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EMERGENCY RADIOLOGY

ORIGINAL ARTICLE

Current practice of emergency radiology in Turkey and future expectations: a survey study

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PURPOSE
The development of emergency radiology (ER) in Turkey has accelerated with the increase in the number of patients admitted to emergency departments. We aimed to present and discuss the responses to a survey distributed to radiologists in Turkey, which included questions about the current practice of ER and future expectations.

METHODS
A survey with 29 questions enquiring about the infrastructure of respondents' hospitals and radiology units, information about emergency services and ER (including patient volume), the number of staff and equipment, the ER working plan and reporting method, and training in the field of ER were distributed to members of the Turkish Radiological Society by email.

RESULTS
The response rate was 21.97% (328/1.493). The presence of distinct ER units in radiology departments was confirmed by 40.55% of respondents, while for 34.25%, ER was located inside the emergency room. Of the respondents, 26.96% stated they believed that emergency cases should be reported by emergency radiologists, and the necessity for an ER subunit in the emergency room was agreed upon by 58.64% of contributors. The majority of respondents (69.54%) agreed with the opinion that residents should receive their ER training in an ER unit.

CONCLUSION
Keeping abreast of current ER practices and radiologists' expectations may be helpful for improving national ER practices and academic studies.

KEYWORDS
Emergency, improvement, practice, radiology, survey

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Emergency radiology (ER), a relatively new subspecialty in the radiology area, is unique in its emphasis on the imaging of acutely ill or injured patients.[1] The number of patients and volume of images taken by emergency services has risen in recent years due to the wide use of ER, which often requires a rapid report turnaround on a round-the-clock basis. Optimizing patient outcomes in high-volume emergency services can be accomplished by emergency radiologists through the triage of patients.[2]

Although the need for ER is clear, specialization in ER and/or ER policy, including the management of emergency imaging and education, is not yet established in most countries. In various countries, ER is not recognized as a distinct category within the radiology community. Compared with other subspecialties, ER has the fewest number of fellowship training programs in developed countries.[1]

Teaching the importance of ER may be accomplished through learning initiatives with radiologists and clinicians, which could increase awareness about its functional requirements and advantages. In recent years, radiology societies have introduced surveys that examine

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radiologists' levels of awareness and knowledge regarding ER. These surveys reveal the current situation of ER in radiology departments, along with the expectations of radiologists working in ER, and they provide an in-depth, multifaceted review of several topics of critical importance to trauma and emergency imaging.[3,4] However, needs, expectations, and recommended actions are often based on local circumstances, which may necessitate the use of nation-specific surveys to implement appropriate policies for ER management and the establishment of ER units.

In this study, we present the results of an ER survey distributed to radiologists in Turkey. The results of the survey are then discussed in relation to the current situation of ER in Turkey, the radiologists' points of view, and expectations for the future development of ER practice and education in Turkey.

Methods

Survey construction

Institutional review board approval was obtained for this study (2021/92-1369). An anonymous digital survey consisting of 29 questions was developed by a team of four practicing academic emergency radiologists based in part on the methods undertaken by Scaglione et al.[3] The survey was first reviewed by 22 members of the Emergency Radiology Research and Education Study Group, which is one of the radiology study groups of the Turkish Radiological Society (TRS). The TRS Board of Directors also reviewed the survey and permitted the distribution of the survey to their members by using their email lists. Survey questions were designed to be responded to by all types of radiologists, including residents, fellows, consultants, academic radiologists, and chairpersons of radiology departments. Questions that were designed to probe the current practice of ER and radiologists' points of view about the future of the ER were sub-grouped to investigate the respondent's position, hospital infrastructure, emergency service, and ER workload, including patient volume, the number of staff, equipment, work planning and reporting methods in ER, and educational and academic activities in ER.

The format of the survey questions consisted of yes/no and multiple-choice selection questions.

Survey distribution

The digital survey was made available to radiologists via a web link to Survey Monkey (Palo Alto, CA). Initial emails accompanying the survey and reminder emails one week after its introduction directed that radiologists should complete the survey only once.

Since this distribution approach would potentially result in duplicate responses across different platforms, initial emails accompanying the survey and reminder emails one week after its introduction directed that radiologists should complete the survey only once The survey was conducted between April 15th and May 4th, 2021.

Statistical analysis

All available data were analyzed on a question-by-question basis; relevant frequencies for each question are provided in the results. Survey data were exported into Excel (Microsoft Inc., Redmond, WA) and analyzed using descriptive statistics; categorical variables were expressed as frequencies and percentages. The responses to some questions that investigated the opinions of radiologists about ER were assessed according to the rank and workplace of radiologists. All data were collected and descriptive metrics calculated using IBM SPSS statistics software, version 25 (IBM Software, New York, USA).

Main points

- This study reveals the current practices of emergency radiology (ER) in Turkey and radiologists' perspectives and expectations regarding ER.
- Current infrastructure, staff, and academic personnel of radiology departments need to be improved to establish ER divisions in radiology departments.
- Absence of ER units in radiology departments results in drawbacks not only in ER practice but also regarding the education of radiology residents in terms of emergency settings management.
- ER practice may be better managed by radiologists who undergo dedicated ER subspecialty training with a distinct ER study area as part of the core curriculum.

Results

The survey questions and corresponding results with respondents' rates are presented in Table 1. The response rate of the survey was 21.97% (n = 328). Although survey announcement emails were sent to 4.213 members of TRS, it was confirmed that 1.493 recipients read the emails and became aware of the survey. The highest participation was achieved the second day after the survey was sent. The average completion time of the survey was 4 minutes and 36 seconds.

Respondents' positions and hospital infrastructure

Most of the respondents of the survey were practicing radiologists (n = 143, 43.6%), followed by residents (n = 100, 30.49%), academics in universities (n = 60, 18.29%), chairpersons (n = 13, 3.96%), and academics in state hospitals (n = 12, 3.66%) (Figure 1). The number of beds in the hospitals where most of the participants worked was between 100 vs 500 (32.21%), followed by >1000 (28.83%) and >500 (28.53%). Most of the respondents were from university hospitals (37.80%). The majority of the hospitals were training hospitals (70.12%) and major trauma-treating hospitals (96.95%).

It was determined that more than one participant participated in the survey in some hospitals. There were 19, 12, and five respondes from one hospital, four respondents from six hospıtals, three respondents from eight hospitals, and two respondents from 13 hospitals. The remaining 280 respondes were from distinct hospitals. Analysis of the responses from those working at the same hospital yielded no discrepancies in terms of the structuring of units and departments, bed capacity, or the number of cases admitted to the radiology department.

Patient volume, staff, and equipment in emergency departments (ED) and emergency radiology

More than half of the respondents (51.38%) revealed that the number of patients admitted to the ED daily was >400. A separate ER unit was available in 40.55% of radiology departments, while 34.25% of respondents declared that ER units resided within the ED. The need to establish a distinct ER unit in the ED was agreed upon by 58.64% of all respondents, with the highest rate reported for academics at training and research hospitals (81.82%) and the lowest rate for radiologists (49.65%) (Table 2). Based on hospital types, this suggestion received the greatest level of approval in university hospitals (66.13%).

The presence of imaging equipment used for only emergency patients and the presence of equipment in ER units varied widely between hospitals. One-quarter of radiologists stated that X-ray, ultrasonography

Table 1. Respondents' answers to the survey

Q1. What position do you have in the field of radiology?		n - %
Radiology resident		100-30.5%
Radiologist		143-43.6%
Radiology educator		12-3.7%
Academician		60-18.3%
Chairperson/head of department		13-3.9%
	Total	328-100%
Q2. What is the status of the hospital where you work?		
State hospital		52-15.9%
Training-research hospital		96-29.3%
City hospital*		29-8.8%
University hospital		124-37.8%
Private hospital		27-8.2%
	Total	328-100%
Q3. What is the name of the hospital where you work?		
Institution name		235-74.8%
If you do not wish to notify your institution, please specify		79-25.2%
	Total	314-100%
Q4. What is the bed capacity of your hospital?		
<100		34-10.4%
100-500		105-32.2%
>500		93-28.6%
>1000		94-28.8%
	Total	326-100%
Q5. Does your hospital provide medical student or radiology residency training?		
Yes		230-70.1%
No		98-29.9%
	Total	328-100%
Q6. Are major emergencies (arrest, stroke, myocardial infarction, acute abdomen) and major trauma cases accepted?		
Yes		318-96.9%
No		10-3.1%
	Total	328-100%
Q7. What is the daily number of cases admitted to the ED?		
<100		30-9.2%
100-200		37-11.4%
200-300		44-13.5%
300-400		47-14.5%
>400		167-51.4%
	Total	325-100%
Q8. Does your ED have a separate ER department that evaluates emergency patients?		
Yes		133-40.6%
No		195-59.4%
	Total	328-100%
Q9. If you have an ER department, is this department located in the ED?		
Yes		100-34.2%
No		192-65.8%
	Total	292-100%
Q10. Should ER departments be included in the ED?		
Yes		190-58.6%
No		134-41.4%
	Total	324-100%

Table 1. Continued

Q11. Which devices do you have reserved for ER?		
X-ray		43-13.6%
X-ray + US		15-4.8%
X-ray + CT		35-11.1%
X-ray + US + CT		74-23.4%
X-ray + US + CT + MRI		81-25.6%
X-ray + US + IR		0-0.0%
X-ray + US + CT + IR		6-1.9%
X-ray + US + CT + MRI + IR		62-19.6%
	Total	316-100%
Q12. If there is no US device in the emergency room, how do you do these procedures?		
It is done in the radiology department		290-94.5%
The patient is referred to an external center		11-3.6%
Evaluated by teleradiology		6-1.9%
	Total	307-100%
Q13. If there is no CT device in the emergency room, how do you do these procedures?		
It is done in the radiology department		268-89.3%
The patient is referred to an external center		13-4.3%
Evaluated by teleradiology		19-6.4%
	Total	300-100%
Q14. If there is no MRI device in the emergency room, how do you do these procedures?		
It is done in the radiology department		270-86.8%
The patient is referred to an external center		25-8.1%
Evaluated by teleradiology		16-5.1%
	Total	311-100%
Q15. If there are no IR devices in the emergency room, how do you do these procedures?		
It is done in the radiology department		235-74.1%
The patient is referred to an external center		82-25.9%
	Total	317-100%
Q16. How many radiologists work in your RD?		
1-10		123-37.5%
10-20		101-30.8%
20-30		53-16.2%
>30		51-15.5%
	Total	328-100%
Q17. In your hospital, is there a radiologist who only deals with ER?		
Yes		63-19.2%
No		265-80.8%
	Total	328-100%
Q18. How many radiologists are working only in ER in your hospital?		
0		247-76.2%
1-3		55-17.0%
3-5		17-5.3%
5-10		1-0.3%
>10		4-1.2%
	Total	324-100%
Q19. Are there any rotating doctors in ER in your hospital?		
All radiologists work in the emergency room in rotation		186-63.9%
Some of the radiologists rotate in the emergency room		71-24.4%
Only emergency radiologists work in the emergency room		34-11.7%
	Total	291-100%
Q20.Which radiologists should report emergency imaging examinations in RD?		
Subspecialists according to anatomic area (brain –> neuroradiology; lung –> chest radiologists etc.)		106-33.2%
Radiologists at emergency radiology rotation		127-39.8%
Emergency radiologists		86-27.0%
	Total	319-100%

Table 1. Continued

Q21. How many radiologists report emergency imaging examinations during the daytime (8:00–17:00)		
1		120-36.8%
1-4		139-42.6%
5-10		49-15.1%
10-15		18-5.5%
	Total	326-100%
Q22. How many radiologists report emergency imaging examinations during nightshifts (17:00–8:00) and weekends (24 hours)?		
1		172-53.9%
1-3		104-32.6%
3-5		12-3.8%
>5		31-9.7%
	Total	319-100%
Q23. If consultant radiologists work only in the daytime, how are emergency imaging examinations reported?		
		0-0.0%
Residents prepare the draft of the report		76-25.5%
Residents prepare the draft of the report; difficult cases are reported by on-duty consultant radiologist		
All imaging examinations are reported by on-duty consultant radiologists		2-9.4%
All imaging examinations are reported via teleradiology		96-32.3%
Residents prepare the draft of the report, and main report is prepared the following day		4-15.2%
All imaging examinations are assessed by on-duty consultant radiologist; short review notes, including imaging findings, are illustrated on hospital information system and images are sent to teleradiology for final report		
Residents prepare the draft of the report; difficult cases are reported by on-duty consultant radiologists and images are sent to teleradiology for final report		26-8.8%
		26-8.8%
	Total	297-100%
Q24. Are emergency US examinations performed by non-radiologists in EDs?		
Yes		16-4.9%
No		214-65.4%
Only FAST, other US examinations are performed by radiologists		97-29.7%
	Total	327-100%
Q25. Do you agree with the suggestion that radiology residents should have their ER education in ER units settled in emergency medicine service?		
Yes		226-69.5%
No		99-30.5%
	Total	325-100%
Q26. Is it necessary to include ER as a separate subject in the core curriculum of radiology resident education?		
Yes		289-88.1%
No		39-11.9%
	Total	328-100%
Q27. Do you have regular (weekly or monthly) multidisciplinary case-based discussion meetings with the ED in your hospital?		
Yes		24-7.3%
No		303-92.7%
-	**Total**	327-100%
Q.28. Do you think that a sufficient number of academic studies about ER are performed in your department?		
Yes		31-9.5%
No		297-90.5%
	Total	328-100%
Q29. Which one of the following is correct?		
In our country, the number of neuro, chest, and abdomen radiologists are sufficient Emergency radiology practice and education should be performed by these radiologists. There is no need for a separate emergency radiology unit.		83-25.5%
Optimization of emergency imaging examination protocols and assessment of these imaging examinations should be performed by radiologists who have emergency radiology education or experience in this field		243-74.5%
	Total	326-100%

*City hospital: large regional health institutions that include state hospitals and training and research hospitals affiliated to the Ministry of Health. ED, emergency department; ER, emergency radiology; RD, radiology department; US, ultrasonography; CT, computed tomography; MRI, magnetic resonance imaging; IR, interventional radiology; FAST, focused assessment with sonography for trauma.

(US), computed tomography (CT), magnetic resonance imaging (MRI), and interventional radiology (IR) equipment in their hospitals could be used for patients presenting to the ED (Table 1).

US, CT, MRI, or IR examinations were reported to be performed in the radiology department separate to the ED in 94.46%, 89.33%, 86.82%, and 74.13% of responses, respectively, where equipment for such imaging examinations was not located in the ED (Figure 2). If US, CT, MRI, or IR was not available in the ED, patients were referred to another hospital in 3.58%, 4.33%, 8.04%, and 25.87% of respondents' hospitals, respectively.

The number of radiologists in respondents' radiology departments varied between 1–10 (37.50%) and >30 (15.55%). Few respondents (19.21%) declared that a dedicated emergency radiologist was working in their department, with the number of radiologists working only in ER being 1–3 in 16.98% of cases, 3–5 in 5.25% of cases, 5–10 in 0.31% of cases, and >10 in 1.23% of cases. In 63.92% of respondents' hospitals, all radiologists were doing ER work on rotation.

Emergency radiology work planning and reporting

The number of radiologists involved in reporting ER examinations during the day time (8:00–17:00) was one in 36.81% of hospitals, 1–4 in 42.64% of hospitals, and 5–10 in 15.03% of hospitals, while ER reports during night shifts (17:00–8:00) and weekends were performed by one radiologist in 53.92% of cases and 1–3 radiologists in 32.60% of cases. In the absence of consultant radiologists on night shifts and weekends, ER examinations were mostly reported via teleradiology (32.32%), followed by residents' draft reporting systems, with difficult cases being discussed with the on-duty consultant radiologist (25.59%). In the ED, all US examinations and focused assessment with sonography for trauma were reported to be performed by non-radiologist physicians in 4.89% and 29.66% of respondents' hospitals, respectively. Reporting of ER examinations by emergency radiologists, radiologists on ER rotation, or subspecialists other than emergency radiologists according to their interest area was approved by 26.96%, 39.81%, and 33.23% of respondents, respectively.

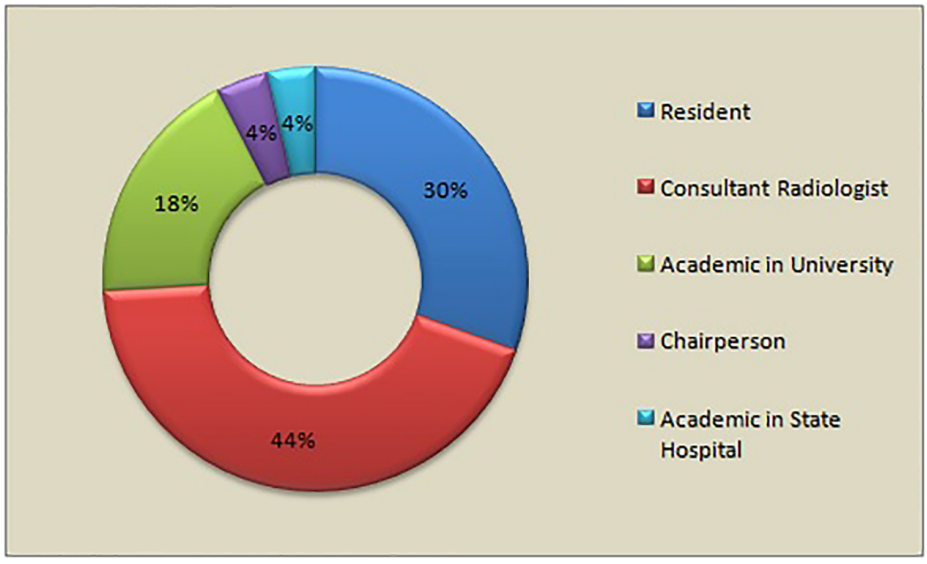

Figure 1. Circle diagram of distribution of the respondents

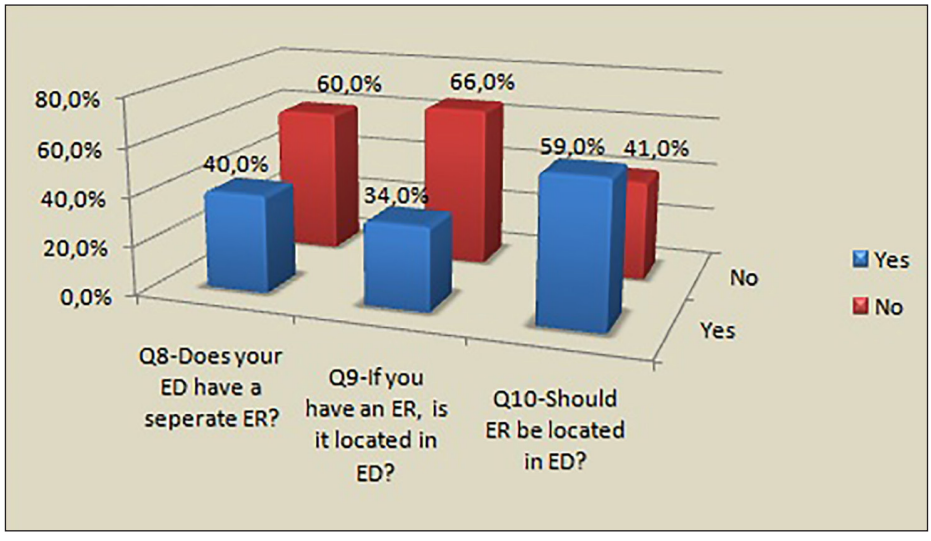

Figure 2. The distribution of the ER location. ER, emergency radiology; ED, emergency department.

Reporting ER examinations by emergency radiologists was approved by 41.67% of academics in training and research hospitals, 28.68% of radiologists, 27.27% of residents, and 15.38% of the chairpersons of the departments. The suggestion received the highest approval from respondents who worked in city hospitals (51.72%), followed by private hospitals (37.50%), and university hospitals (25.20%). A higher percentage (74.54%) of radiologists agreed with the opinion that the optimization of emergency imaging examination protocols and assessments should be performed by radiologists with a specialized ER education or experience in ER. Support for this was highest among residents (79%) and lowest among department chairpersons (53.85%).

Emergency radiology education

The majority of respondents (69.54%), including 73.27% of residents and 53.85% of department chairpersons, agreed that residents should receive their ER training in the ER unit. Additionally, 88.11% of contributors, 91.09% of residents, and 92.31% of department chairpersons declared that ER should be a separate subspecialty in the curriculum of radiology training. There was no regular multidisciplinary meeting conducted within the ED in 92.66% of respondents' radiology departments, with only 11.20% of respondents from university hospitals declaring that they have such meetings. The number of academic studies on ER in their departments was insufficient, according to 90.55% of respondents, 75% of academics in university, and 84.62% of department chairpersons. Only 20.80% of respondents from university hospitals stated that the number of academic studies in their departments was sufficient.

Discussion

The results of this survey explained some current ER practice issues and the scope of radiologists' perspectives concerning ER in

Table 2. The responses to some questions in the survey according to the positions of radiologists

	Residents (n =101)	Consultants (n = 143)	Academics in state hospital (n =12)	Academics in university (n = 60)	Chairpersons (n = 13)
Q10- Should ER be included in ED?					
Yes	57-57.0%	70-49.6%	9	46-76.7%	9
No	43-43.0%	71-50.4%	2	14-23.3%	4
Q20- Which radiologists should report emergency imaging examinations in RD?					
Subspecialists according to anatomic area	29-29.3%	34-25.0%	3	36-60.0%	5
Radiologists at ER rotation	43-43.4%	63-46.3%	4	11-18.3%	6
ER radiologists	27-27.3%	39-28.7%	5	13-21.7%	2
Q25- Do you agree with the suggestion that radiology residents should have their emergency radiology education in ER units settled in emergency medicine service?					
Yes	74-73.3%	96-68.6%	10	40-66.7%	7
No	27-26.7%	44-31.4%	2	20-33.3%	6
Q26- Is it necessary to include emergency radiology as a separate subject in the core curriculum of radiology resident education?					
Yes	92-91.1%	126-88.1%	10	50-83.3%	12
No	9-8.9%	17-11.9%	2	10-16.7%	1
Q28- Do you think that a sufficient number of academic studies about emergency radiology are performed in your department?					
Yes	13-12.9%	2-1.4%	0	15-25.0%	2
No	88-87.1%	141-98.6%	12	45-75.0%	11
Q29- Which one of the following is correct?					
In our country, the number of neuro, chest, and abdomen radiologists is sufficient. ER practice and education should be performed by these radiologists. There is no need for a separate ER unit	21-21.0%	39-27.3%	3	14-23.7%	6
Optimization of emergency imaging examination protocols and assessment of these examinations should be performed by radiologists who have ER education or experience in this field	79-79.0%	104-72.7%	9	45-76.3%	7

Some questions were not answered by some respondents (four answers in Q10, nine in Q20, three in Q25, and two in Q29 were skipped). ER, emergency radiology; ED, emergency department; RD, radiology department.

Turkey. In their responses, radiologists noted the current drawbacks of ER practice, training, and the academic situation in Turkey and stated their opinions on improving these issues.

The response rate of our survey (21.97%) was fair compared with previous survey studies regarding ER.[1,3-5] However, we calculated this rate based on the information that 1.493 of 4.213 members read the survey emails and became aware of the survey. If all members are taken into account, then the response rate of the survey is approximately 6%. A previous survey study regarding ER practice across Europe had a 10% response rate, while another in the United States had a 29.6% response rate.[3,4] The variation in response rates to ER surveys may have resulted from undelivered emails, inadequate reminders, the time needed to complete the survey, or the disinterest of some radiologists. The distribution of the radiologists according to their positions in radiology (resident, academic, radiologist, chairperson of the department) allowed the study to represent the opinions of different stakeholders in the field. Importantly, one-third of respondents of this survey were residents, which suggests a willingness by this group to announce their ideas, recommendations, and expectations on ER. Learning the ideas of this younger population may open new frontiers and help to further develop policies regarding radiology subspecialties.

A subspecialty in radiology departments may be improved by having the appropriate infrastructure.[2,6] Less than half of radiologists in Turkey revealed that there was a distinct ER unit in their departments, and ER units were located in ED in only 34.25% of respondents' hospitals. Approval for a distinct ER unit within the ED was highest among university hospital respondents (66.13%), which suggests that an ER unit within an ED improves patient management but is also necessary for training and academic purposes. The establishment of a distinct ER unit in a radiology department or ED may be insufficient to handle the imaging examinations of patients presenting to the ED. According to respondents, 13.6% of radiology departments had only X-ray units, which may diminish the diagnostic capability of ER practice in these hospitals. CT in EDs was only present in 60% of respondents' hospitals. Emergency radiography units should be equipped with appropriate imaging equipment that meets ED requirements.[7] In this survey, we found that 8.04% of patients needing MRI and 25.87% of patients needing IR were sent to another hospital due to the inability to perform these in the ED. These high rates of patient loss may decrease the efficiency of ER and ED practice, along with decreasing educational and academic activities. The absence of imaging equipment in ER units affects not only radiology practice and training but also the ED and other departments that may be affected in terms of their practice and training. It is well known that emergency radiologists' efficiency and communication skills, and therefore management of patients' imaging, can be facilitated by placing the emergency radiologist in close proximity to the radiology technologist and the ED.[2] The results of the survey also showed that the number of

radiologists involved in the reporting of ER significantly decreased during night shifts and weekends compared with daytime practice. However, this practice manner is not compatible with the nature of ER since the number of patients and severity of illnesses and traumatic cases do not decrease during night shifts and weekends. Approximately one-third of respondents declared that the imaging examinations of patients presented during these time periods are assessed via teleradiology. This drawback in ER practice can be overcome with a specific staffing structure that includes dedicated ER radiologists who are familiar with the workload and requirements of the ED.[8,9] Scaglione et al.[3] also reported that X-ray, US, and CT equipment were sufficient in ER units of European centers; however, the absence of MRI and IR units caused patient discharges, according to their survey study. They suggest that the presence of MRI and IR units near the ED may also be helpful in evaluating these patients if it is not possible to assess them in the ED.[3]

For 63.92% of respondents' hospitals, the hospital was stated to have ER rotation, which suggests awareness about the importance of ER in radiology practice. However, the results of this survey also revealed that although most radiologists agreed with the necessity of an ER unit in the hospitals, they did not have the same level of approval for the reporting of ER examinations by emergency radiologists. Low approval rates of ER reporting by emergency radiologists in respondents (26.96%), academics in university (21.67%), and chairpersons of departments (15.38%) were surprising and need to be discussed to discover their underlying reasons. One of the reasons for this may be the unwillingness of radiologists to lose an area of their practice and other associated benefits.[10] Another reason for this approach may be that some patients presenting to the ED have chronic medical conditions rather than emergency conditions. Evaluation of these patients' imaging examinations may be better performed by radiologists rather than emergency radiologists. This drawback may be more critical in countries where indications of ER imaging are not well established and clinical decision support systems are not used. In Turkey, EDs have no limitation policy regarding ordering CT examinations, and there is no clinical decision support system used generally within the country, which causes the over-ordering of image examinations and the assessment of non-emergency cases by emergency radiologists. This clinical practice results in radiologists having less confidence in ER assessments. Radiologists are also not used to responding to clinicians' requirements in common practice. Usually, radiologists need sufficient time to evaluate the images before reporting. However, ER practice necessitates fast and accurate responses, suggestions, comments, and reports so that decisions can be made regarding emergency treatment. This requirement may also be one of the underlying reasons for the unwillingness of some radiologists to conduct ER. For department chairpersons, it may be difficult to establish a new ER unit and manage the distribution of imaging workload between subspecialties. However, this point of view may hinder the improvement of the ER subspecialty in Turkey, which would be significantly improved by the allocation of emergency radiologists who are trained and only work in this area.

One of the interesting results of the survey was that 30% agreed that ER training of residents in ER units was unnecessary. This percentage is high from our point of view. Also, the majority of the respondents (88.11%) suggested that ER training should be taught as a distinct part of the curriculum embedded in radiology training. The responses of radiology department chairpersons to the question on ER training were interesting. Although 53.85% of department chairpersons agreed with the opinion that residents should receive their ER training in the ER unit, 92.31% of them declared that ER should exist as a separate subject like other subspecialties in the core curriculum of radiology training. Differences between these responses point to a discrepancy. We think that this subspecialty, as part of the core curriculum, deserves to be performed in a distinct unit, and training in this subspecialty should be performed by emergency radiologists who are educated in this area. The education of ER residents also presents an academic point of view regarding ER. As an academic activity, multidisciplinary meetings regarding ER are not performed in radiology departments according to 92.7% of respondents. Also, 90.55% of respondents stated that the number of academic studies about ER is not sufficient within their department. An insufficiency of these academic activities in radiology departments may be caused by the inadequate numbers of dedicated emergency radiologists. An absence of academic studies and an insufficient number of emergency radiologists leads to an unwillingness to pursue ER fellowship or training among radiology residents. The establishment of nationally based ER training guidelines, maintaining principles of ER fellowship programs, and encouraging radiology residents to pursue ER as a specialty may be helpful in overcoming these obstacles. A previous survey study showed that radiology residents with the greatest exposure to ER during residency were more familiar with ER training and career opportunities.[5] One way to encourage residents to become more familiar with ER may be to increase the number of ER questions on board examinations. Improvement of ER is maintained in developed countries where ER is accepted as a distinct academic discipline by the community of radiologists.[6] One of the ways to make improvements in ER may be for emergency medicine societies to declare the necessity of distinct ER units in EDs with dedicated emergency radiologists. Because emergency radiologists focus on the needs of emergency physicians, the importance of collaboration between emergency physicians and emergency radiologists may be more objectively evaluated by the radiology community.[2] However, a key way to improve ER within a radiology community may be by attracting radiology residents to specialized fellowship programs. A previous survey conducted among radiology residents revealed that the two most important factors in selecting a subspecialty were whether it would be intellectually stimulating and whether respondents had a strong personal interest in it.[5]

Our study has some limitations. The response rate in this survey may be thought of as relatively low if all members of TRS are taken into account. However, the response rate was higher than in some previous surveys regarding ER.[3,4] The low response rate in this survey may have resulted in selection bias and overrepresentation of some respondent groups, such as residents and university employees. Some responses to survey questions about ER unit infrastructure (Q11–15), ER practice (Q17–24), and ER education (Q25–28) may have been more representative of residents' and university employees' opinions. We could not obtain responses from some institutes that have distinct ER units and/or emergency radiologists for the survey. Some of the questions, including Q10, Q20, Q25, Q26, and Q28, may be considered as directives from respondents. There are overlaps in categories of questions, such as Q4, Q7, Q16, Q18, Q21, and Q22. These overlaps may have caused confusion among respondents when it came to selecting the category that their department or ER unit belonged to. We did not classify the radiol-

ogists or residents according to their length of experience in radiology, and therefore we could not analyze their responses according to their level of expertise.

In conclusion, infrastructural, educational, and academic drawbacks in radiology departments affect the orientation of radiologists in ER. The scarcity of emergency radiologists feeds the shortcomings of ER. To contribute to ER improvement in the country, ER should be nationally structured as a subspecialty in radiology, radiology departments should be encouraged to establish distinct ER units with dedicated emergency radiologists, and ER units should be structured in line with international guidelines.

Conflict of interest disclosure

The authors declared no conflicts of interest.

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