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## A Current Overview of Intensive Care Subspecialty Education in Turkey: What Do Educational Staff, Subspecialty Residents and Specialists Think?

Türkiye'deki Yoğun Bakım Yan Dal Eğitimine Güncel Bir Bakış: Eğitim Görevlileri, Yan Dal Araştırma Görevlileri ve Yan Dal Uzmanları Ne Düşünüyor?

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**Presented in:** This study was presented as an oral presentation at the 21<sup>st</sup> National Intensive Care Congress.

**ABSTRACT Objective:** Intensive care subspecialty programs have been opened in many medical faculties and training-research hospitals in our country, and intensivists who have graduated are working in the field. The aim of this study aimed to collect information about the status of intensive care subspecialty education and the working conditions of intensive care specialists working in the field.

**Materials and Methods:** After obtaining the ethics committee approval, three questionnaires for intensive care subspecialty educational staff (ES), research assistants (RA), and graduated specialists (PG) were prepared through the Google Survey and published on social media. In the questionnaires, the status of education and working conditions in the field after graduation were questioned. The descriptive statistics method was used for analysis.

**Results:** The questionnaires were answered by 38 ES, 99 RA, and 46 PG. Fifty-four percent of the ES were between the ages of 51 and 60 and 65.8% were women. Fifty-one percent of ES were working in a university hospital. Forty-seven percent of full-time ES were working in the department of anesthesiology and reanimation subdepartment of intensive care, and the rate of participation of all partner clinics in the program was 86.5%. Twenty-seven (71.1%) of the ES thought that the TUKMOS core training program should be changed. The main specialty of 54.5% of RAs were anesthesiology and reanimation, and 52% of them were studying at a state university. The rate of those who were on duty at the hospital was 87.8%, and the rate of those who described the rotation training as "medium" was 36.5%. Sixty-five percent of the PGs were anesthesiology and reanimation specialists, and 64.4% said that they would like to primarily work in training and research hospitals in terms of efficiency and quality; 87% of them stated that intensive care specialists should be able to work in any kind of intensive care unit, 69.6% thinks that the education they receive is sufficient.

**Conclusion:** We believe that evaluating and sharing the data of this study may cause positive changes in intensive care subspecialty education and post-graduate working conditions.

**Keywords:** Intensive care, subspecialty, training

**ÖZ Amaç:** Ülkemizde birçok tıp fakültesi ve eğitim-araştırma hastanesinde yoğun bakım yan dal programları açılmıştır ve sahada mezun olan yoğun bakım uzmanları çalışmaktadır. Bu çalışmanın amacı, yoğun bakım yandal uzmanlık eğitiminin durumu ve sahada çalışan yoğun bakım uzmanlarının çalışma koşulları hakkında bilgi toplamaktır.

**Gereç ve Yöntem:** Etik kurul izni alındıktan sonra yoğun bakım yan dal eğitimcileri (E), araştırma görevlileri (AG) ve mezun olmuş uzmanlara (U) yönelik üç anket Google Survey aracılığıyla hazırlanarak sosyal medya üzerinden yayınlanmıştır. Anketlerde eğitimin durumu eğitici ve yan dal asistanlarına yöneltilmiş, mezuniyet sonrası sahadaki çalışma koşulları da yan dal uzmanlarına sorulmuştur. Gelen cevaplar için tanımlayıcı istatistik yöntemi kullanılmıştır.

**Bulgular:** Anketler 38 E, 99 AG ve 46 U tarafından cevaplandı. E'lerin %54'ü 51-60 yaşları arasındaydı ve %65,8'i kadındı. E'nin %51'i bir üniversite hastanesinde çalışıyordu. Tam zamanlı E'lerin %47'si tam zamanlı olarak anesteziyoloji ve reanimasyon kliniğinin yoğun bakım bilim dalına bağlı olarak çalışırken ve tüm paydaş kliniklerin programa katılım oranı %86,5 idi. E'lerin 27'si

(%71,1) TUKMOS temel eğitim programının değiştirilmesi gerektiğini düşünmektedir. AG'nin %54,5'inin ana uzmanlık alanı anesteziyoloji ve reanimasyon olup, %52'si devlet üniversitesinde çalışıyordu. Hastanede nöbet tutanların oranı %87,8, rotasyon eğitimini "orta" olarak tanımlayanların oranı ise %36,5 oldu. Yoğun bakım uzmanlarının %65'i anesteziyoloji ve reanimasyon uzmanı olup, %64,4'ü verimlilik ve kalite açısından öncelikli olarak eğitim ve araştırma hastanelerinde çalışmak istediğini, %87'si yoğun bakım uzmanının herhangi bir yoğun bakım ünitesinde çalışabilmesi gerektiğini belirtmiştir. Yoğun bakım uzmanı olanların %69,6'sı aldıkları eğitimin yeterli olduğunu düşünmektedir.

**Sonuç:** Bu çalışmanın verilerinin değerlendirilmesi ve paylaşılmasının yoğun bakım yandal uzmanlık eğitimi ve mezuniyet sonrası çalışma koşullarında olumlu değişikliklere neden olabileceğine inanıyoruz.

**Anahtar Kelimeler:** Yoğun bakım, yandal, eğitim

## Introduction

With the increase in the aging of the world population and the advancement of technology, the importance of intensive care medicine has increased even more as the limits in the treatment demands of patients expand. The number of trained and experienced physicians and health personnel in intensive care medicine that can meet this demand is still insufficient. Since intensive care medicine is a relatively young and rapidly expanding field of specialization, training competent physicians in intensive care brings some difficulties for both trainees and trainers (1). In a survey study by Wong et al. (2); It has been revealed that many medical faculties do not include intensive care education and young doctors are inadequate in recognizing and properly managing critically ill patients because they have little knowledge and skills in intensive care. In this case, major specialties such as anesthesiology and reanimation, internal medicine and general surgery have tried to present critical care information in the training programs of specialty students. However, due to the increasing demand, intensive care education was established for the first time as a subspecialty by Max Harry Weil in Los Angeles and Peter Safar at Presbyterian University Hospital in Pittsburgh in 1961 (3). In addition, Peter Safar developed the first "full-time intensivist" concept in 1965 (4). Intensive care medicine was accepted for the first time as a multidisciplinary higher specialty by the American Board of Medical Specialties in 1980 (3).

In our country, at the meeting of the Board of Specialization in Medicine Curriculum Formation and Standards Determination System (TUKMOS) commission in 2010, it was stated as a vision to ensure the equivalence of education and training given in all educational institutions related to the theoretical and practical execution of intensive care education and in accordance with the Specialization Training Regulation published in the Official Gazette No. 25.8.2009/27292, intensive care subspecialty training protocols were created in various institutions and intensive

care subspecialists were trained (5). The number of trained intensive care specialists (PG) in our country has been reported as approximately 700 by 2021 (6). Intensive care subspecialty training protocols available in our country are carried out using the relevant core training curriculum with rotations to the major specialties of anesthesiology and reanimation, infectious diseases and clinical microbiology, general surgery, chest diseases, internal medicine, and neurology. First, Competency-Based Training program in Intensive Care Medicine for Europe and other world regions (CoBaTrICE), which was designed as an international partnership program in terms of standardizing intensive care education and improving education and training and improving the quality of critical patient care, was examined. Then, taking the suggestions of the relevant partner intensive care associations, our own curriculum was developed with the first version (v.2.1-2016) of the "Intensive Care Speciality Education Core Curriculum" created by the Ministry of Health Medical Specialization Board. It was last updated in 2017 (v.2.3-2017) (7).

The aim of this study is to learn the status of intensive care subspecialty education, which is a new specialization field in our country, by taking the opinions of the trainers, PG in the field and subspecialty students, and to reveal the problems and solution suggestions.

## Materials and Methods

This study was planned as a questionnaire prepared for intensive care subspecialty educational staff (ES), intensive care subspecialty research assistants (RA) and PG after the approval of the Ankara City Hospital Clinical Research Ethics Committee (no: E1-22-2308, date: 12.01.2022). Three sub-surveys were prepared for each group through Google Survey by the researchers and these surveys were sent over social media. In addition, the Turkish Society of Intensive Care delivered the questionnaires to its members via e-mail.

The questions in the questionnaires were designed for three main themes: the current situation in intensive care education, the perspective of the trainees and the working conditions in the field after graduation. The introduction section of the surveys incorporated an informed consent process, ensuring that participants could only proceed to complete the surveys after granting their consent.

### Statistical Analysis

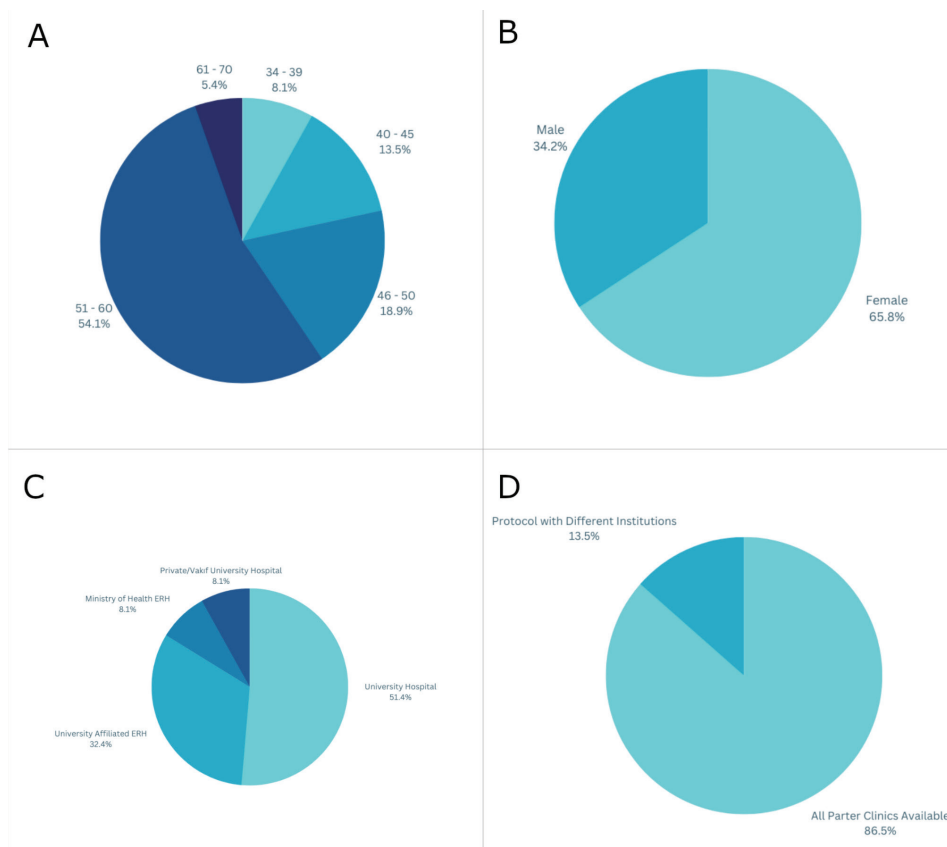
Descriptive statistical methods were used in the evaluation of the answers to the questionnaires.

## Results

54.1% of the 38 ES who answered the questionnaire were between the ages of 51-60 and 65.8% were women. 51.4% of the ES were working at the university hospital. 47.2% of the full-time ES were working in the intensive care subdepartments of the anesthesiology and reanimation clinics. The rate of participation of all partner clinics in the

training program was 86.5% (Figure 1). The most important problems encountered during the execution of the protocols were stated as the organization of the rotations, the disruptions during the pandemic period, and the clinics in the protocolled institutions leaving the program for different reasons. In the section of “your suggestions that were not included in the questionnaire and could contribute to the education” were stated as followings, the planning and duration of internal and inter-institutional rotations, differences of the training content of the partner programs and especially the standardization of education proposal. Twenty-seven (71.1%) of the ES thought that the TUKMOS core training program should be changed. It was noted that 44% of the ES were aware that the core training program was renewed in 2017, and most of them thought that the ES criteria were not clear.

Most of the RAs participating in the study were in the 35-40 age range and the female/male ratio was equal. While 62.7% of them were senior third year residents,

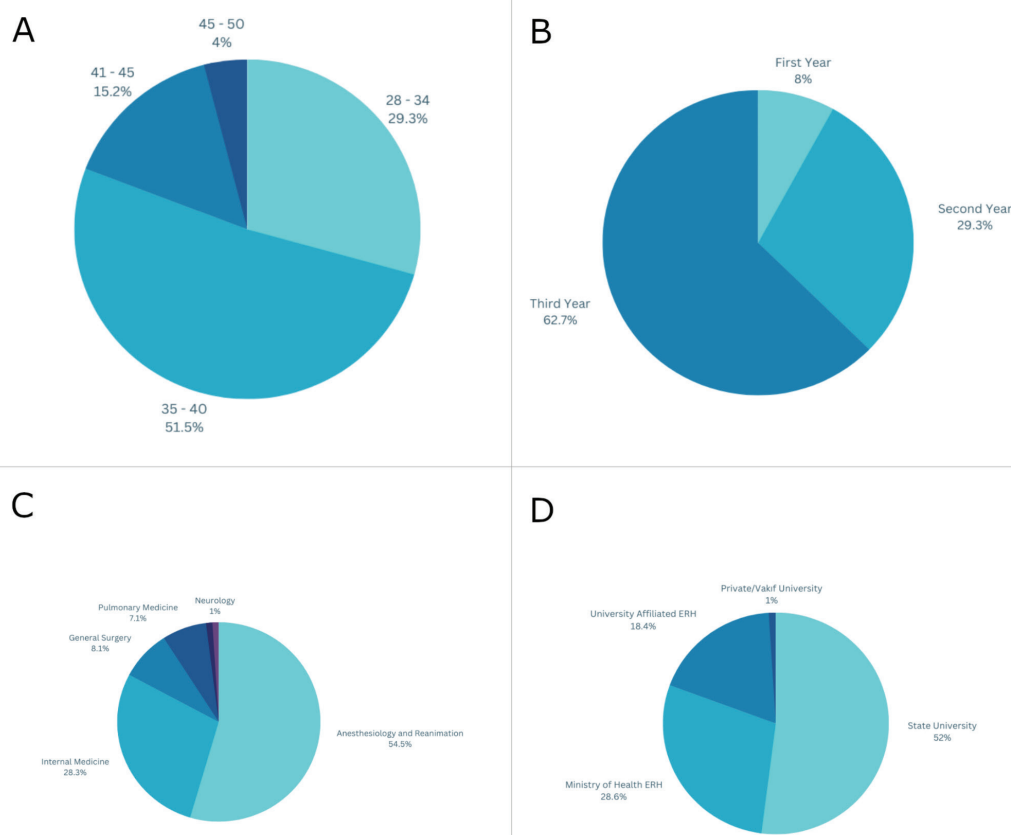


**Figure 1.** Characteristics of educational staff. Panel A: age groups, panel B: gender, panel C: institution, panel D: intensive care subspecialty education program

ERH: Education and research hospital

29.3% were second year residents and 8% were first year residents. According to main specialties 54.5% of them were Anesthesiology and Reanimation specialists, and 52% of them were studying at a state university (Figure 2). Those who received training by night shifts in the hospital were 87.8%. The rate of those who described the rotation education quality in their protocols as “medium” was 36.5%. The rate of those who thought that the subspecialty education they received was sufficient was 57.4%. Reasons for choosing intensive care subspecialty were stated as following, academic career (n=44), good financial income expectation (n=24), escape from compulsory service (n=22), more employment possibility (n=17) and because he/she likes the subspecialty (n=13). The types of educational activities in the program they are in were stated as following, seminar (n=70), journal club (n=51), ES lectures (n=35), case presentation meetings (n=17), mortality-morbidity meetings (n=10), all above (n=8) and none of above (n=11). Surveyed RAs stated the followings as additional training topics,

difficult airway management (n=78), mechanical ventilation (n=87), advanced hemodynamic monitoring (n=87), renal replacement therapy (n=87), ultrasonography (USG) training (n=92), echocardiography (ECHO) training (n=90) and extracorporeal membrane oxygenation training (n=75 residents) (Figure 3). Majority of participant RAs (n=61) stated that at the end of the program, the way in which their knowledge and competencies were tested should be “As is now the case, oral examination in the presence of a jury determined by the Ministry of Health or universities”. While RAs evaluated their education processes as “Tiring, stressful and needs improvement” (n=27), it was noted that when asked to evaluate their ES on a 5-point scale, 28.6% gave 1 point and 14.3% gave 5 points. 79.8% of the participants stated that they have sufficient knowledge and skills to manage an intensive care unit (ICU) and they want to work in the country (46.5%). It was determined that the majority wanted to work in the Ministry of Health Education and Research hospitals and university hospitals, but only

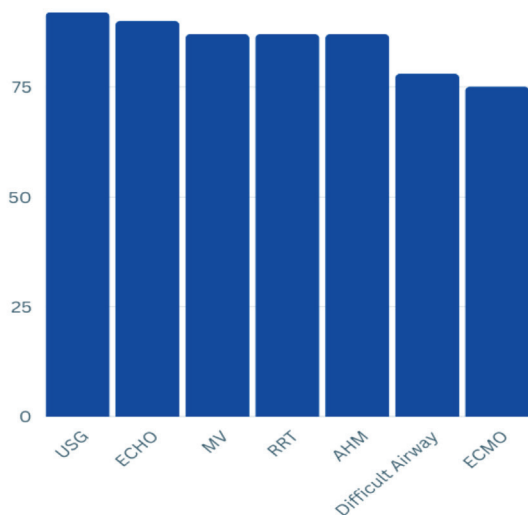


**Figure 2.** Characteristics of research assistants. Panel A: age groups, panel B: year in education, panel C: main specialty, panel D: institution of subspecialty education

ERH: Education and research hospital

37.4% could publish. In open-ended questions, they stated that they expected better economic conditions and that they wanted to receive a truly multidisciplinary education.

54.2% of the PGs who answered the questionnaire have been working in the field for more than 4 years, and 64.6% were anesthesiology and reanimation specialists (Figure 4). 69.9% of them stated that the training they received was sufficient. Most of the participants (64%) thought that their



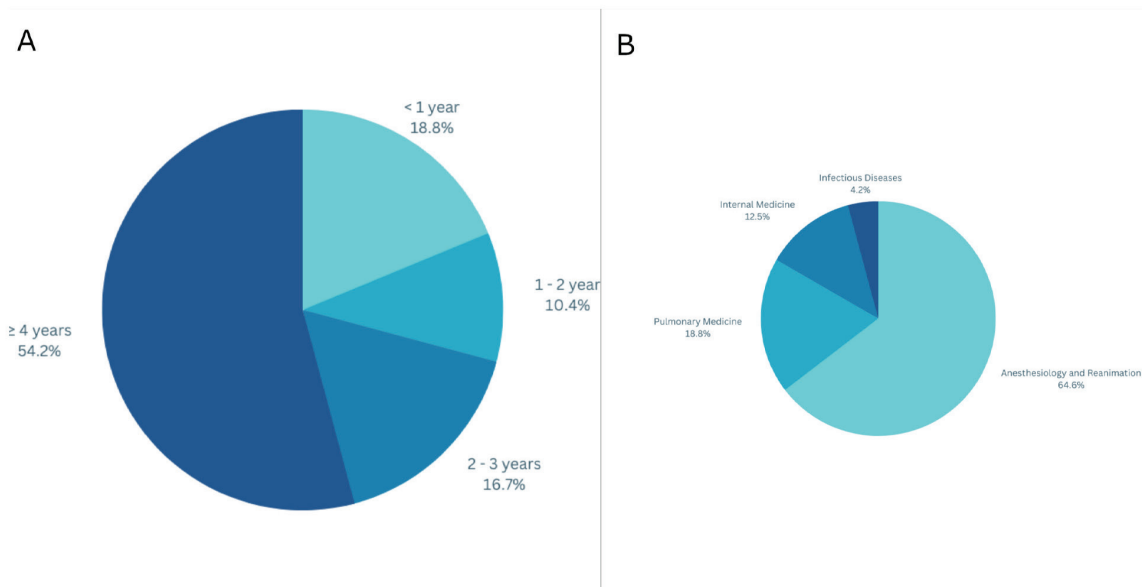
**Figure 3.** Additional training topics addressed by research assistants  
 USG: Ultrasonography, ECHO: echocardiography, MV: mechanical ventilation, RRT: renal replacement therapy, AHM: advanced hemodynamic monitoring, ECMO: extracorporeal membrane oxygenation

work in training and research hospitals would be correct in terms of efficiency and quality. Also 87% of them stated that they should be able to work in any kind of ICU. We have determined that they see the Ministry of Health as the solution authority for the problems they encounter in the field, which they stated in the open-ended questions, and that most of them want to be academicians.

### Discussion

In this study, while it was determined that the intensive care subspecialty ES had not very positive views about the functioning of the existing protocols, the standardization of education and the core training program, it was observed that the training programs of the RAs in education were evaluated as tiring and service-oriented and unfortunately found their trainers and core training program inadequate.

It was observed that 65.2% of the PG who started to work in the field were from the field of anesthesiology and reanimation. Chest diseases and internal medicine were the 2<sup>nd</sup> and 3<sup>rd</sup> in this regard. It was considered as an important result that 64.4% of the PG stated that their work in training and research hospitals would be correct in terms of efficiency and quality. Another important result was that 87% of PGs thought that they should be able to work in all kinds of ICUs. This result means that the separation according to major branches is not desired, and it is an extremely positive idea that will contribute to the development of the intensive care



**Figure 4.** Characteristics of intensive care specialists. Panel A: years in specialty, panel B: main specialty

department. An important issue stated by the subspecialists is the technical inadequacies in hospitals. It has been stated that these inadequacies, such as some device deficiencies, compel intensive care workers to work below their capacity. In addition, in order to continue scientifically, the importance of preferring subspecialties to be employed in training and research hospitals was emphasized. Subspecialists consider the Ministry of Health to be the first and their societies to be in the second place in solving the current problems.

62.7% of the participants who received intensive care subspecialty training were senior 3<sup>rd</sup> year RAs and 57.4% stated that the training they received was good. On the other hand, they expressed an opinion as "moderate" for rotation training. Thus, it has been revealed that although the intensive care ES have concerns about providing a good subspecialty education and make self-sacrificing efforts, they cannot receive much support from the protocol partners and the curriculum needs to be revised according to the realities of country, institution, and field demands. Since RAs also evaluate the quality of rotation education as medium, it is important to renew the trainer's job description in the protocols and to monitor whether the rotation goals are followed. It can be suggested that hospital/university administrations or relevant ministry units should meticulously monitor the situation by receiving feedback from both the trainer and the student at regular intervals and make the necessary warnings. In addition, it would be appropriate to review the rotation goals and durations in terms of their contribution to the intensive care student.

In our study, the fact that once RAs now PGs found the education they received more sufficient after becoming a specialist (69.9%) gave the impression that the expectation of intensive care subspecialty education was more idealized than the field realities, and the opinion that the education was already sufficient due to the conditions increased when they went to the field. Since it is essential to approach the ideal in terms of quality and efficiency, it would be appropriate to examine and arrange the relevant equipment and infrastructure in institutions with intensive care, by the relevant partners, and to listen to such demands of the ES.

Among the training topics or courses requested by RAs, the top three were USG applications (92 participants), renal replacement and mechanical ventilation training (87 participants), and ECHO (90 participants) applications. It is understood that training programs may be insufficient in these subjects since renal replacement and ECHO

applications cannot be learned in the rotations of the relevant branch. ECHO and USG devices are also a training priority, but there are not enough numbers in each training clinic. For this reason, in addition to the efforts of the associations, we believe that it will be appropriate to shape the training activities by considering the needs of the PGs working in the field.

It is noteworthy that among the reasons for choosing this subspecialty, the goals of making an academic career and escaping from compulsory service are the leading ones. The abolition or shortening of the compulsory service may be a precaution for the quotas that are more and more vacant each year. In addition, it can be suggested that the ES should support RAs who want to do academic work, and the relevant associations should provide academic training, and the courses and activities related to this subject in the curriculum should be increased in an applicable and auditable way.

According to the report of the World Federation of Societies of Intensive and Critical Care Medicine Associations, it is seen that 54 different programs have been defined in 42 countries around the world, and 37 programs with durations ranging from 3-72 months have been defined in the European continent (3). Intensive care is major branch in Spain, Portugal, Switzerland, Australia, and New Zealand. In Europe intensive care training is planned as follows, 39% higher specialization (allows students to participate in ICU training programs in basic specialties such as internal medicine, anesthesiology, surgery), 22% sub-specialization of a single branch (only one specialization is allowed to participate in an ICU training program, this is mostly anesthesiology), 30% sub-specialization of more than one major branch (more than one major branch offers the opportunity of education within its own program) and 9% as a major specialty. Since there is no standardization in intensive care education in the world, by examining the conditions, needs and field facts of our country and by evaluating the feedback to be received at certain intervals objectively, moving to the most ideal system for our country will increase the motivation of both ES and RAs.

In adult education, educators must develop their students' skills and make appropriate assessments as role models. The fact that evaluation is only done in 50% of the programs in the world with a survey conducted in 2009 shows that feedback and a developing student evaluation are still not standard in many educational curricula (8).

The fact that RAs is satisfied with the current graduation exam system in our study shows that the serious implementation of this exam system by the Ministry of Health together with the institutions is an important gain compared to the world in terms of standardization. Although it is certain that an evaluation exam (board, etc.) to be held at regular intervals for both ES and RAs will increase the quality of education, it would be appropriate to consider this issue for our country in the following years, since enough ES and standardized education have not been reached yet.

Three points should be considered for effective teaching in intensive care education: The trainer's limited theoretical knowledge of how students learn, their lack of awareness of effective and useful teaching strategies, and difficulties in providing effective feedback (9). In this study, when we look at the types of educational activities, it is noteworthy that the options of seminar, journal club and ES lectures were marked the most, and there were 11 RAs stating that none of them were done. Since bedside rounds are especially important for intensive care ES, they will make good use of the time by asking the RAs what they want to learn, determining the level of the student and preparing accordingly, ensuring that the student expresses his/her opinion about the patient's treatment without hesitation, examining together at the bedside and giving effective feedback. Increasing the teacher-student relationship with the techniques will be a factor that increases the satisfaction with the training programs (9-11). Also, a multicenter evaluation of ICU educators revealed that ES who appear to enjoy their work are valued by the students/RA. Additionally, they found that traits of professionalism and the display of empathy were common by and influential among teachers who were respected by residents (12). Apart from these it is widely acknowledged that critical care practice presents challenges for education. There have been several realistic examples of evidence-based instructional strategies that can be used in the daily practice of critical care without interfering with workflow or lowering the standard of patient care (13).

In the survey conducted by Siddiqui et al. (14), in which American anesthesiology and reanimation specialists who chose intensive care subspecialty were asked various questions, the participants stated that they were not valued and they did not want to choose this subspecialty again due to economic difficulties, heavy workload, burnout syndrome, and career progression problems. Of the board-certified, mostly male (75%) intensive care subspecialist anesthesiologists

who have been on duty for an average of 5 years, 25.2% responded to the questionnaire, and half of them described the training they received as excellent. Of these, 70.6% work in academic centers and 53.6% work in open surgical ICUs. Of these, 75% spend an average of 25% of their clinical practice in intensive care. Those giving general anesthesia were 88.7%, of which 30.8% deal with trauma and 27.1% deal with cardiothoracic anesthesia. 89% of them take part in academic studies, 60% work in leadership positions, 37% give academic lectures. In this article, the unfilled quotas in the USA were attributed to burnout, gender inequality, lack of private employment opportunities, fatigue, lack of respect, lack of academic research education, decreased professional satisfaction. In the analysis, it was determined that job dissatisfaction was 49%, work-life imbalance was 52%, and burnout was 74%. The authors concluded that anesthesiologists who received intensive care subspecialty training were board certified at a higher rate, could do more academic work, and could participate in resident training, however, if improvements were made in burnout, work-life balance, and dignity, the rate of choosing a subspecialty in intensive care would increase (14). In our study, the heavy workload stated by both RAs and PGs and the problems experienced in the field after graduating are indicators of a shared destiny.

One of the limitations of this cross-sectional survey study is that the number of participations in the survey is relatively low, considering the number of RAs and PGs, whose exact numbers we do not know. Although the name and institution information were not requested, we attributed the low number of participants to the concern that it may have negative consequences for the trainers or the relevant institutions, or to the disbelief that a solution will be found for the problems. Another limitation is that we did not prepare detailed questions about the problems experienced in rotations. For this reason, we could not learn what kind of issues the trainers and students faced during the rotations. We think that further study is needed on this subject.

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## Conclusion

As a result, in this study, the problems encountered in the intensive care subspecialty education can be summarized as the lack of standardization, the lack of coordination with the education program protocol partners, the differences in the educational content of the rotation clinics according to the institutions, the need to update core education

program according to the country conditions, demands and opportunities, the negativity in the heavy service workload-education balance of the RAs, different problems experienced by PG in the field and systemic problems that prevent trainers from giving education as they wish. Increasing the quality of education and ensuring working peace in the field will lead to even brighter successes in our intensive care medicine, which has proven its competence especially in the coronavirus disease-2019 pandemic. For this reason, we are of the opinion that TUKMOS, the boards of directors of intensive care associations and training program responsables should determine the problems by conducting serious workshops, and that both intensive care subspecialty training and intensive care subspecialty field work principles should be determined objectively and put into practice fairly, according to the country's requirements.

### **Ethics**

**Ethics Committee Approval:** This study written consent was obtained from the Ankara City Hospital Clinical Research Ethics Committee (no: E1-22-2308, date: 12.01.2022).

**Informed Consent:** The introduction section of the surveys incorporated an informed consent process, ensuring that participants could only proceed to complete the surveys after granting their consent.

**Peer-review:** Externally peer-reviewed.

### **Authorship Contributions**

Concept: H.A., S.Ü., G.Y., H.B., I.Ö.T., O.D., Design: H.A., S.Ü., G.Y., H.B., I.Ö.T., O.D., Data Collection and Process: H.A., S.Ü., G.Y., H.B., I.Ö.T., O.D., Analysis or Interpretation: H.A., S.Ü., G.Y., H.B., I.Ö.T., O.D., Literature Search: H.A., S.Ü., G.Y., H.B., I.Ö.T., O.D., Writing: H.A., S.Ü., G.Y., H.B., I.Ö.T., O.D.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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