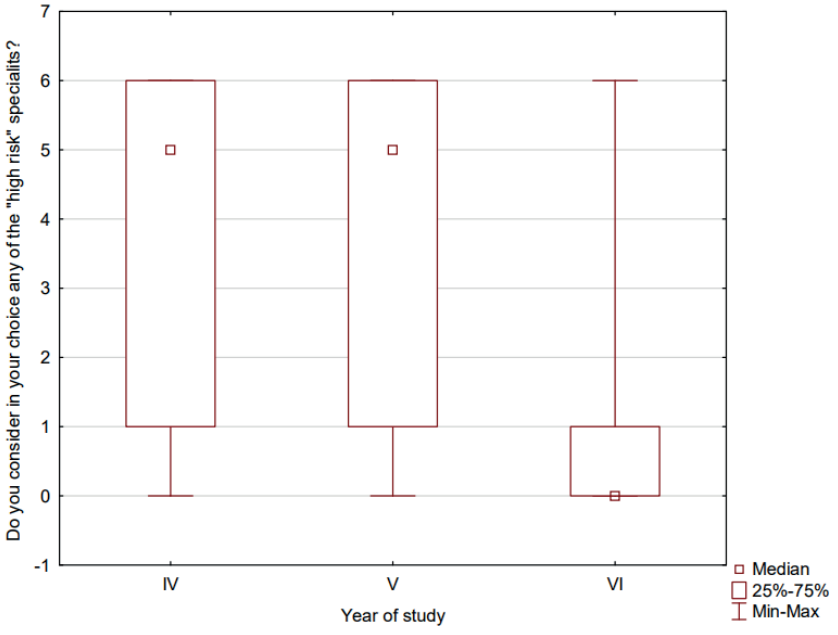


Figure 2. **Willingness to choose a specialization belonging to the “high-risk” group (Kruskal-Wallis ANOVA test, p <0.001)**

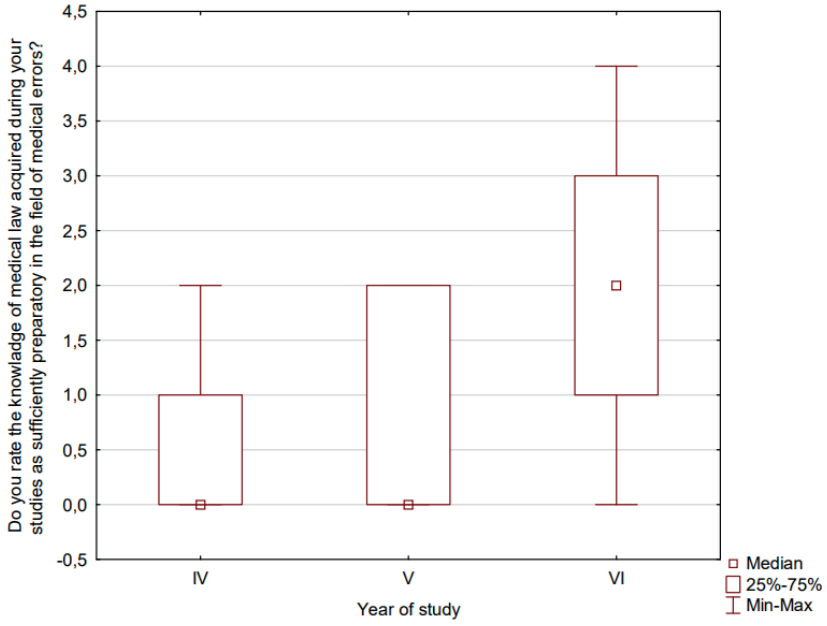


Figure 3. **Knowledge of medical errors (Kruskal-Wallis ANOVA test, p <0.001)**

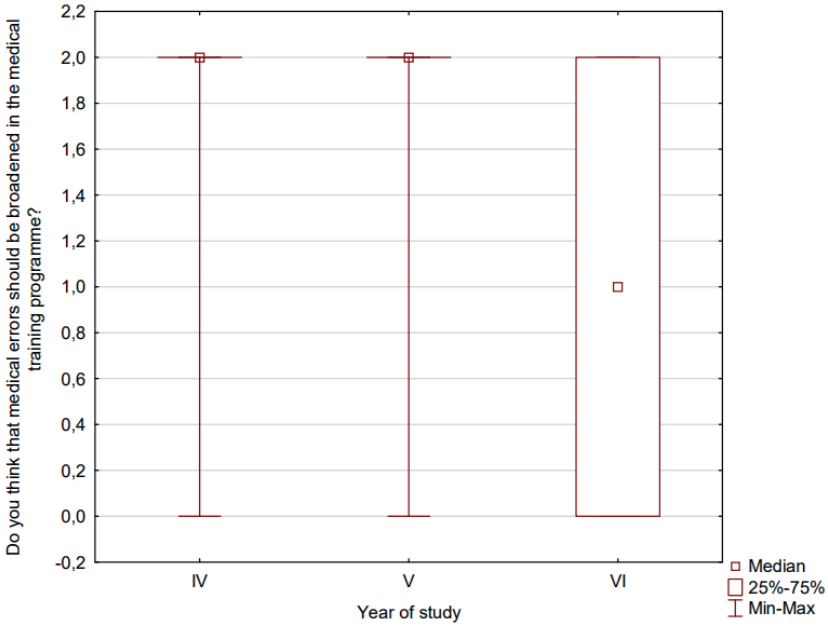


Figure 4. **The need to expand knowledge in the field of medical errors (Kruskal-Wallis ANOVA test, p <0.001)**

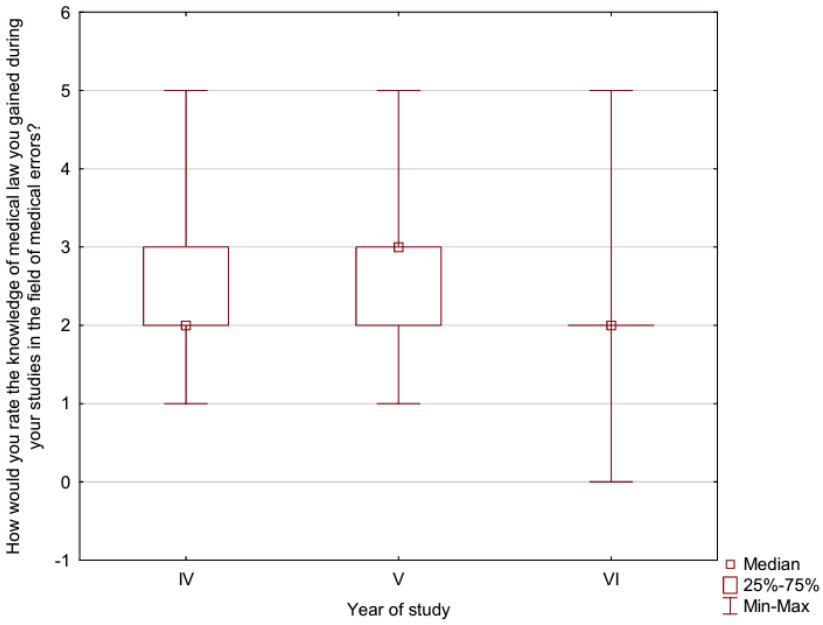


Figure 5. **Assessment of knowledge in the field of medical errors (Kruskal-Wallis ANOVA test, p <0.001)**

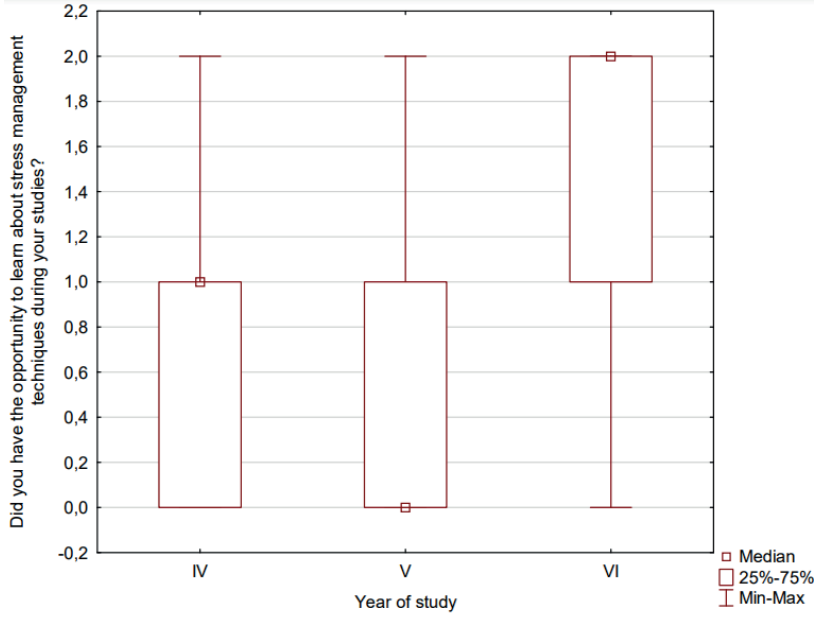


Figure 6. **Opportunity to learn about stress coping techniques (Kruskal-Wallis ANOVA test, p<0.001)**

Sex

Statistically significant differences were observed between women and men in terms of considering the choice of high-risk specialty. Female students were significantly less likely to declare their willingness to choose these specialties (Table 4).

Table 4. **Comparison of the studied variables by gender (Mann-Whitney *U* Test)**

Variables	Female		Male		Z	*p*
	N = 204		*N* = 82			
	Mean	*SD*	Mean	*SD*		
Another medical profession	1.313725	0.569857	1.395062	0.605785	-0.89247	0.372144
Choosing a medical specialization	0.950980	0.216440	0.950617	0.218016	-0.00237	0.998108
Knowledge of the concept of "high-risk specialization"	1.147059	0.641689	1.197531	0.714489	-0.73832	0.460321
Taking into account the risk of being sued when choosing a specialization	1.382353	1.313395	1.358025	1.306796	0.31145	0.755456
Willingness to choose a specialization from the "high-risk" group	2.666667	2.450830	3.463415	2.620881	-2.40468	0.016187 *
Knowledge of medical law	1.000000	1.186957	0.901235	1.044090	0.46955	0.638675
Assessment of own knowledge about medical errors	2.397059	0.938603	2.419753	0.906424	-0.42687	0.669477
Expanding the scope of knowledge about medical errors	1.627451	0.693695	1.654321	0.635620	-0.05138	0.959021
Opportunity to learn stress management techniques	0.897059	0.821024	0.750000	0.834388	1.19034	0.233914
Increasing the number of classes on stress management techniques	1.854430	0.489715	1.720588	0.619234	1.15793	0.246895

SD – standard deviation; * – statistically significant result $p < 0.05$.

Place of residence

Statistically significant differences were found between students living in areas with more than 100,000 inhabitants and those with less than 100,000 inhabitants. It was revealed that individuals from smaller towns were more likely to consider choosing a high-risk specialty. On the other hand, students from larger cities evaluated higher the knowledge on medical errors they achieved during studies (Table 5).

Table 5. **Comparison of the studied variables by place of residence (Mann-Whitney *U* Test)**

Variables	A city with less than 100,000 inhabitants		A city with over 100,000 inhabitants		Z	p
	N = 120		*N* = 166			
	Mean	*SD*	Mean	*SD*		
Another medical profession	1.316667	0.564843	1.349398	0.591531	-0.34698	0.728603
Choosing a medical specialization	0.941667	0.235355	0.957831	0.201582	-0.23253	0.816126
Knowledge of the concept of "high-risk specialization"	1.141667	0.713564	1.180723	0.625607	-0.30932	0.757081
Taking into account the risk of being sued when choosing a specialization	1.400000	1.337249	1.355422	1.288716	0.23543	0.813877
Willingness to choose a specialization from the "high-risk" group	3.183333	2.486884	2.686747	2.534263	1.67480	0.093975
Knowledge of medical law	0.766667	1.059041	1.114458	1.187881	-2.30575	0.021125*
Assessment of own knowledge about medical errors	2.333333	0.813059	2.457831	1.000620	-0.99025	0.322054
Expanding the scope of knowledge about medical errors	1.691667	0.632400	1.596386	0.704779	0.90042	0.367896
Opportunity to learn stress management techniques	0.857143	0.816002	0.861446	0.837794	-0.00291	0.997674
Increasing the number of classes on stress management techniques	1.797980	0.534137	1.828125	0.534029	-0.46466	0.642175

SD – standard deviation; * – statistically significant result $p < 0.05$

Discussion

Medical students show less interest in choosing surgical specialties, which constitute the majority of "high-risk" specialties associated with medical malpractice lawsuits. An important factor may be the increasing number of women pursuing medical studies, as they are less likely than men to choose surgical specialties. In this study, the majority of respondents were female. A detailed analysis of the obtained results indicates that only 31 out of 204 female participants expressed interest in specialties widely considered to be surgical ones. Among them, nearly one-third (9 women) considered more than one surgical specialty in their career choices. Additionally, 85 female respondents (41.6%) showed interest in specialties classified as "high-risk."

In a survey conducted at the Collegium Medicum of Nicolaus Copernicus University in Bydgoszcz in 2014 regarding the choice of studies and future medical specialization, the majority of respondents expressed interest in non-surgical specialties – 68% of women and 53% of men [7]. Moreover, an analysis of data from the qualification processes of specialization training in Poland in Autumn 2022, Spring 2022, and Autumn 2021 in terms of interest in choosing surgical specialties and other fields associated with a high risk of medical errors, indicates a high percentage of unfilled specialization slots [8].

The decline in interest in surgical specialties is probably influenced by lifestyle-related factors. Surgical specialties often make it difficult to balance personal and professional life. Considering the additional stress resulting from the higher frequency of malpractice lawsuits among specialists in surgical fields, these specialties may appear excessively challenging and mentally demanding for young doctors [7, 9, 10].

In 2020, the Medical University of Silesia conducted a survey to examine the factors contributing to the decreasing interest in general surgery as a specialty among resident doctors and interns. The main reasons for resignation from this specialization included a disproportionate level of responsibility relative to salary, mental and physical strain, and excessive working hours. In addition, 8.4% of respondents indicated frequent criminal and civil trials as a contributing factor [9].

The other research, also from 2020, conducted by the Jagiellonian University, investigated the reasons for the declining interest in surgical specialties among Polish students. Among the main factors were mentioned: low interest in surgery, poor quality of education, unsatisfactory skills self-assessment, limited number of performed practical procedures. Lifestyle factors included working in a long-standing position, lack of work-life balance, unfavorable working hours, and high levels of stress [10].

Obstetrics and gynecology is a high-risk specialty in terms of medical malpractice lawsuits and has been the most frequently chosen surgical specialty in Poland in recent years. A survey conducted in Ireland among medical students regarding the reasons for choosing or rejecting obstetrics and gynecology as a specialty, indicated high interest in this field. However, the majority of respondents identified significant disadvantages, including difficulties in maintaining a work-life balance (72% of respondents) and concerns about legal proceedings (68.1% of respondents) [11].

This study demonstrated that the majority of students consider the possibility of a medical malpractice lawsuit while choosing a specialty. Such considerations are most common among sixth-year students, which is most likely due to their greater awareness of the challenges associated with various medical specialties.

In a 2008 study conducted in San Francisco among third-year medical students, 51% of respondents expected a decrease in future job satisfaction due to potential lawsuits. Additionally, 21.6% of respondents indicated that concerns about medical errors influenced their choice of future medical specialty [12]. These concerns are not unfounded, as the number of medical malpractice lawsuits has been increasing in recent years. The estimated number of medical errors in Poland is around 45,000 per year. According to statistical data from the National Prosecutor's Office, there was a significant 45% increase in the number of medical malpractice cases in 2016

compared to the previous year. That year, prosecutors across the country handled 4,963 cases [2].

According to the 2019 *Medscape Malpractice Report*, more than half of the 4,300 surveyed physicians (58%) had been sued at some point in their careers, regardless of whether they had made a medical error or not. The most frequently sued specialists are general surgeons, urologists, otolaryngologists, obstetrician-gynecologists, radiologists, emergency medicine physicians, cardiologists, gastroenterologists, and anesthesiologists [13].

Data from physicians in the United States predicts that among those working in "low-risk" specialties, 36% will face their first malpractice claim before the age of 45. While in the case of physicians in "high-risk" specialties, this percentage rises to 88% [14, 15]. In Poland, the highest risk of lawsuits is associated with general surgery (25% of judgments), orthopedics and traumatology (20% of judgments), and obstetrics and gynecology (11% of judgments) [16].

In our study, the answers to the question regarding students' knowledge of medical law deserve particular attention. According to the collected data, more than half of the respondents, especially those in the younger age group, do not believe that they had sufficient opportunities to acquire this knowledge during their studies. Additionally, younger respondents most frequently emphasized the need to expand their legal knowledge regarding medical malpractice.

The scope of knowledge in the field of medical law that medical studies graduates should acquire is regulated by the Minister of National Education and Science by way of an appropriate regulation (Journal of Laws 2023, item 2152). In the latest regulation, the number of hours dedicated to behavioral and social sciences remains unchanged compared to the previous ordinance from July 26, 2019 (Journal of Laws 2019, item 1573) [6, 17]. However, the number of hours allocated to legal and organizational aspects of medicine has been reduced from 100 to 90, while the hours dedicated to clinical sciences have been increased. When comparing these regulations with the survey responses indicating insufficient preparation of students in the field of knowledge about medical errors, it becomes evident that both the number of hours allocated to such courses and the scope of the covered material should be reconsidered. It is important to note that the format and timing of medical law courses depend on the individual curriculum of each medical university, determining how and when students acquire this knowledge [6, 17].

Also the knowledge of stress management techniques acquired during studies was rated as unsatisfactory by more than half of the respondents. At the same time, the majority of students considered such courses necessary. Senior students were more likely to have been introduced to stress management methods and evaluated them more favorably than younger respondents, who more often expressed the need to acquire such skills.

Effective stress management skills and knowledge of appropriate techniques play a crucial role in the medical profession, which is classified as one of the most stressful professions, ranking 9th on the list of the 100 most stressful jobs in Poland [18]. The level of stress is also influenced by the type of medical specialty – among the 10

specialties rated by physicians as the most stressful, 9 are surgical specialties along with anesthesiology and intensive care [18]. According to another study on this matter, occupational stress, in the opinion of doctors, influences the risk of making medical mistakes. More than one-third of respondents rated the intensity of professional stress as 5 on a five-point scale, and almost half admitted that they have difficulties in coping with stress at work [19].

Due to the professional stress in the medical profession described previously, information on coping strategies should be provided during medical studies. The education of medical students regarding stress and its effects is regulated by the Regulation of the Minister of Science and Higher Education [6]. According to the curriculum, each student should acquire exhaustive knowledge covering the concept of stress, including eustress and distress, its impact on the etiopathogenesis and progression of somatic diseases and mental disorders, as well as stress-management techniques [6, 17]. Courses covering these topics should be conducted as part of medical psychology training. However, considering the results of our study, even after completing such courses, students find their knowledge of stress management insufficient.

During their education, students are required to participate in facultative courses, selecting topics of interest from a variety of courses offered by the university. These courses could provide an opportunity to introduce additional knowledge on stress management techniques, similar to the initiative implemented in 2013 at the Medical University of Silesia (ŚUM). At that time, for the first time in Poland, an elective course for sixth-year medical students was introduced, focusing on stress and stress prevention. As part of the course, students were familiarized with the mechanisms of stress development, its impact on health, and various stress management techniques, including problem-focused coping strategies [20].

In 2021, the Medical University of Bialystok paid attention to the benefits of teaching stress management techniques to medical students, particularly the practice of mindfulness. Researchers from the university analyzed data from several years of their own observations during simulation-based training sessions with sixth-year medical students. According to the authors, medical simulations not only help students enhance their practical knowledge, but also serve as training in "soft skills," preparing them to cope with stressors they will face in their future medical careers [21].

Improving the quality of the above-mentioned classes on stress management techniques and introducing practical classes on the subject of medical errors and related stressful situations in medical practice may build the self-efficacy of medical students and increase their competences in the above-mentioned areas. According to Albert-Bandura's social cognitive theory, we learn through our own experiences (e.g., learning practical skills during medical simulations) and by observing the behavior of others and the consequences of their actions. Moreover, one of the key elements of the theory that plays an important role in learning is the sense of self-efficacy, i.e., the belief that we are able to effectively perform a given task or cope with a situation, which is a motivating factor to take action and persevere in the face of difficulties. The inability to attempt to learn how to perform a given activity slows down the development of a sense of effectiveness and may, in the future, contribute to reduced

motivation to undertake specializations perceived as more difficult, including surgical ones [22–25].

Enriching practical clinical and simulation classes with methods of coping with stressful situations and the principles of communication with the patient should be an element of these classes, especially since these subjects are often conducted by experienced clinicians who have already faced many difficult stressful situations at work. Their sharing of their own experiences – thanks to the authenticity of their stories and the real chance that students may face similar challenges in the future – is a valuable source of practical advice and preparation for professional work. However, due to large exercise groups and frequent lack of time for classes held during doctors' working hours, additional classes on stress management, medical law, or communication with patients should also be held as separate, compulsory subjects. The way of conducting these classes, which differs between individual medical faculties, should be unified so that each student has the opportunity to acquire the above-mentioned skills to the same extent [26].

Conclusions

1. Medical students have shown less interest in choosing a specialization with a high risk of being sued for medical malpractice. This trend applies in particular to women and students in their final year of studies.
2. The vast majority of sixth-year medical students took into account the risk of a medical malpractice lawsuit when choosing their professional specialization.
3. The majority of students assessed their knowledge of both stress management techniques and medical law as insufficient. A significant majority of respondents indicated the need to increase the number of classes in these areas.
4. The assessment of the risk of medical errors on the choice of specialization, as well as other factors influencing students' decisions regarding their future career path, require further research.

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