

ORIGINAL ARTICLE

Interventional Competency Goals Self-evaluations from the Perspective of Family Medicine Residents for Emergency Medicine Rotation

Girişimsel Yeterlilik, Acil Tıp Rotasyonu için Aile Hekimliği Asistanlarının Bakış Açısından Öz Değerlendirmeleri Hedefler

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ABSTRACT

Background: This study aims to determine how competent family medicine residents think they are in meeting the interventional competency goals set for the emergency medicine rotation and what factors are linked to their competency levels.

Material and Method: The study is a methodological and cross-sectional study between 1 May and 31 October 2022. One hundred thirty-eight family medicine residents who completed their emergency medicine rotation and agreed to participate were included in the study. In the questionnaire used to collect data in the study, the Emergency Medicine Rotational Competence Scale (EMRICS) was developed by the researchers based on the family medicine specialty training curriculum and sociodemographic characteristics.

Results: The mean age of the study group was 29.71±4.27 (Mean±SD) years, and 60.10% (n:83) were women. The mean scores obtained from the scale in the study group were 59.86±11.72 (Mean±SD). While the interventional competence in which family physician residents had the highest proficiency was arterial blood gas with 97.80% (n:135), the lowest was tracheostomy with 15.20% (n:21). Evaluation of essential life support (p:0.037), intubation (p:0.028), tracheostomy (p:0.034), trauma patient assessment (p:0.004) in the study group who applied five or more times received higher EMRICS than those who did not apply at all.

Conclusion: Family medicine residents are competent enough for most emergency medicine rotation targets. In order to achieve the desired competence in interventional competency goals, it is recommended that it be repeated at least five times. Developed based on the training curriculum, EMRICS is a valid and reliable measurement tool for competency assessment.

Keywords: Family medicine, Emergency medicine, Clinical competence, Medical education.

ÖZ

Amaç: Bu çalışmanın amacı, aile hekimliği asistanlarının acil tıp rotasyonunda hedeflenen girişimsel yeterlilik hedeflerinde kendilerini ne kadar yetkin gördüklerini ve yeterlilik düzeyleri ile ilişkili faktörleri değerlendirmektir.

Gereç ve Yöntem: Çalışma, 01 Mayıs-31 Ekim 2022 tarihleri arasında gerçekleştirilen metodolojik ve kesitsel bir çalışmadır. Acil tıp rotasyonunu tamamlamış ve araştırmaya katılmayı kabul eden 138 aile hekimliği asistanı çalışmaya dahil edilmiştir. Araştırmada veri toplamak için kullanılan ankette, aile hekimliği uzmanlık eğitimi müfredatı ve sosyodemografik özellikler temel alınarak araştırmacılar tarafından geliştirilen Acil Tıp Rotasyon Girişimsel Yeterlilik Ölçeği (EMRICS) bulunmaktadır.

Bulgular: Çalışma grubunun yaş ortalaması 29.71±4.27 (Ort±SS) yıl ve %60,10'u (n:83) kadındı. Çalışma grubunda ölçekten alınan ortalama puanlar 59.86±11.72 (Ort±SS) idi. Aile hekimliği asistanlarının en yüksek yeterliliğe sahip olduğu girişimsel yeterlilik %97,80 (n:135) ile arteriyel kan gazı iken, en düşük ise %15,20 (n:21) ile trakeostomi idi. Beş ve üzeri uygulama yapan çalışma grubunda TYD değerlendirmesi (p:0,037), entübasyon (p:0,028), trakeostomi (p:0,034), travma hastası değerlendirmesi (p:0,004) yapmayanlara göre daha yüksek EMRICS aldı. hiç.

Sonuç: Girişimsel yeterlilik hedeflerinde istenilen yeterliliğe ulaşılabilmesi için en az 5 kez tekrarlanması önerilmektedir.

Anahtar Kelimeler: Aile hekimliği, acil tıp, girişimsel yeterlilik ölçeği, tıp eğitimi.

Introduction

Family Medicine aims to protect and improve health and to provide early diagnosis, treatment, follow-up and rehabilitation of all health problems that may be encountered in all age groups from childhood to advanced age, regardless of gender, complaint, or disease in order to contribute to individual, family and community health. It is a specialty that requires acquiring the necessary knowledge, skills, and attitudes to provide a modern, qualified, evidence-based health service in harmony with the principles of

medical ethics (1). Family medicine residency training in Türkiye consists of three essential parts: family medicine practice training, rotations, and field training (2). Half of the total training time is reserved for rotations (1). In these rotations, it is aimed that situations rarely seen in family medicine practice environments can be learned in a shorter time in other hospital clinics and that individuals can be evaluated with a holistic perspective and learn the care services they can receive in other steps (2,3). Emergency medicine and elderly care are among the

most needed training in family medicine (4). With the regulation made in the education curriculum in Türkiye in 2019, a 1-month compulsory emergency medicine rotation was added to the education curriculum, and the expected interventional competency goals and competency levels were specified (1). However, only a limited amount of research has been conducted in Türkiye to determine how the emergency medicine rotation successfully achieves these goals (5). In addition, there is a constant need for new research to periodically evaluate and update the educational content, rotation areas and durations according to social needs (6).

This research evaluates how competent family medicine residents see themselves in the targeted patient management and interventional procedures in emergency medicine rotation and the factors associated with their competency levels.

Material and Methods

Study design and settings

The methodological and cross-sectional study was conducted between 1 May 2022 and 31 October 2022. The research was carried out in the tertiary level hospitals providing family medicine residency training in the province of İzmir, located in the west of Turkey. A questionnaire form was used to collect data in the study. The questionnaire included the questions of the Emergency Medicine Rotation Interventional Competence Scale (EMRICS), developed by the researchers based on sociodemographic characteristics, medical, physical, and technical conditions of the institution, and family medicine residency training curriculum. The surveys were administered face-to-face or in the form of web surveys. Approval for the study was obtained from the Ethics Committee of İzmir Katip Çelebi University Non-Interventional Clinical Research (Date: 21.04.2022 / Decision No: 0186).

Study population

A total of 138 full-time family medicine residency students who completed their emergency medicine rotation and agreed to participate were included in the study.

Development of the EMRICS

In preparing the EMRICS, the competency criteria of the Board of Specialization in Medicine were examined (1). The relevance and intelligibility of each scale item (10 emergency medicine specialists, two family medicine specialists, and two public health specialists) ranged between 0.571 and 1.000, and the content validity index was 0.737. Internal consistency (Cronbach's alpha) and Interclass Correlation (ICC) analyses were used to evaluate the scale's reliability. Items with total item correlations greater than 0.20 were considered reliable (7). Reliability levels expressed by the Cronbach alpha coefficient range were 0.40 and lower, with no reliability, 0.40-0.60 low reliability, 0.60-0.80 reliability, and 0.80-1.00 highly reliability (8). Since

the total item correlations of any item in the scale were not lower than 0.20, they were not excluded. Principal component analysis (PCA) and Varimax rotation in Exploratory Factor Analysis (EFA) were used for construct validity. In the factor analysis of Kaiser-Meyer-Olkin (KMO): 0.790, Barlett's test result was $p < 0.001$. An item with factor loadings below 0.30 was excluded from the scale.

Scoring

As a result, the answers given to the emergency intervention items in the scale were "1- I know how the intervention was done, and I can explain about it, 2- I can do this intervention under guidance or supervision/supervision, 3- I can perform interventions on uncomplicated, common cases, 4- I can apply intervention in all kinds of cases." It consists of 24 four-point Likert-type items and a single sub-field. The minimum score obtained from the scale was 24, and the maximum total score was 96. As the score obtained from the scale increases, it shows that the competence of emergency intervention increases. Whether their interventional competencies are sufficient was determined according to the standards in the Medical Specialization Board Curriculum (1). The required entrepreneurial competency level and above determined in the curriculum were accepted as sufficient.

Evaluation of Data

Data analysis was done using the SPSS v15 (SPSS, San Diego, CA) package program. Descriptive statistics of the study group were reported. The Kolmogorov-Smirnov test assessed whether the scale total scores showed normal distribution. When the data did not show normal distribution, Mann-Whitney U, Kruskal Wallis analysis was used. The significance level was accepted as $p < 0.05$.

Results

The ages of the study group ranged from 24-51, with a mean age of 29.71 ± 4.27 (Mean \pm SD) years, and 60.10% (n:83) were women. 43.50% (n:60) of the residents in the study group completed the emergency type rotation in the first year, 31.20% (n:43) in the second, and 25.40% (n:35) in the third year of residency. Although the duration of employment in the profession varied between 1-24 years, the mean was 4.78 ± 3.94 (Mean \pm SD) years.

As a result of factor analysis, the scale consisting of a single sub-domain explained 33.70% of the total variance. The factor loads of the items ranged from 0.46 to 0.70, and their total correlations ranged from 0.43 to 0.63. Cronbach's alpha value was 0.92. The mean scores obtained from the scale in the study group were 59.86 ± 11.72 (Mean \pm SD), the median value was 60.00, and the extreme values were between 24-96. EMRICS factor load and item-total correlation value of the study group are given in Table 1.

While the interventional competence in which family physician residents had the highest proficiency was

arterial blood gas analysis with 97.80% (n:135), the lowest was tracheostomy with 15.20% (n:21). The distribution of entrepreneurial competencies in the study group according to their adequacy status is given in Graphic 1.

There was no difference in the scores of the study group in terms of age (p:0.148), gender (p:0.825), working time in the profession (0.620), and the number of years of residency they rotated (p:0.299). The comparison of the scores obtained from the EMRICS according to the factors associated with the hospital characteristics of the study group is given in Table 2.

Evaluation of BLS (p:0.037), intubation (p:0.028), tracheostomy (p:0.034), trauma patient assessment (p:0.004), primary wound closure (p:0.042), loss of consciousness including GCS (p:0.037), gastric lavage (p:0.026) in the study group who performed five or more

applications received higher EMRICS than those who did not. In abscess incision/drainage (p<0.001) eye closure (p<0.001), and emergency airway opening (p:0.022), those who did not perform any application scored 1-4 times and scored lower than those who applied five or more times. On the other hand, those who performed the critically ill evaluation (p:0.009), acute abdomen evaluation (p:0.025), and fracture immobilization (p:0.007) 5 or more times scored higher than those who performed it 1-4 times. It was determined that those who performed the respiratory and ventilation Evaluation (p:0.002) 5 times and above got higher scores than those who did not and 1-4 times. The comparison of the scores obtained from the EMRICS according to the observation and practice status of the study group during the emergency rotation is given in Table 3.

Table 1. EMRICS factor load, item-total correlation value of the study group

	Factor Load	Item-Total Correlation	Cronbach's Alpha Value When Item is Removed
Basic Life Support	0.640	0.573	0.908
Advanced Cardiac Life Support	0.558	0.486	0.909
Emergency Airway Opening	0.531	0.470	0.910
Intubation	0.551	0.501	0.909
Critical Patient Assessment	0.594	0.527	0.908
Breathing and Ventilation Evaluation	0.606	0.536	0.908
Arterial Blood Gas Evaluation	0.614	0.542	0.908
Effective Use and Interpretation of Emergency Examinations and Tests	0.662	0.585	0.907
Fast and Effective Implementation of Advanced Examinations and Tests	0.700	0.625	0.909
Acute Abdomen Evaluation	0.586	0.514	0.907
Trauma Patient Assessment	0.616	0.579	0.909
Forensic Case Report	0.527	0.484	0.909
Fracture Immobilization	0.599	0.575	0.907
Splint	0.460	0.430	0.911
Primary Wound Closure	0.559	0.536	0.908
Abscess Incision/Drainage	0.499	0.472	0.910
Allergy-Anaphylaxis	0.601	0.533	0.908
Poisoning	0.621	0.564	0.908
Gastric Lavage	0.533	0.602	0.907
Evaluation of Unconsciousness Including GCS	0.646	0.478	0.909
Foreign Body in Eye	0.586	0.556	0.908
Eye Closure	0.527	0.505	0.909
Heat Stroke	0.499	0.458	0.910
Hypothermia	0.544	0.502	0.909

EMRICS: Emergency Medicine Rotation Interventional Competence Scale, GCS: Glasgow Coma Scale.

Table 2. Comparison of the scores of the study group according to the factors related to hospital characteristics from EMRICS

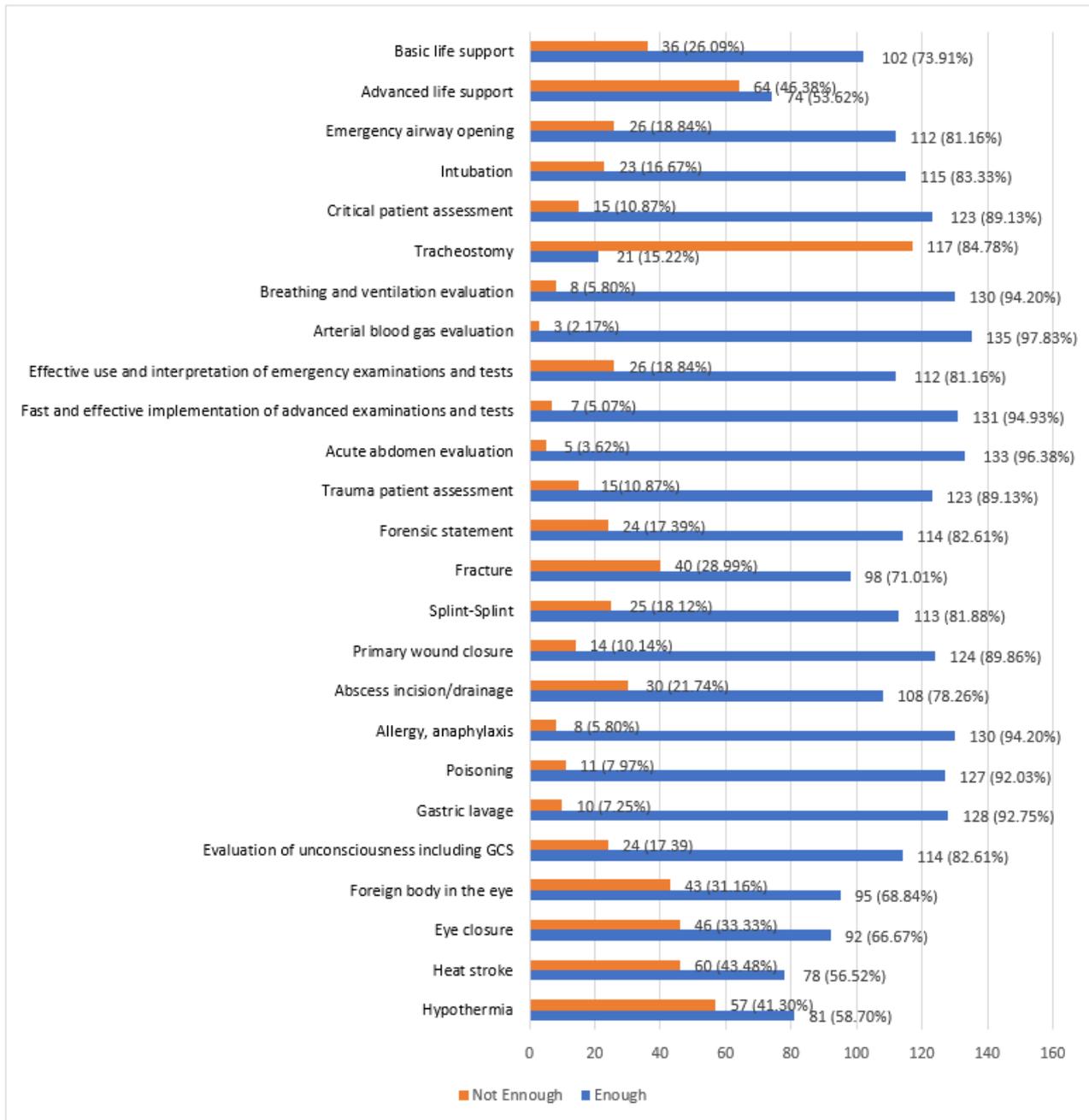
	EMRICS Score Median (Min-Max)	p: Z
Number of faculty members		
1-3	60.00 (31.00-77.00)	0.347;2.119
4-6	60.00 (24.00-96.00)	
7 and more	57.50 (44.00-78.00)	
Number of specialist physicians		
1-3	63.00 (49.00-94.00)	0.004;11.142
4-6	57.00 (49.00-76.00)	
7 and more	59.00(24.00-96.00)	
Number of assistant physicians		
0-10	59.00 (53.00-76.00)	0.917;1.462
11-20	62.00 (34.00-77.00)	
21-30	61.00 (38.00-96.00)	
31-40	58.00 (24.00-94.00)	
41-50	59.00 (31.00-87.00)	
51 and more	60.00 (44.00-85.00)	
Emergency bed capacity		
0-20	60.00 (49.00-77.00)	0.225;4.361
21-40	59.00 (31.00-96.00)	
41-60	61.50 (24.00-94.00)	
61 and more	52.00 (44.00-85.00)	
Number of emergency service admissions per day		
0-250	58.00 (58.00-58.00)	0.586;2.832
251-500	60.00 (49.00-96.00)	
501-750	60.00 (31.00-87.00)	
751-1000	59.00 (24.00-94.00)	
1001 and more	63.00 (44.00-85.00)	

EMRICS: Emergency Medicine Rotation Interventional Competence Scale.

Table 3. Comparison of the scores obtained from EMRICS according to the observation and practice status of the study group during the emergency rotation

	EMRICS Score Median (Min-Max)			p;Z
	Never Did	1-4 Applications	5 Or More Applications	
Basic Life Support	55.50 ^b (31.00-75.00)	60.00 (24.00-96.00)	60.00 ^a (49.00-94.00)	0.037; 6.315
Advanced Cardiac Life Support	59.00 (31.00-96.00)	60.00 (24.0-85.0)	60.50 (49.0-94.0)	0.140; 3.936
Emergency Airway Opening	59.00 ^b (24.00-96.00)	60.00 ^a (34.00-85.00)	62.00 ^a (49.00-94.00)	0.022; 7.679
Intubation	57.00 ^b (31.00-87.00)	60.00 (24.00-96.00)	61.00 ^a (51.00-94.00)	0.028; 7.118
Tracheostomy	60.00 ^b (24.00-96.00)	68 (49-85)	94.00 ^a (60.00-94.00)	0.034; 6.758
Critical Patient Assessment	53.00 (24.00-75.00)	56 ^a (31-96)	62.00 ^a (44.00-94.00)	0.009; 9.377
Breathing and Ventilation Evaluation	56.00 ^b (24.00-75.00)	54 ^b (31-96)	61.00 ^a (44.00-94.00)	0.002; 12.753
Arterial Blood Gas Evaluation	60.00 (48.00-75.00)	55.00 (31.00-78.00)	60.00 (24.00-96.00)	0.217; 3.055
Effective Use and Interpretation of Emergency Examinations and Tests	60.00 (60.00-60.00)	34.00 (34.00-65.00)	60.00 (24.00-96.00)	0.366; 2.011
Fast And Effective Implementation of Advanced Examinations and Tests	54.00 (49.00-68.00)	51.00 (34.00-77.00)	60.00 (24.00-96.00)	0.114; 4.351
Acute Abdomen Evaluation	60.00 (34.00-65.00)	52.00 ^a (48.00-65.00)	60.00 ^a (24.00-96.00)	0.025; 7.406
Trauma Patient Assessment	54.00 ^b (34.00-96.00)	62.00 (31.00-75.00)	61.00 ^a (24.00-94.00)	0.004; 10.993
Forensic Case Report	60.00 (34.00-77.00)	56.00 (31.00-87.00)	60.00 (24.00-96.00)	0.435; 1.663
Fracture Immobilization	59.00 (34.00-96.00)	55.00 ^a (31.00-69.00)	61.50 ^a (24.00-94.00)	0.007; 9.886
Splint	59.00 (31.00-96.00)	61.00 (38.00-76.00)	60.00 (24.00-94.00)	0.257; 2.721
Primary Wound Closure	56.00 ^b (34.00-96.00)	61.00 (31.00-78.00)	60.50 ^a (24.00-94.00)	0.042; 6.352
Abscess Incision/Drainage	55.50 ^b (31.00-75.00)	63.50 ^a (45.00-96.00)	61.40 ^a (24.00-94.00)	<0.001; 15.773
Allergy-Anaphylaxis	57.00 (34.00-96.00)	60.00 (24.00-87.00)	61.00 (44.00-94.00)	0.184; 3.385
Poisoning	59.00 (38.00-78.00)	60.00 (24.00-85.00)	60.00 (34.00-96.00)	0.530; 1.270
Gastric Lavage	55.00 ^b (34.00-75.00)	60.00 (48.00-77.00)	61.00 ^a (24.00-96.00)	0.042; 6.320
Evaluation of Unconsciousness Including GCS	57.00 ^b (31.00-78.00)	60.00 (24.00-85.00)	61.50 ^a (44.00-96.00)	0.026; 7.295
Foreign Body in Eye	60.00 (31.00-96.00)	59.00 (53.00-74.00)	61.00 (24.00-94.00)	0.458; 1.561
Eye Closure	56.00 ^b (31.00-96.00)	62.00 ^a (53.00-87.00)	64.00 ^a (24.00-94.00)	0.001; 15.160
Heat Stroke	60.00 (31.00-96.00)	58.00 (49.00-77.00)	59.50 (24.00-94.00)	0.949; 0.1040
Hypothermia	60.00 (34.00-96.00)	56.50 (24.00-75.00)	65.00 (31.00-94.00)	0.053; 0.864

a>b (p<0.05) *No difference was detected for the value without the letter a and b. EMRICS: Emergency Medicine Rotation Interventional Competence Scale, GCS: Glasgow Coma Scale.



Graphic 1. Distribution of entrepreneurial competencies in the study group according to their proficiency status.

Discussion

Family physicians are one of the most important components of preventive health services, and good specialist training is one of the most critical steps toward protecting public health and improving health service quality. The complementary element of family physician education is emergency medicine education (9). With the latest curriculum change in Türkiye, emergency medicine rotation has been added to the family medicine residency training curriculum (1). Although there have been some studies on family medicine residency training in Türkiye in the past years, there is no research investigating the adequacy of

emergency medicine rotation in the literature (5). In terms of materials and methodology, this is the first study in our country investigating the competencies of family medicine residents in patient management and interventional procedures, which are aimed to be learned in emergency medicine rotation, and EMRICS, developed by us, was used for evaluation.

When the mean age and gender distribution of the participants are examined, it is similar to other studies conducted with family physician assistants in the literature (5,10-12).

Among the target interventional competencies

determined in the curriculum of the study group, it is seen that the highest competency is in arterial blood gas analysis and the lowest in tracheostomy. In a study conducted by Cikman et al., it was reported that 86% of specialist physicians considered themselves competent in arterial blood gas analysis, while 14% did not find it sufficient (13). A study conducted among anesthesiologists in England reported that physicians feel they need more interventional competence regarding tracheostomy and need to receive adequate training on this subject (14). A study conducted on otolaryngology residents in India stated that the frequency of tracheostomy in 58% of residents was 5-10, while 19% had less than two tracheostomy applications. On the other hand, it has been reported that 84% of resident physicians consider themselves sufficiently competent (15). A study conducted with otolaryngology residents in Israel reported that 65% of resident physicians were confident in performing tracheostomy (16). Even in surgical branches more familiar with interventional procedures, physicians feel inadequate when sufficient applications are not performed. According to our study, the proficiency status of family physician residents is directly related to the number of practices and observations. Therefore, practicing as much as possible for each attempt is recommended.

No difference was found in scale scores in gender, age, professional year and other institutional characteristics. Among the study group, those who had performed BLS, intubation, tracheostomy, trauma patient evaluation, primary wound closure, unconsciousness assessment including GCS, and gastric lavage five or more times had higher scores on EMRICS than those who did not. In abscess incision/drainage, eye closure, and emergency airway opening applications, those who did not apply received lower scores than those who performed 1-4 times and had five times or more applications. There was no difference between performing these applications 1-4 times and five or more times. This situation makes us think that having practiced even once for some applications positively affects the proficiency level.

Those who performed critically ill care, acute abdomen, fracture/immobilization application five or more times scored higher than those who performed it 1-4 times. It was determined that those who performed the respiratory and ventilation evaluation 5 times and above scored higher than those who did not do it at all and 1-4 times. Five or more years of experience is required for the adequacy of these applications. One reason may be that some applications are more comprehensive, more complex for resident physicians, and require experience. Arslan et al. reported that more than half of the family medicine residents needed to be informed about the learning objectives verbally or written before the emergency medicine rotation. Providing advance information about the purpose of rotation and learning goals can help residents be more successful (5).

Although there are differences between the

applications, it should be repeated at least five times to achieve the desired competence in the number of observations and applications during the emergency rotation of the study group. In the study of Sanyal et al., it is recommended to perform at least ten applications for tracheostomy procedure (15). Practices and patient management in the interventional competency targets specified in the curriculum are generally carried out in the red area, yellow area and trauma areas in the emergency services. In order to achieve these goals in the required number and homogeneously by the reasons for application, it would be appropriate to arrange the working and shift hours in the emergency medicine rotation as equal as possible in the red area, yellow area and trauma units.

There needs to be a recommendation in the curriculum as to which year of specialization training the emergency-type rotation will be carried out (1). No difference was found when the scores of those in the study group were compared with those who completed the rotation in the first, second, and third years of the education process. When the scores of the study group in EMRICS were compared in terms of the characteristics of the institution where they worked, the average score of those in educational institutions with fewer specialist physicians was higher. This may be due to the difference in the number of specialist physicians between universities and training and research hospitals.

The study has some limitations. First of all, the study survey includes the unilateral evaluations of the family medicine residents and does not include the evaluation and opinions of the clinic manager. The second significant limitation of this study is that it was conducted in only one province. The results of the study cannot be generalized to the whole country since the study was carried out in tertiary hospitals providing family medicine residency training in the city center of Izmir. Another limitation of the research is that the questionnaire was administered with two different methods (face-to-face or online). Both methods were used to reach more participants in a shorter time. The study results include the unilateral evaluations of the family medicine residents and do not include the evaluations and opinions of the rotation clinicians.

Conclusion

This research is the first study in our country to investigate the interventional competencies of family medicine residents in emergency medicine rotation. EMRICS, which was developed based on the curriculum for this research, is a valid and reliable measurement tool. Family medicine residents are competent enough for most emergency medicine rotation targets. In order to achieve the desired competence in interventional applications and patient management, although there is a difference between the applications, it is recommended that they be repeated at least five times. However, it is possible to do it at least once. In order to achieve these goals in sufficient numbers, it would be appropriate to arrange the working hours

and shift hours as equally as possible in the red area, yellow area and trauma units.

Ethical Considerations: The study was approved by the İzmir Katip Çelebi University Non-Interventional Clinical Research Ethics Committee (Date: 21.04.2022 / Decision No: 0186). It is declared that the Principles of the Declaration of Helsinki carried out the study.

Conflict of Interest: The authors declared no potential conflicts concerning this article's research, authorship, and publication.

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