

# Forensic pathology education in Türkiye: Insights from the national forensic pathology awareness survey

Türkiye'de patoloji eğitiminde adli patolojinin yeri:  
Ulusal adli patoloji farkındalık anketi sonuçları

İD Eylül Gün<sup>1,2\*</sup>,  
0000-0003-2643-7617

İD Ayşe Özgün Şahin<sup>2</sup>,  
0000-0002-6149-8397

## ABSTRACT

**Objective:** In the field of medicolegal investigations in Türkiye, autopsies are typically performed by forensic medicine specialists while postmortem histopathological examinations are performed by pathology specialists. However, the absence of forensic pathology from the core curriculum for residency in pathology has led to a significant lack of awareness and proficiency among pathologists in this subspecialty. To address this issue, a survey study aimed at evaluating the status of forensic pathology within pathology residency programs, increasing awareness and understanding of the significance of incorporating forensic pathology into pathology residency was conducted.

**Methods:** A survey consisting of a total of 14 questions was sent to all pathology residents and young specialist pathologists within the first five years of their specialization via e-mail and social media channels.

**Results:** A total of 212 participants, including pathology residents and young specialist pathologists in their first five years of specialization, took part in the survey. The institutions where the participants received training were university hospitals (53.8%), training and research hospitals (34.9%), affiliated university hospitals (9%), and private university hospitals (9%), respectively. 92.9% of respondents indicated the absence of forensic pathology training in their residency programs, and only 13.8% reported exposure to forensic pathology on external rotations during their training. Additionally, 84.8% of the participants expressed a desire for the inclusion of forensic pathology rotations in the core curriculum. The majority of the participants stated that they lacked knowledge about the job descriptions and activities of forensic pathologists, emphasizing the need for such training during their residency and some young specialist pathologists disclosed difficulties in handling forensic matters throughout their expertise.

**Conclusion:** The results of the survey reveal a significant deficiency in forensic pathology education across institutions in Türkiye, accompanied by a low level of awareness. To address this issue and prevent a major gap in specialty training, it is crucial to incorporate forensic pathology training into the core curriculum for pathology and provide external rotations in cases where in-departmental training is not feasible.

**Keywords:** Survey, forensic pathology, forensics, residency, training, curriculum

## ÖZET

**Amaç:** Türkiye'de adli tıp alanında otopsi genellikle adli tıp uzmanları tarafından, postmortem histopatolojik incelemeler ise patoloji uzmanları tarafından yapılmaktadır. Bununla birlikte, adli patolojinin tıbbi patoloji uzmanlık eğitimi çekirdek eğitim programında yer almaması, patolojiler arasında bu alanda önemli bir farkındalık ve yeterlilik eksikliğine yol açmaktadır. Tıbbi patoloji asistan eğitiminde adli patolojinin yerini öğrenmek ve bu konuda farkındalık oluşturmak amacıyla yürüttüğümüz anket çalışmasının sonuçlarını sunmayı amaçladık.

**Yöntem:** Tüm patoloji asistanlarına ve uzmanlıklarının ilk beş yılında olan genç uzman patolojlara e-posta ve sosyal medya kanalları aracılığıyla toplam 14 sorudan oluşan bir anket gönderildi.

**Bulgular:** Araştırmaya patoloji asistanları ve uzmanlıklarının ilk beş yılındaki genç uzman patolojilerin de aralarında bulunduğu toplam 212 kişi katılmıştır. Katılımcıların eğitim aldığı kurumlar sırasıyla üniversite hastaneleri (%53,8), eğitim ve araştırma hastaneleri (%34,9), afiliye üniversite hastaneleri (%9) ve özel üniversite hastaneleri (%9)'dir. Katılımcıların %92,9'u uzmanlık programlarında adli patoloji eğitiminin bulunmadığını ve yalnızca %13,8'i eğitimleri sırasında dış rotasyonlarda adli patolojiye maruz kaldıklarını belirtmiştir. Bunun yanında, katılımcıların %84,8'i adli patoloji rotasyonunun çekirdek müfredata dahil edilmesini istediğini ifade etmiştir. Katılımcıların büyük bir kısmı adli patolojilerin görev tanımları ve faaliyetleri hakkında bilgi sahibi olmadıklarını belirtmiş, uzmanlıklarında bu tür bir eğitimin gerekliliğini vurgulamış, bazı genç uzman patolojiler ise uzmanlıklarını süresince adli konuları ele almada zorluk yaşadıklarını belirtmişlerdir.

**Sonuç:** Araştırmanın sonuçları, Türkiye'deki kurumlarda adli patoloji eğitiminde önemli bir eksiklik olduğunu ve farkındalık düzeyinin düşük olduğunu ortaya koymaktadır. Bu konuyu ele almak ve uzmanlık eğitiminde büyük bir boşluğu önlemek adına adli patoloji eğitiminin tıbbi patoloji çekirdek eğitim programına dahil edilmesi ve bölüm içi eğitimin mümkün olmadığı durumlarda dış rotasyon sağlanması ülkemizde adli patolojinin geleceği açısından büyük önem taşımaktadır.

**Anahtar Kelimeler:** Anket, adli patoloji, adli tıp, asistanlık, ihtisas, eğitim programı

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**Corresponding Author:** Eylül Gün, Department of Cellular Pathology, Basildon&Thurrock University Hospital, Mid and South Essex NHS

Foundation Trust, Basildon, Essex, SS16 5NL United Kingdom

**E-mail:** dreylulgün@gmail.com

<sup>1</sup>MD DipRCPath, Department of Cellular Pathology, Basildon&Thurrock University Hospital, Mid and South Essex NHS Foundation Trust, Basildon, Essex, United Kingdom

<sup>2</sup>MD, Department of Histopathology, The Council of Forensic Medicine, Istanbul, Turkey



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## INTRODUCTION

Forensic pathology is an important subspecialty of pathology that deals with the investigation of sudden, unexpected, or violent deaths. It plays a crucial role in determining the cause and manner of death in medicolegal cases. It has been one of the most crucial elements of autopsy investigations since the beginning of the forensic sciences. It appears to be a distinct and specialized field of pathology practice that, in many ways, is different from clinical and surgical pathology (1).

The utility of histopathological examination during autopsies has been a topic of debate, however, recent studies indicate that histopathological examination continues to be the cornerstone method in identifying the underlying cause of death, despite advancements in autopsy techniques (2,3).

The Anglo-Saxon model in forensic medicine practices involves the performance of postmortem autopsy and histopathological examination by a single physician. However, this model contrasts with practices in the Middle East and Continental Europe, where the performance of postmortem examinations and autopsies are carried out by forensic medicine specialists, and postmortem histopathological examinations are performed by pathologists. An example of this variation can be seen in Türkiye where this division has led to a concerning lack of understanding about forensic pathology among pathologists and deficiencies in its practice (3).

Forensic pathology is not included in the Core Curriculum for Residency (CCR) in Pathology (v2.4.) in our country (4,5). This situation causes low awareness of forensic pathology by pathologists and deficiencies in the practice of forensic pathology. In order to address this issue, a survey study was conducted to evaluate the position of forensic pathology within pathology residency programs in our country aiming to increase awareness and understanding of the significance of incorporating forensic pathology into pathology residency

## METHODS

A survey was designed by two pathology specialists who had been working in the field of forensic

pathology utilizing the Google Forms online survey tool with a total of 14 questions. The survey consisted of some ordinal scale-type questions to be able to determine the training background of the participants, some dichotomous scale-type questions (answers such as "Yes", "No", and "I don't know") to be able to capture the binary choice and easily distinguish the responses, and some open-ended questions to collect some data about the opinions of the participants on the subjects.

A content validity analysis was performed by seeking the expert opinions of two experienced forensic pathologists to evaluate the relevance and comprehensiveness of the questions and a sample of potential participants reviewed the survey to determine if the questions appear relevant and easy to understand as a face validity analysis. Necessary adjustments were made based on their feedback before the survey was distributed.

The target participants were chosen as all pathology residents and young specialist pathologists within the first five years of their specialization who constitute the members of the "Resident and Young Specialist Pathologists Committee" under the umbrella of the Federation of Turkish Pathology Societies, aiming to reflect the current issues about forensic pathology during and right after pathology training.

A predetermined sample size before conducting the survey was not possible to be calculated due to the unique nature of the study and the challenges in accurately estimating the total number of potential participants. We aimed to include as many eligible participants as possible. The survey was distributed via e-mail and social media channels. The questions aimed to generally assess the state of forensic pathology in pathology residency, whether there was a rotation of forensic pathology in institutions without forensic pathology training, the knowledge regarding the job descriptions of forensic pathologists, and opinions on organs and systems evaluated in forensic pathology. (Appendix 1) additional file.

### Ethical Statement

The permission for the study was obtained from the The Council of Forensic Medicine Education and Scientific Research Commission, dated 03/08/2022, and numbered 21589509/2022/577.

## RESULTS

A total of 212 people, including 111 pathology residents and 101 young specialists, participated in the survey. The institutions where the participants received training were university hospitals (53.8%), training and research hospitals (34.9%), university hospitals affiliated with training and research hospitals (9%), and private university hospitals (9%), respectively (Figure 1). While 101 of the survey participants were young pathology specialists (47.6%) who were in the first five years of their residency, the number of participants from the last year of residency to the first year was 37, 33, 23, and 18, respectively (Figure 2).

Of the 212 participants, 196 (92.5%) reported that their residency program did not provide training in forensic pathology, while only 29 (14.8%) of them had an external rotation in the field lasting one or two months. The majority, 167 (78.7%), did not have any experience in forensic pathology during their training (Figure 3 and 4). In response to the question "How much of your four-year residency program covers forensic pathology?", seven participants answered one month, three participants answered two months, two participants answered three months, one participant answered four months, one participant answered five months, and one participant mentioned that they received training a couple of times from visiting forensic medicine educators through seminars.

A total of 179 (84.8%) participants stated they would want core pathology training to include a forensic pathology rotation (Figure 5). When asked if perinatal and pediatric autopsies were performed in their department, 179 (84.4%) answered "Yes". When asked about the level of interest in forensic pathology, 107 (50.5%) replied "No", 57 (26.9%) replied "Yes", and 48 (22.6%) replied, "I don't know" (Figure 6).

The most challenging organs and systems to evaluate in forensic pathology, according to the participants, were the central nervous system (36%) and cardiovascular system (34.6%). These were followed by the reticuloendothelial system and respiratory system. Some participants answered "All" to this question (Figure 7).

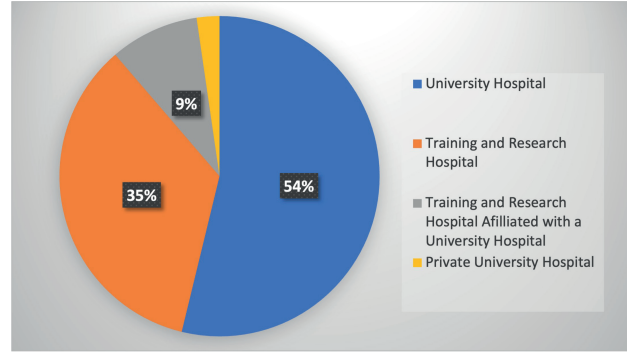


Figure 1. Training facilities of the participants.

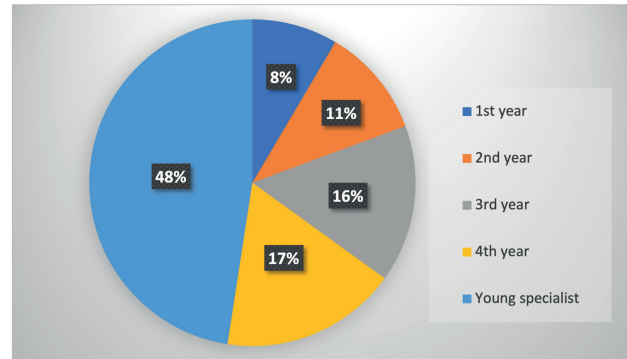


Figure 2. Training stage of the participants.

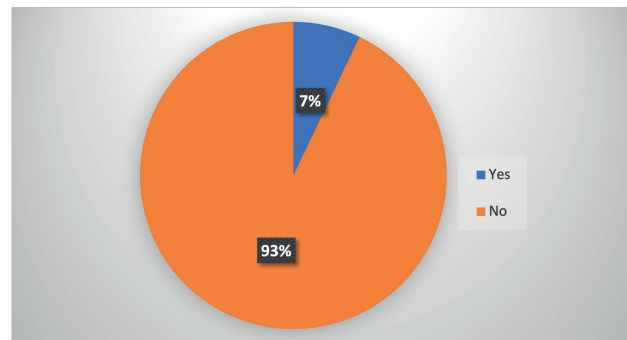


Figure 3. Presence of forensic pathology training in the residency program.

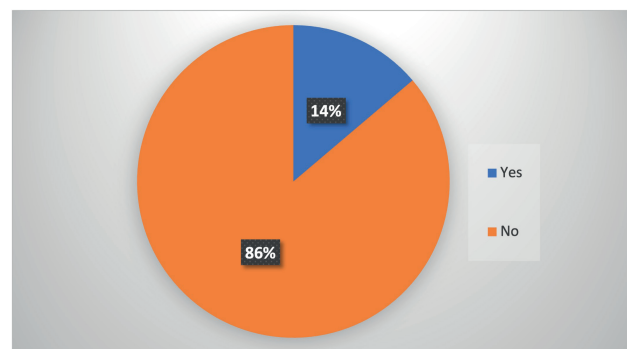
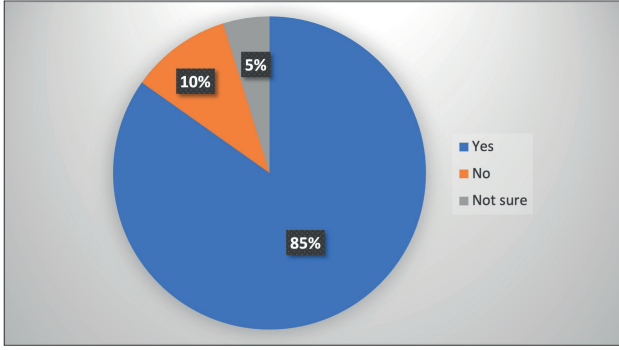
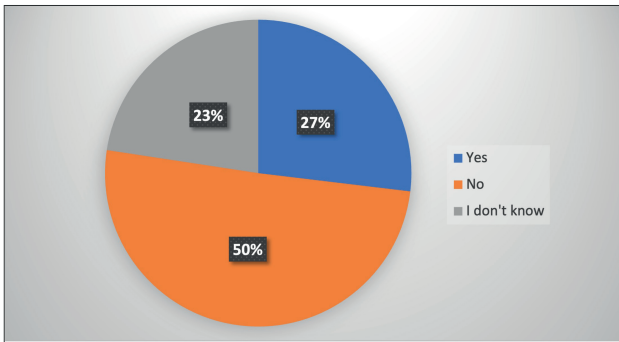


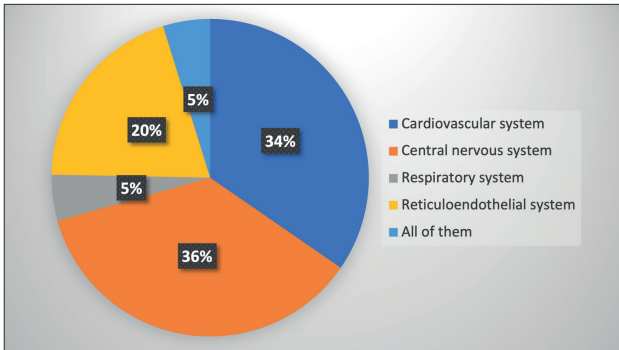
Figure 4. Presence of forensic pathology rotation.



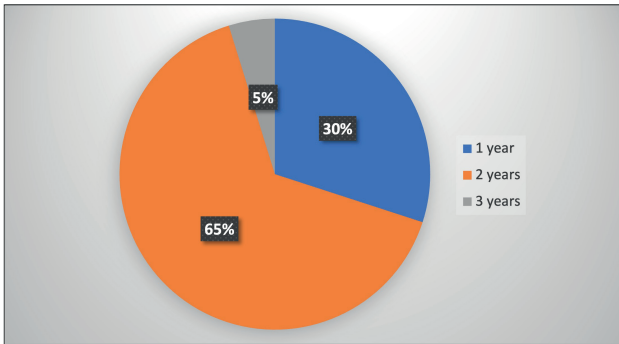
**Figure 5.** Would you like forensic pathology training to be added to the residency program?



**Figure 6.** Do you have a special interest in forensic pathology?



**Figure 7.** What are the most challenging organs and systems to evaluate in forensic pathology in your opinion?



**Figure 8.** What do you think should be the duration of the subspecialty training in forensic pathology if it is added to the program?

The majority of the participants stated that they did not have knowledge or lacked knowledge about the job descriptions and activities of the pathology specialists working in the Council of Forensic Medicine and they thought that this training should be given during their residency, while some of the young specialists stated that they had difficulties in forensic matters throughout their specialist years. The answers to the question “What do you think should be the duration of the subspecialty training in forensic pathology if it is added to the program?” were 1 year– 30%, 2 years– 65%, and 3 years– 5% (Figure 8).

## DISCUSSION

Histopathology contributes significantly to forensic medicine by offering more precise and in-depth details on the cause and manner of death. In addition to other investigative methods, tissue samples from the deceased can assist in identifying underlying diseases and injuries that may have contributed to the death. Despite its importance, histopathology at autopsy has faced criticism and challenges in recent years. Some have argued that the process is time-consuming and the results are often subjective, leading to a lack of standardization and accuracy in interpretation (2,3,8,9). Although post-mortem microscopic examination has decreased in some centers due to virtual autopsies performed in increasing numbers, it is still deemed necessary in the majority of autopsies in Türkiye (10).

The use of histopathology in forensic medicine presents challenges, such as the need for specialized training and expertise in both pathology and forensic medicine, particularly in post-mortem pathology. Deficiencies in specialist training programs for both forensic medicine and pathology have been previously identified particularly in countries where the two are considered separate branches as well as countries with advanced training programs like the United States (4,6,7,11). The fact that forensic medicine and pathology are seen as two separate branches in today’s system, instead of an inseparable pair in forensic sciences, deepens this education gap. In Türkiye, although the pathology specialist training system does not include training in forensic pathology and forensic autopsy, pathologists are still obliged to perform post-mortem examinations

and forensic autopsies in cases where there is no forensic medicine specialist available. This, as clearly stated in the survey results, causes occupational anxieties and inadequacies among pathologists who had no experience in forensic medicine and forensic pathology during their residency.

A survey study among Canadian pathology trainees revealed that they have limited access to autopsy teachings which impacts their career choices as forensic pathologists despite the need for forensic pathologists in the job market after they finish training (12). Another study from Türkiye that was performed on actively working pathology specialists showed a reluctance towards performing postmortem microscopic examinations and a low interest rate in the forensic pathology practice (7). Also, in our study, similar results were obtained when asked about the level of interest in forensic pathology with 50.5% of the participants replying "No," 26.9% replying "Yes," and 22.6% replying "I don't know." This shows that there is a significant number of pathology residents and young specialists who do not have a clear understanding of the field and its importance in medicolegal cases.

The results of the survey indicate that the majority of pathology residents and young specialists in our country did not receive training in forensic pathology. Only 14.8% of the participants had an external rotation lasting one or two months in forensic pathology, and 78.7% of them reported not having any experience in the field during their training. Despite this, 84.8% of the participants stated that they would like their core pathology training to include a rotation in forensic pathology. This indicates a high demand among pathology residents and young pathologists to receive training in forensic pathology and highlights a need for the inclusion of forensic pathology training in pathology residency programs.

Forensic pathology provides the opportunity to evaluate the whole human body altogether in addition to the experience in surgical pathology. Moreover, autopsy pathology offers the opportunity to evaluate basic pathological processes from the start to the end, including inflammation, tissue repair, and hemodynamic processes, which are frequently overlooked in routine surgical pathology, and also to

see benign or early neoplastic processes that are rarely seen in surgical pathology (8). The limited knowledge of the pathology of vital organs such as the heart and the brain, which cannot be fully evaluated in surgical pathology, highlights a major deficiency in pathology education, as shown by the survey results.

The majority of participants reported that they did not have knowledge or lacked knowledge about the job descriptions and activities of the pathology specialists working in the Council of Forensic Medicine and believed that this training should be given during their residency. This supports the idea that pathology residency programs should incorporate more training in forensic pathology, including not only practical experience but also education on the roles and responsibilities of forensic pathologists.

Our survey study has some limitations. First of all, we were unable to select a predefined sample size before conducting the survey because of the distinctive characteristics of our study and the difficulties in precisely predicting the total number of possible participants. As a result, we aimed to include as many eligible participants as possible within the constraints of the available time and resources. Secondly, despite our intention to conduct a reliability analysis on the survey instrument, we encountered challenges stemming from its complexity. The nature of the questions and the diversity of responses made it difficult to apply standard reliability analysis methods effectively. Given the intricate interplay of various question types and the potential for nuanced interpretations, a reliable assessment of internal consistency became impractical within the scope of this study. While a formal reliability analysis could not be executed, we have taken utmost care in designing the survey, emphasizing clarity, relevance, and coherence in our questions. As a result, we believe the survey still provides valuable insights into the subjects under investigation and we believe the insights gathered from this approach provide valuable preliminary data for future research in this area.

## CONCLUSION

In conclusion, the results of our survey show that there is a deficiency in most of the institutions

providing training in forensic pathology education in our country, that many people have a very low awareness of this issue, and that young specialist pathologists have problems in this regard. To address these gaps, the pathology CCR should be revised

to incorporate a rotation in forensic pathology and with external rotation in institutions where in-departmental training cannot be provided, including education on the job descriptions and activities of forensic pathologists.

### Forensic Pathology Awareness Survey

1) In which institution did you work or do you work as a pathology resident?

Mark only one oval.

- University Hospital
- Training and Research Hospital
- Training and Research Hospital Affiliated with a University Hospital
- Private University Hospital

2) What year of your residency are you in?

Mark only one oval.

- 1
- 2
- 3
- 4
- I am a young specialist

3) Is forensic pathology training included in your residency program?

Mark only one oval.

- Yes
- No

4) If your answer to the above question is yes, please indicate how much of the 4-year residency it covers in months.

\_\_\_\_\_

5) If forensic pathology is not included in your residency program, do you have a forensic pathology rotation as an external rotation?

Mark only one oval.

- Yes
- No

6) If your answer to the above question is yes, please indicate how many months your external rotation is.

\_\_\_\_\_

7) Would you like the forensic pathology training to be included in the pathology core curriculum for residency?

Mark only one oval.

- Yes
- No
- Not sure

8) Are perinatal and pediatric autopsies performed in your department?

Mark only one oval.

Yes

No

9) Do you have a special interest in forensic pathology?[]

Mark only one oval.

Yes

No

I don't know

10) Among the organs and systems evaluated in forensic pathology, which one do you think will be the most challenging for you?

Mark only one oval.

Cardiovascular system

Central nervous system

Respiratory system

Reticuloendothelial system

Other: \_\_\_\_\_

11) Write what you think about the job descriptions of pathology specialists working in the Council of Forensic Medicine.

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12) How long do you think should the duration of the subspecialty training in forensic pathology if it is added as a subspecialty program?

Mark only one oval.

1 year

2 years

3 years

13) Do you think that the forensic pathology sessions in national pathology congresses are sufficient?

Mark only one oval.

Yes

No

I don't have an opinion

14) Please write the main issues that you want to be discussed about forensic pathology in national pathology congresses.

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The results of this study were presented as an oral presentation at the 31st Turkish National Congress of Pathology which was held in Izmir, Turkey between 26-30 October 2022.

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**Ethics approval and consent to participate:** The study was approved by the Council of Forensic Medicine, Education and Scientific from the Investigation Commission (date and number 03.08.2022/21589509/2022/577)

**Competing interests:** No competing interests are declared by the authors.

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