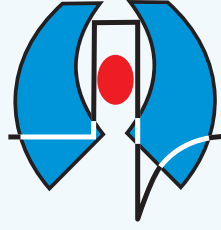


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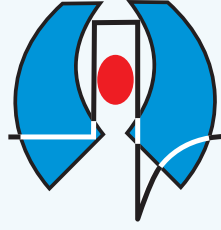
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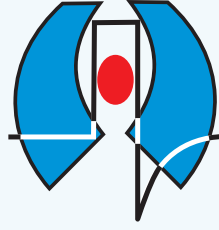
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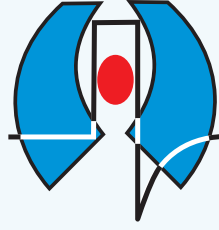
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İncelemeye sunulan araştırmada olası bir bilimsel hata, etik ihlal şüphesi veya iddiasıyla karşılaşırsa, bu dergi verilen yazıyı destek kuruluşların veya diğer yetkililerin oluşturmasına sunma hakkını saklı tutar. Bu dergi sorunun

düzenli biçimde takip edilmesi sorumluluğunu kabul eder ancak gerçek soruşturmayı veya hatalar hakkında karar verme yetkisini üstlenmez.

Yayın Politikası ve Makale Yazım Kuralları aşağıda belirtilen maddeler "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations)" (2016, <http://www.icmje.org/>) temel alınarak hazırlanmıştır.

Araştırma makalelerinin hazırlığı, sistematik derleme, meta-analizleri ve sunumu ise uluslararası kılavuzlara uygun olmalıdır.

Randomize çalışmalar için; CONSORT (Moher D, Schultz KF, Altman D, for the CONSORT Group. The CONSORT statement revised recommendations for improving the quality of reports of parallel group randomized trials. JAMA 2001; 285:1987-91) (<http://www.consort-statement.org/>).

Sistematik derleme ve meta-analizlerin raporlamaları için; PRISMA [Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 2009; 6(7): e1000097] (<http://www.prisma-statement.org/>).

Tanısal değerli çalışmalar için; STARD (Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, et al, for the STARD Group. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. Ann Intern Med 2003;138:40-4) (<http://www.stard-statement.org/>).

Gözlemsel çalışmalar için; STROBE (<http://www.strobe-statement.org/>).

Meta-analizleri ve gözlemsel çalışmaların sistematik derlemeleri için; MOOSE [Stroup DF, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting "Meta-analysis of observational Studies in Epidemiology" (MOOSE) group. JAMA 2000; 283: 2008-12].

YAZI ÇEŞİTLERİ

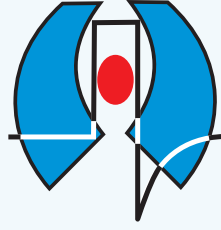
Özgün Araştırmalar

Yazının tümünün 5000 kelimedenden az olması gerekmektedir. İlk sayfa hariç tüm yazıların sağ üst köşelerinde sayfa numaraları bulunmalıdır. Yazıda, konunun anlaşılmasına gerekli olan sayıda ve içerikte tablo ve şekil bulunmalıdır.

Başlık sayfası, kaynaklar, şekiller ve tablolar ile ilgili kurallar bu dergide basılan tüm yayın türleri için geçerlidir.

1) Başlık Sayfası (Sayfa 1)

Yazı başlığının, yazar(lar)ın bilgilerinin, anahtar kelimelerin ve kısa başlıkların yer aldığı ilk sayfadır.



YAZARLARA BİLGİ

Türkçe yazılarda, yazının İngilizce başlığı da mutlaka yer almalıdır; yabancı dildeki yayınlarda ise yazının Türkçe başlığı da bulunmalıdır.

Türkçe ve İngilizce anahtar sözcükler ve kısa başlık da başlık sayfasında yer almalıdır.

Yazarların isimleri, hangi kurumda çalıştıkları ve açık adresleri belirtilmelidir. Yazışmaların yapılacağı yazarın adresi de ayrıca açık olarak belirtilmelidir. Yazarlarla iletişimde öncelikle e-posta adresi kullanılacağından, yazışmaların yapılacağı yazara ait e-posta adresi belirtilmelidir. Buna ek olarak telefon ve faks numaraları da bildirilmelidir.

Çalışma herhangi bir bilimsel toplantıda önceden bildirilen koşullarda tebliğ edilmiş ya da özeti yayınlanmış ise bu sayfada konu ile ilgili açıklama yapılmalıdır.

Yine bu sayfada, dergiye gönderilen yazı ile ilgili herhangi bir kuruluşun desteği sağlanmışsa belirtilmelidir.

2) Özet (Sayfa 2)

İkinci sayfada yazının Türkçe ve İngilizce özetleri (her biri için en fazla 200 sözcük) ile anahtar sözcükler belirtilmelidir.

Özet bölümü; Amaç, Gereç ve Yöntem, Bulgular, Sonuç şeklinde alt başlıklarla düzenlenir. Derleme, olgu sunumu ve eğitim yazılarında özet bölümü alt başlıklara ayrılmaz. Bunlarda özet bölümü, 200 kelimeyi geçmeyecek şekilde amaçlar, bulgular ve sonuç cümlelerini içermelidir.

Özet bölümünde kaynaklar gösterilmemelidir. Özet bölümünde kısaltmalardan mümkün olduğunca kaçınılmalıdır. Yapılacak kısaltmalar metindekilerden bağımsız olarak ele alınmalıdır.

3) Metin (Özetin uzunluğuna göre Sayfa 3 veya 4'den başlayarak)

Metinde ana başlıklar şunlardır: Giriş, Gereç ve Yöntem, Bulgular, Tartışma.

Giriş bölümü, çalışmanın mantığı ve konunun geçmişi ile ilgili bilgiler içermelidir. Çalışmanın sonuçları giriş bölümünde tartışılmamalıdır.

Gereç ve Yöntem bölümü, çalışmanın tekrar edilebilmesi için yeterli ayrıntılar içermelidir. Kullanılan istatistik yöntemler açık olarak belirtilmelidir.

Bulgular bölümü de çalışmanın tekrar edilebilmesine yetecek ayrıntıları içermelidir.

Tartışma bölümünde, elde edilen bulguların doğru ve ayrıntılı bir yorumu verilmelidir. Bu bölümde kullanılacak literatürün, yazarların bulguları ile direkt ilişkili olmasına dikkat edilmelidir.

Teşekkür mümkün olduğunca kısa tutulmalıdır. Her türlü çıkar çatışması, finansal destek, bağış ve diğer editöryal (istatistik analiz, İngilizce/Türkçe değerlendirme) ve/veya teknik yardım var ise metnin sonunda sunulmalıdır.

Metinde fazla kısaltma kullanmaktan kaçınılmalıdır. Tüm kısaltılacak terimler metinde ilk geçtiği yerde parantez içinde belirtilmelidir. Özetle ve metinde yapılan kısaltmalar birbirinden bağımsız olarak ele alınmalıdır. Özet bölümünde kısaltması yapılan kelimeler, metinde ilk geçtiği yerde tekrar uzun şekilleri ile yazılıp kısaltılmamalıdır.

4) Kaynaklar

Kaynakların gerçekliğinden yazarlar sorumludur.

Kaynaklar metinde geçiş sırasına göre numaralandırılmalıdır. Kullanılan kaynaklar metinde parantez içinde belirtilmelidir.

Kişisel görüşmeler, yayınlanmamış veriler ve henüz yayınlanmamış çalışmalar bu bölümde değil, metin içinde şu şekilde verilmelidir: [isim(ler), yayınlanmamış veri, 19...].

Kaynaklar listesi makale metninin sonunda ayrı bir sayfaya yazılmalıdır. Altıdan fazla yazarın yer aldığı kaynaklarda 6. isimden sonraki yazarlar için "et al" ("ve ark") kısaltması kullanılmalıdır. Dergi isimlerinin kısaltmaları Index Medicus'taki stile uygun olarak yapılır. Tüm referanslar Vancouver sistemine göre aşağıdaki şekilde yazılmalıdır.

a) Standart Makale: Intiso D, Santilli V, Grasso MG, Rossi R, Caruso I. Rehabilitation of walking with electromyographic biofeedback in foot-drop after stroke. Stroke 1994;25:1189-92.

b) Kitap: Getzen TE. Health economics: fundamentals of funds. New York: John Wiley & Sons; 1997.

c) Kitap Bölümü: Porter RJ, Meldrum BS. Antiepileptic drugs. In: Katzung BG, editor. Basic and clinical pharmacology. 6th ed. Norwalk, CN: Appleton and Lange; 1995. p. 361-80.

Birden fazla editör varsa: editors.

d) Toplantıda Sunulan Makale: Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Reinhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561-5.

e) Elektronik Formatta Makale: Morse SS. Factors in the emergence of infectious disease. Emerg Infect Dis [serial online] 1995 1(1):[24 screens]. Available from: URL: http://www/cdc.gov/ncidoc/EID/eid.htm. Accessed December 25, 1999.

f) Tez: Kaplan SI. Post-hospital home health care: the elderly access and utilization (thesis). St. Louis (MO): Washington Univ; 1995.

5) Tablolar, Grafikler, Şekiller, Resimler

Tüm tablolar, grafikler veya şekiller ayrı bir kağıda basılmalıdır. Her birine metinde geçiş sırasına göre numara verilmeli ve kısa birer başlık yazılmalıdır. Kullanılan kısaltmalar alt kısımda mutlaka açıklanmalıdır. Özellikle tablolar metni açıklayıcı ve kolay anlaşılır hale getirme amacı ile hazırlanmalı ve metnin tekrarı olmamalıdır. Başka bir yayından alıntı yapıyorsa yazılı baskı izni birlikte yollanmalıdır. Fotoğraflar parlak kağıda basılmalıdır. Çizimler profesyonellerce yapılmalı ve gri renkler kullanılmamalıdır.

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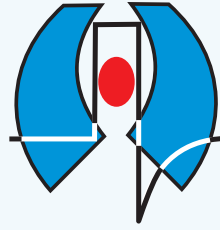
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INSTRUCTIONS TO AUTHORS

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Submitted manuscripts to Turkish Journal of Intensive Care are subjected for double-blind peer-review. The journal publishes articles in Turkish and English languages.

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It publishes original experimental and clinical researches, case reports, invited reviews, editorial comments, letters to editor on topics related to intensive care, and poster abstracts presented in national intensive care congresses/meetings. The scientific board guiding the selection of the papers to be published in the journal consists of elected experts of the journal and if necessary, selected from national and international authorities.

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Preparation of research articles, systematic reviews and meta-analyses must comply with study design guidelines:

CONSORT statement for randomized controlled trials (Moher D, Schultz KF, Altman D, for the CONSORT Group. The CONSORT statement revised recommendations for improving the quality of reports of parallel group randomized trials. *JAMA* 2001; 285: 1987-91) (<http://www.consort-statement.org/>);

PRISMA statement of preferred reporting items for systematic reviews and meta-analyses (Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 2009; 6(7): e1000097.) (<http://www.prisma-statement.org/>);

STARD checklist for the reporting of studies of diagnostic accuracy (Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, et al., for the STARD Group. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. *Ann Intern Med* 2003;138:40-4.) (<http://www.stard-statement.org/>);

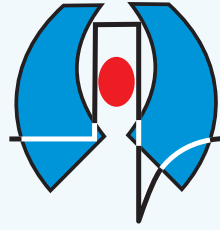
STROBE statement, a checklist of items that should be included in reports of observational studies (<http://www.strobe-statement.org/>);

MOOSE guidelines for meta-analysis and systemic reviews of observational studies (Stroup DF, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting Meta-analysis of observational Studies in Epidemiology (MOOSE) group. *JAMA* 2000; 283: 2008-12).

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1) Title Page (Page 1)

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Turkish and English key words and running titles should also be included in the title page.

The names and full postal addresses (including institutions addresses) of authors and the author to whom correspondence is to be addressed should be indicated separately. Especially as e-mail addresses will be used for communication, e-mail address of the corresponding author should be stated. In addition, telephone and fax numbers must be notified.

If the content of the paper has been presented before, the time and place of the conference should be denoted.

If there are any grants and other financial supports by any institutions or firms for the study, information must be provided by the authors.

2) Summary (Page 2)

In the second page, Turkish and English summaries of the manuscript (maximum 200 words for each), and the key words should take place.

The summary consists of the following sections separately: Objective, Materials and Methods, Results, Conclusion. Separate sections are not used in the summaries for the review articles, case reports and educational articles. For these articles, the summaries should not exceed 200 words and briefly present the scope and aims of the study, describe the salient findings and give the conclusions.

The references should not be cited in the summary section. As far as possible, use of abbreviations are to be avoided. If any abbreviations are used, they must be taken into consideration independently of the abbreviations used in the text.

3) Text (According to the length of the summaries Page 3 or 4 and etc.)

The typical main headings of the text are as follows: Introduction, Materials and Methods, Results, Discussion.

The introduction, part should include the rationale for investigation and the background of the present study. Results of the present study should not be discussed in introduction part. Materials and methods section should be presented in sufficient detail to permit the repetition of the work. The statistical tests used should be stated.

Results should also be given in detail to allow the reproduction of the study.

Discussion section should provide a thorough interpretation of the results. It is recommended that citations should be restricted to those which relate to the findings of the authors.

Acknowledgements should be as brief as possible. Any technical or financial support or editorial contributions (statistical analysis, English/Turkish evaluation) towards the study should appear at the end of the article.

The excessive use of abbreviations is to be avoided. All abbreviations should be defined when first used by placing them in brackets after the full term. Abbreviations made in the abstract and text are separately taken into consideration. Abbreviations of the full terms that are made in the abstract must be re-abbreviated after the same full term in the text.

4) References

Accuracy of reference data is the author's responsibility. References should be numbered according to the consecutive citation in the text. References should be indicated by parenthesis in the text.

Personal communications, unpublished observations, and submitted manuscripts must be cited in the text as "(name(s), unpublished data, 19...)"

The reference list should be typed on a separate page at the end of the manuscript and if there are more than 6 authors, the rest should be written as 'et al' or 've ark.' Journal titles should be abbreviated according to the style used in the Index Medicus. All the references should be written according to the Vancouver system as follows:

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If more than one editor: editors.

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f) Thesis: Kaplan SI. Post-hospital home health care: the elderly access and utilization (thesis). St. Louis (MO): Washington Univ; 1995.

5) Tables, Graphics, Figures, and Pictures

All tables, graphics or figures should be presented on a separate sheet. All should be numbered consecutively and a brief descriptive caption should be given. Used abbreviations should be explained further in the figure's legend. Especially, the text of tables should be easily understandable and should not repeat the data of the main text. Illustrations that already published are acceptable if supplied by permission of authors for publication. Photographs should be printed on glossy paper. Figures should be done professionally and no gray colors be used.

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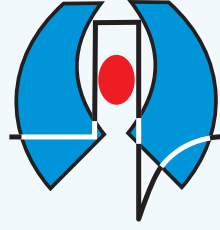
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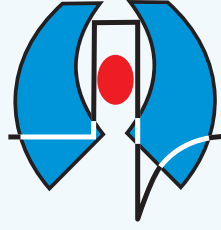
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The Evaluation of Nosocomial Candidemia in Pediatric Intensive Care: A Single-center Study

Çocuk Yoğun Bakımda Nozokomiyal Kandideminin Değerlendirilmesi: Tek Merkez Çalışması

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ABSTRACT Objective: Patients in pediatric intensive care units are more likely to develop serious nosocomial infections due to comorbidities, longer and more invasive procedural treatments, and the development of immunosuppression. We described *Candida* infections, management, morbidity and mortality in critically ill pediatric patients.

Materials and Methods: A retrospective single-center study includes patients aged 1 month-18 years treated against candidemia from January to December 2021. This included those who had blood cultures of *Candida* species growth. We excluded patients with infection *Candida* in endotracheal aspiration and/or urinary specimens, etc. The demographic characteristics, medical histories, comorbidities, length of stay, need for mechanical ventilation supports, laboratories, relationship use of catheters and total parenteral nutrition, treatment periods, antifungal response/resistance, duration of treatment and adverse effects, morbidities/mortalities.

Results: In this study, the total mortality rate was 40.7%, and the mortality rate due to candidemia was detected at 44.4%, but the correlation between candidemia and mortality was not significant ($p=0.975$). However, 18.5% of them are caused by nosocomial. The mortality risk did not change for subtypes ($p=0.975$). No significant correlation was found when mortality ($p=0.07$) and central venous catheter infection ($p=0.563$) were compared using total parenteral nutrition.

Conclusion: In our study, in which 27 patients were followed up for nosocomial candidemia, the rate of candidemia was found to be higher in patients with comorbidity, long-term mechanical ventilation support, central venous catheter use, long hospital stay, parenteral nutritional support, and high Pediatric Risk of Mortality III score. *C. parapsilosis* was detected most frequently in our *Candida* subtype unit with a rate of 59.3%. The fluconazole 8 (29.6%), amphotericin B 18 (66.7%) and voriconazole 1 (3.7%) patients were initiated. At this treatment time, only 4 (14.8%) patients developed organ failure. In our study, we detected a total mortality rate of 40.7%. However, 18.5% of them were caused by nosocomial candidemia. Considering all these reasons, we believe that our risk factors, diagnosis, treatment, follow-up, and management process will contribute to the literature.

Keywords: Pediatrics, intensive care unit, nosocomial, candidemia

ÖZ Amaç: Çocuk yoğun bakımdaki hastaların komorbiditeleri, daha uzun ve invaziv prosedürel tedavilerin olması ve immünosüpresyon gelişimi nedeniyle ciddi nozokomiyal enfeksiyonların gelişme olasılığı daha yüksektir. Çalışmamızda, üçüncü basamak hastanemizde kritik pediatrik hastalarda kan kültüründe *Candida* saptanan hastaların izlem süreci, morbidite ve mortalitesini tanımlamayı amaçladık.

Gereç ve Yöntem: Retrospektif tek merkezli çalışmamızda, Ocak 2021-Aralık 2021 döneminde ünitemizde yatan 1 ay-18 yaş arası ve kan kültüründe *Candida* türleri üremesi olanlar dahil edilmiştir. Sadece endotrakeal aspirasyon ve/veya idrar örneklerinde *Candida* türleri enfeksiyonu üremesi olan hastalar çalışma dışı bırakılmıştır. Çalışmamızda hastaların demografik özellikleri, tıbbi öyküsü, komorbiditeleri, hastane yatış süresi, mekanik ventilasyon ihtiyacı, laboratuvar değerleri, kateter kullanımı ve total parenteral beslenme ile ilişkisi, tedavi süreleri, antifungal tedaviye yanıt/direnç durumu ve yan etkiler morbidite/mortalite durumu incelenmiştir.

Bulgular: Çalışmamızda toplam ölüm oranı %40,7, kandidemiye bağlı ölüm oranı %44,4 olarak saptandı, ancak kandidemi ile ölüm arasındaki ilişki anlamlı değildi ($p=0,975$). Bunların %18,5'inin nozokomiyal kandidemiden kaynaklandığı görüldü. Mortalite riski, kandida türleri arasında farklılık göstermemektedir ($p=0,975$). Parenteral beslenme kullanılmasının mortalite ($p=0,07$) ve santral venöz kateter enfeksiyonu ($p=0,563$) ile anlamlı bir ilişkisi saptanmamıştır.

Sonuç: Hastane kaynaklı kandidemi nedeniyle 27 hastanın takip edildiği çalışmamızda komorbidite, uzun süreli mekanik ventilasyon desteği, santral venöz kateter kullanımı, hastanede uzun süre kalma, parenteral beslenme desteği ve yüksek Pediatrik Ölüm Riski III puanı olanlarda daha yüksek oranda bulunmaktadır. *C. parapsilosis* en sık *Candida* alt tipi olarak ünitemizde %59,3 ile tespit edildi. Hastalara flukonazol 8 (%29,6), amfoterisin B 18 (%66,7) ve vorikonazol 1 (%3,7) başlanmıştı ve bu tedavi süresinde hastaların sadece 4'ünde (%14,8) organ yetmezliği gelişmiştir. Çalışmamızda toplam mortalite oranı %40,7 olarak tespit edildi. Öte yandan, bu ölümlerin %18,5'i hastane kaynaklı kandidemiden kaynaklanmıştır. Tüm bu nedenlerle kandidemi risk faktörleri, tanısı, tedavi, izlem ve yönetim sürecimizin literatüre katkıda bulunacağı düşüncesindeyiz.

Anahtar Kelimeler: Pediatri, yoğun bakım ünitesi, nozokomiyal, kandidemi

Introduction

In hospitalized children bloodstream infections after bacterias and viruses, *Candida* represents the third most common cause (1). In children, nosocomial candidemia is one of the most frequent reasons of healthcare-associated infections (2). The most encountered etiology of *Candida* infections is the increased length of hospital stay, and the most severe conclusions are associated with increased morbidity and mortality (3). Intensive care unit (ICU) stay, is a strong risk factor that is having *Candida* species bloodstream infections. Especially in the pediatric age group having comorbidity, longer and invasive procedural treatment and immune system malfunction more likely to occur these infections in the pediatric intensive care unit (PICU) (4,5). Using of central venous (CVC) and arterial catheters (AVC), intravenous parenteral nutrition, increased length of ICU stay, previous broad-spectrum and prolonged antibiotics, immunodeficiency, cancers, bone marrow transplantation, endotracheal intubation and colonization with *Candida* spp. are reported to increase nosocomial *Candida* infections (6). Candidemias are a kind of life-threatening infection for immunocompromised patients. Although the risk factors for candidemia in critically ill children are known, it is necessary to treat with central lines (CVC, AVC, etc.), total parenteral nutrition (TPN), broad-spectrum antibiotics, and increased length of stay. In all pediatric populations (not only in PICU) the candidemia incidence was reported in various studies as 0.21-10.5 cases/1000 admissions (7). The type of candidemia, management and outcome have different among the study centers. The reason for this links closely to differences in different countries local prevention, prophylaxis and treatment practices. Currently, the lack of guidelines for candidemia management in PICU is caused to be different results in management and treatment (8). In this single-center retrospective study, we aimed to describe *Candida* infections, management, morbidity, mortality in

critically pediatric patients and evaluate the risk factors and effects of nosocomial candidiasis in a tertiary level hospital in PICU.

Materials and Methods

We performed that a retrospective, single-center study which including patients ages 1 month-18 years treated against candidemia the periods from January to December 2021 in PICU. Our hospital is an 800-bed 3rd level hospital and the PICU is a 52-bed unit in which annual admission is about 1400 patients a year. In this heterogeneous population of admissions (pneumonia, sepsis, trauma, metabolic diseases, status epilepticus, genetic disorders, etc.), at the time of stay in PICU, we evaluated their all infections. In this study, we included the patients, all the year 2021 who had blood and/or CVC blood cultures *Candida* species growth. We excluded patients with infection of *Candida* species in only one area a pulmonary, urinary, abdomen, thorax, extremities, etc. because of not being invasive *Candida* infections. Additionally, if the patient's age is from 1 month-18 years, they were excluded from the study, too.

The demographic characteristics, medical histories, comorbidities, length of stay in PICU, need for mechanical ventilation supports, laboratories, relationship with the use of catheters and TPN, treatment periods, antifungal treatment response/resistance, duration of treatment and adverse effects, morbidities, and mortalities of patients whose electronic and archive files were examined and evaluated.

The Pediatric Risk of Mortality III (PRISM III) score, which is one of the most commonly used mortality detection scoring systems in PICUs, was used when examining patient data. While calculating the PRISM III score, 17 different parameters including the patient's vital signs, mental status, pupillary reflex, blood gas measurements and biochemical values in the first 24 hours are used. High scores indicate a high risk of mortality.

In our study, in a patient hospitalized in PICU for treatment due to any disease; nosocomial candidemia was defined as the presence of *Candida* growth in the blood culture that developed at least 48 hours after hospitalization, disrupted the patient's clinical condition, and required new treatment.

In the presence of a CVC used in a patient, if there was no other focus of infection, isolation of the same *Candida* species in the blood culture taken from the CVC at the same time as the peripheral blood, additionally as the growth in the catheter blood in a shorter time than in the vein blood was catheter-related blood flow was defined as infection.

The definition of resistance to fluconazole, in culture identification and sensitization form were evaluated in microbiology. In addition, the condition of fluconazole resistance was considered to be non-decreased in infection markers and persistence of clinical findings or culture growth despite receiving fluconazole treatment. It was accepted that candidemia eradication was not detected in at least two blood and/or catheter blood cultures. Although the patient was treated effectively and appropriately, the cause of death of the patients whose death could not be explained reason other than candidemia was accepted as *Candida* infection.

Amphotericin B was available as liposomal amphotericin B in our hospital pharmacy, so the same liposomal amphotericin B form was used in all our patients. Notification of antifungal susceptibility to our patients is at least 24 hours after the reproduction notification. Fluconazole treatment was started first in patients with *C. albicans* and when the sensitivity was announced, fluconazole was replaced with a sensitive antifungal if there was resistance. In those with *Candida* non-albicans overgrowth, empirical fluconazole, amphotericin B, or voriconazole were started, depending on the severity of the patient's disease. The treatment was readjusted when the sensitivity status was given.

All data obtained in this way was recorded in the form of patient data. The ethics committee approval was obtained by Clinical Research Ethics Committee of Harran University (decision no: 22/02/04, date: 24.01.2022) before the study began.

Statistical Analysis

Statistical analysis was performed with SPSS statistical package (IBM® SPSS® 26 SPSS Inc., Chicago, IL, ABD) for Windows 22.0. The conformity of the variables to the normal distribution was analyzed by analytical methods (Kolmogorov-Smirnov test). Descriptive analyzes were given as minimum-maximum, median and interquartile range (IQR) for

continuous data. Descriptive statistics were made by giving frequency and percentage values of categorical variables belonging to sociodemographic and clinical information. Pearson's chi-square or Fisher's Exact chi-square test was used to compare the categorical variables. Significance was considered if the p-value was less than 0.05.

Results

In this study, we evaluated 27 (2.2%) patients with *Candida* species nosocomial infections in blood cultures during the stay of PICU admissions for the periods January and December 2021. The 27 (2.2%) blood cultures had candidemia, but all the *Candida* infections in this period were 75 (6.2%) which had infections like pneumonia, urinary infection, etc. The patients included in our study examined genders (girl/boy), diagnosis of hospitalizations (respiratory failure 44.4%, cardiac failure 7.4%, status epilepticus 22.2%, sepsis 3.7%, post-resuscitation 14.8%, trauma and hemolytic uremic syndrome 3.7%), and their comorbidities (congenital heart disease 7.4%, congenital metabolic disease 18.5%, cerebral palsy 44.4%, congenital anomalies 71.4%) are shown in Table 1. At the time of admission patient's age (2-204; median 55.3; IQR 90 months), length of stay (24-433; median 117.1; IQR 137 days), PRISM III score (3-98; median 98; IQR 35), at the day of the beginning of candidemia infections (9-340; median 340; IQR 85 days) and starting of antibiotics days (9-340; median 340; IQR 85 days) at the time of candidemia are shown in Table 2. At the first evaluations of patients Glasgow coma scale [GCS >8: 10 (37%), GCS <8: 17 (63%)], first admission place [emergency service 19 (70.4%), general service 5 (18.5%)], first respiratory support [oxygen support with mask 2 (7.4%), high flow nasal cannulas 2 (7.4%), non-invasive mechanical ventilation 9 (33.3%), invasive mechanical ventilation 14 (51.9%)] and after treatment of PICU status [transferred to general service 9 (33.3%), still in PICU 6 (22.2%), exitus 12 (44.4%)] detected (Table 1).

In our study, we detected a total mortality rate of 40.7%. On the other hand, 18.5% of them were caused by nosocomial candidemia. These infections were 10 (37%) CVC infections and 17 (63%) septicemias. CVC removal was performed in 10 (37%) patients during treatment, but not 14 (51.9%). Three of these patients did not have any CVC. The localization of CVCs was 18 (66.6%) jugular, 4 (14.8%) subclavian, 2 (7.4%) femoral. High comorbidity rates and

increased length of stay cause difficulties in vascular access. For this reason, in our study, we could not remove all CVCs. The TPN support rate was 10 (37%) patients.

Our nosocomial candidemia were *C. albicans* 10 (37%) and *Candida non-albicans* 17 (63%). When looking at the

subtypes of *Candida* were *C. albicans* 10 (37%), *C. tropicalis* 1 (3.7%) and *C. parapsilosis* 16 (59.3%). Resistance to fluconazole treatment was 18 (66.6%). The fluconazole 8 (29.6%), amphotericin B 18 (66.7%) and voriconazole 1 (3.7%) of the patients were initiated. At this treatment time,

Table 1. The genders, diagnosis, comorbidities, and at the first evaluations of patients GCS, first admission place, first respiratory support and after treatment of PICU status

		Frequency	Percent (%)
Gender	Girl	13	48.1
	Boy	14	51.9
	Total	27	100
Diagnosis of hospitalization	Respiratory failure	12	44.4
	Cardiac failure	2	7.4
	Status epilepticus	6	22.2
	Sepsis	1	3.7
	Post-resuscitation	4	14.8
	Trauma	1	3.7
	Hemolytic uremic syndrome	1	3.7
	Total	27	100
Comorbidity	Congenital heart disease	2	7.4
	Congenital metabolic disease	3	18.5
	Cerebral palsy	7	44.4
	Congenital anomalies	8	71.4
	None	7	25.9
	Total	27	100
Glasgow coma scale	>8	10	37
	<8	17	63
	Total	27	100
First admission	Emergency service	19	70.4
	General service	5	18.5
	Other hospital	3	11.1
	Total	27	100
First respiratory support	Oxygen support with mask	2	7.4
	High flow nasal canulas	2	7.4
	Non-invasive mechanical ventilation	9	33.3
	Invasive mechanical ventilation	14	51.9
	Total	27	100
Exit from the PICU	Transferred to general service	9	33.3
	Still in PICU	6	22.2
	Exitus	12	44.4
	Total	27	100

GCS: Glasgow coma scale, PICU: pediatric intensive care unit

Table 2. At the time of admission patient's age, length of stay, PRISM III score, at the beginning of candidemia infections and use of antibiotics days at the time of candidemia

	Minimum-maximum	Median	IQR
Age (month)	2-204	55.3	90
Length of stay in PICU (day)	24-433	117.1	137
PRISM III score	3-98	98	35
Candidemia day	9-340	340	85
Antibiotic day	9-340	340	85

PRISM III: Pediatric Risk of Mortality, IQR: interquartile range, PICU: pediatric intensive care unit

Table 3. The evaluation of candidemia risk factors and the effectiveness of management strategy

			p-values
The effectiveness of management	Mortality	PRISM III	1.232
		<i>Candida</i> subtypes	0.975
		TPN using	0.070
Candidemia risk factors	TPN using	CVC/AVC infections	0.563
	Length of stay	Sepsis	1.060
		CVC/AVC infections	1.330

PRISM III: Pediatric Risk of Mortality, CVC/AVC: central venous catheters/arterial catheters

4 (14.8%) of patients developed organ failure. These were renal 2 (7.4%), hepatic 2 (7.4%) and coagulopathy 4 (14.8%). The rate of dialysis requirement was 4 (14%) (one of them hemodialysis and 3 peritoneal).

The mortality risk did not change for the subtypes of candidemia in our study ($p=0.975$). Additionally, when the patients were divided into two groups *C. albicans* (27%) and *Candida non-albicans* (63%), mortality risks did not change ($p=0.916$), again. No significant correlation was found when mortality ($p=0.070$) and CVC/AVC infection ($p=0.563$) were compared in patients using TPN. In our study PRISM III scores and the mortality rates of nosocomial candidemia patients were compared and no correlation was detected ($p=1.232$). When the length of stay was compared with catheter infection ($p=1.330$) and sepsis ($p=1.060$), no significant correlation was found. When the treatment process of our patients with exitus is examined, the statistical evaluation of the effects of PRISM III, *Candida* subtypes and TPN on this situation is given in Table 3. The statistical relationship between the use of TPN, prolonged hospital stay, the use of CVC/AVC and the occurrence of candidemia, sepsis which are among the main factors that may cause candidemia in the PICU, are also shown in Table 3.

The resistance of fluconazole was compared with hemogram ($p=0.727$) and arterial blood gas ($p=0.348$) disorders, it has not detected significant correlations. There

was no organ failure during candidemia treatment time in 22 (81.5%) patients. Moreover, these patients had *C. albicans* 7 (31.8%), *C. tropicalis* 1 (4.5%), *C. parapsilosis* 14 (63.6%). When examined in terms of the development of organ failure and the duration of candidemia treatment, there was no correlation between them ($p=0.441$).

Discussion

Nowadays, candidemias are accepted in pediatric and adult ICUs one of the most common nosocomial infections (9). Hegazi et al. (10), conducted a study that included 589 children in a study and detected 66 (19%) candidemia. In the literature candidemia incidence is 6.4 cases/1000 (0-14.1 cases/1000 admissions) admissions. The Italian adult intensive care study reported 10.1 cases/1000 admissions and Zaoutis et al. (3) study in PICU detected candidemia in 3.5/1000 admissions (11). Invasive candidiasis is caused to be higher morbidity and mortality, especially in immunocompromised and hospitalized. In a year average of 750,000 cases are reported all around the world. The severe diseases/multiple organ failures (MOFs) are detected in invasive candidiasis developed immunocompromised children in PICU/neonatal intensive care unit. The most common isolated *Candida* subtypes are *C. albicans*, *C. glabrata*, *C. tropicalis*, *C. parapsilosis*, *C. krusei*, etc. (12).

Candidemia usually has the same signs and symptoms as general sepsis in childhood, with a death rate of 13% (13). The most commonest pathogen in *Candidas*, in the past was *C. albicans*. Nowadays, *non-albicans Candidas* (especially *C. parapsilosis* and *C. tropicalis*) is being isolated in blood cultures more often, due to increasing resistance of antifungal treatments for *Candida* spp. in PICU (5,14). In a year our PICU admissions average of 1200 and, nosocomial candidemia rate is detected at 2.25% [*C. albicans* 10 (37%) and *non-albicans Candida* 17 (63%)] and general *Candida* infections rate is detected at 10.7% in our study time. When looking at the subtypes of *Candida* were *C. albicans* 10 (37%), *C. tropicalis* 1 (3.7%), and *C. parapsilosis* 16 (59.3%). Contrary to our study, in the study of Uysal Yazici et al. (15) evaluating candidemia cases in the PICU in our country, *C. albicans* was found to be the most common cause (45%). In the study of Ergül et al. (16) in which they evaluated candidemia cases for 3 years in the PICU, 59.1% *C. albicans*, 27.3% *C. parapsilosis*, 13% *C. tropicalis* they were found.

The study conducted by Ağin et al. (6) identified the risk factors of *Candida* infections which were an underlying disease, administration of TPN, and central venous catheterization. Immunocompromised (hematological malignancies, neutropenia, primary immune deficiency, hemopoietic stem cell or solid organ transplantation, corticosteroid treatment, etc.), gastrointestinal tract disease (malignancy, hepaticobiliar diseases, etc.), ICU admissions, IV treatments (TPN, transfusion, etc.), presence of medical supports (CVC, urinary catheter, AVC, etc.), age groups (elderly, neonates, prematurity, immaturity, etc.), receipt of broad-spectrum antibiotic agent/s, trauma and burns diseases are the risk factors of invasive candidiasis (17). Different studies like this supported to understand, the timing and treatment periods of *Candida* infections (18). In our retrospective study periods, the patient's diagnoses of hospitalization in order of frequency were detected as respiratory failure (44.4%), status epilepticus (22.2%), post-resuscitation (14.8%), cardiac failure (7.4%), sepsis (3.7%), trauma (3.7%), and hemolytic uremic syndrome (3.7%). Our hospital, a tertiary PICU, is in a socioculturally underdeveloped center of a developing country. The heterogeneous population of including our study usually had comorbidity. Therefore, increased length of stay, more needed CVC, and mechanical ventilation, feeding problems to cause TPN needing have accelerated the occurrence of

nosocomial *Candida* infections, sepsis and higher mortality. The mortality rate due to candidemia was detected at 44.4%, but the correlation of candidemia and mortality was not significant. Additionally, no significant correlation was found when mortality and catheter infection were compared in patients using TPN.

Repeated and prolonged use of antibiotics/antifungals due to prolonged hospitalization can be caused candidemia and resistance to antifungal agents (9,10). The age group of our patients was 55.3 (2-204; IQR: 90) months which supported their weak immunity. The average period time length of stay in PICU was 137 (24-433; IQR: 137) days and the first 24 hours calculated PRISM III score was 98 (3-98; IQR: 35). These highest PRISM III scores and at the time of admission severe respiratory support needing could be caused high nosocomial infections and candidemia (8). Although these high risks of candidemia, length of stay and PRISM III were compared with nosocomial candidemia, we did not detect any correlation. When examined for candidemia day 340 (9-340; IQR: 85) had a high antibiotics day 340 (9-340; IQR: 85) was detected. Therefore, the resistance to fluconazole treatment was 18 (66.6%) patients. The fluconazole 8 (29.6%), amphotericin B 18 (66.7%) and voriconazole 1 (3.7%) of the patients were initiated. All the candidemias were examined, CVC nosocomial *Candida* infections rate was detected in 15 (55.5%) patients and this group treatment success was 12 (80%) patients, but unfortunately 3 (20%) patients died because of CVC infection. Similarly, Ağin et al. (6) in a study in our country investigating the risk factors for *Candida* infections in PICU, the rate of *Candida*-associated catheter infection was found to be 59.6%. Only 5 (18.5%) patients developed any organ failure. If examined in terms of the development of organ failure and the duration of candidemia treatment, there was no correlation between them. Non-immunocompromised patients have candidemia of severe sepsis/septic shock is very rare. Additionally, if septic shock develops, it is caused a high mortality rate because of MOF. Not only does candidemia cause MOF, using antifungal agents for a long time and/or strong agents causes, too (19).

The presence of CVC increased candidemia three times was reported (20). Especially *C. parapsilosis* was produced spread biofilm areas on central venous lines and then associated with nosocomial candidiasis. Also, *C. parapsilosis* colonization on hands was detected (21).

Our nosocomial candidemia were *C. albicans* 10 (37%) and *Candida non-albicans* 17 (63%). When looking at the subtypes of *Candida* were *C. albicans* 10 (37%), *C. tropicalis* 1 (3.7%) and *C. parapsilosis* 16 (59.3%). The mortality risk did not change for the subtypes of candidemia in our study. Additionally, when the patients were divided into two groups *C. albicans* (27%) and *Candida non-albicans* (63%), mortality risks did not change, again. In the study of Uysal Yazici et al. (15), the mortality rate in candidemia cases was found to be 35%, which is lower than in our study. Again, in this study, while mortality was 44.4% in cases with *C. albicans* overgrowth, it was 36.4% in *non-albicans Candida*. No statistically significant difference was found between the *Candida* subtype and mortality rates (15). Till today all studies suggested removing the CVC if catheter infections. Unless you must use CVC, it must be removed CVC for treatment of resistant infection and/or uncontrolled infection (22). The localization of CVCs was 18 (66.6%) jugular, 4 (14.8%) subclavian, 2 (7.4%) femoral. Since the socioeconomic status is low in the region where our hospital is located, malnutrition, multiple genetic anomalies, and long hospital stays are very common. For all these reasons, as the problem of finding vascular access is high, it is not possible to remove as much CVC as desired. Also, no key treatment was applied to our patients. For this reason, in our study, we could not remove all CVCs. The removal of CVC was at 10 (37%) patients for source control, but 14 (51.8%) were not removed and 3 (11.1%) were no CVC. This situation, long treatment periods, increased resistance to antifungals, morbidity, and mortality can be caused.

Multiple pharmacotherapeutic options are available for the treatments of candidemia triazoles, amphotericin B and echinocandins (23). If the effective and rapidly of appropriate antifungals are not initiated, especially pediatric patients have a high range (7.7-26%) of mortality risk (24,25). At the time of choosing antifungal treatment strategy, it is suggested for adult guidelines procedures. The rapid initiation of antifungal agents at first, than removing CVC, source control, if necessary, addition of secondary drugs, continuing treatment same agents for 14 days after blood culture without *Candida* are the basic rules (26). In our study, we applied these principles, and the fluconazole 8 (29.6%), amphotericin B 18 (66.7%), and voriconazole 1 (3.7%) of the patients were initiated. Resistance to fluconazole treatment was 18 (66.6%) who had secondary antifungal agents such

as amphotericin B, caspofungin, and voriconazole. The finishing of treatment was supplied with detecting blood cultures without *Candida*. Although there has been an increase in treatment options for invasive fungal infections in recent years, use in childhood is generally limited to amphotericin B and liposomal amphotericin B preparations. There is not enough experience in the use of voriconazole from the new azole group treatments or caspofungin from the new candins in childhood (27). Although we have a tertiary and large-capacity PICU, they were not used in our study since there are no echinocandin-type antifungals (such as caspofungin, anidulafungin, etc.) in our hospital. In addition, considering current literature data as a first-line treatment choice for candidemia is reported that to used fluconazole and liposomal amphotericin B same equal in both neonates and children, except for non-neutropenic non-critically ill children (28).

The limitations are that it was retrospective, the number of patients was small, it covered a short period time, it was a single center, and the patients were heterogeneous. In addition, there were no pediatric hematology-oncology or pediatric immunology physicians in our hospital during part of the study period. Also, since there is no chemotherapy preparation unit in our hospital, patients cannot be followed up during active malignancy. For all these reasons, the immunosuppressed patient group, which is one of the riskiest groups for invasive fungal infection, was not included in our study. However, there is insufficient data on the causes, prevention, treatment and follow-up of candidemias in the critically ill group in the PICU, and we think that we will contribute to the literature.

Conclusion

In conclusion, we described *Candida* infections, management, morbidity, mortality in critically pediatric patients and evaluate the risk factors and effects of nosocomial candidiasis in a tertiary level hospital in PICU. In a single center experience: in 52-bed tertiary hospital had been evaluated treatment success and early detection of clinical signs and symptoms. A large heterogenous population of our patients had severe comorbidity and *Candida* risk factors, at the time of treatment had complications because of pathogens and/or pharmacotherapy. We aimed that, our experience with a large population of PICU admissions to

be contributed to the literature. We believe that with the contribution of our experience with nosocomial *Candida* infection in this study in the PICU, more effective treatment methods with less side-effect profile will be developed for candidemia in the future.

Ethics

Ethics Committee Approval: The ethics committee approval for the study was obtained by Harran University Clinical Research Ethics Committee (decision no: 22/02/04, date: 24.01.2022) before the study began.

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: H.F.A., Concept: H.F.A., Design: H.F.A., Data Collection and Process: M.A., Analysis or Interpretation: M.A., Literature Search: H.F.A., M.A., Writing: H.F.A., M.A.

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Evaluation of the End-stage Patients in Intensive Care

Yoğun Bakımda İzlenen Son Dönem Hastaların Süreçlerinin Değerlendirilmesi

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ABSTRACT Objective: The benefit of medical interventions applied in terminal patients who have no hope of recovery and whose death is thought to be approaching is still a controversial issue. In this study, it was aimed to analyze the terminal stage patients hospitalized in the intensive care unit. **Materials and Methods:** The general characteristics and laboratory results of 61 end-stage patients admitted to the adult intensive care unit of university hospital between December 2016 and may 2017 were examined. Life expectancy, mortality rates, factors affecting mortality, and costs per patient were evaluated according to the palliative prognostic index (PPI) and palliative care admission score (PCAS) of the patients.

Results: Exitus patients had an average of 13.83 days of intensive care stay and patients who survived had a mean 30.69 days ($p<0.05$). The PCAS was not statistically significant between ex and alive patients. Exitus patients had a PPI of 6.48, whereas survivors had a PPI of 3.73, ($p<0.05$). Exitus patients had a mean palliative life expectancy of 3.78 days, whereas the palliative life expectancy of surviving patients was 71.42 days ($p<0.05$). The most common primary disease for intensive care admission is malignancy, with 33 patients. The average cost of treatment for exitus patients was \$3654,50, while the cost of treatment for surviving patients was \$7053,38 ($p<0.05$). **Conclusion:** End-stage patients should be admitted to the palliative care unit or hospice using prognostic scoring systems. The bed capacity in intensive care units should be used for patients who have a chance to be treated. It is thought that unnecessary health expenditures can be avoided by hospitalizing terminal patients in palliative care units and hospices.

Keywords: End-stage patient, palliative care, intensive care unit, cost

ÖZ Amaç: İyileşme umudu kalmayan ve ölümün yaklaştığı düşünülen terminal dönem hastalarda uygulanan tıbbi müdahalelerin hastaya yararı halen tartışılan bir konudur. Bu çalışmada yoğun bakım ünitesinde yatan terminal dönem hastaların prospektif olarak analiz edilmesi amaçlanmıştır.

Gereç ve Yöntem: Üniversite hastanesi erişkin yoğun bakım ünitesine Aralık 2016 ile Mayıs 2017 tarihleri arasında yatan 61 son dönem hastanın, genel özellikleri ve laboratuvar sonuçları incelenmiştir. Burada hastaların palyatif prognostik indeks (PPI) ve palyatif bakım yatış skoruna (PBYS) göre beklenen yaşam süreleri, mortalite oranları ve mortaliteye etki eden faktörler, hasta başı maliyetler değerlendirilmiştir.

Bulgular: Ölen hastaların yoğun bakım kalış süresi ortalama 13,83 gün iken hayatta olan hastaların ortalama 30,69 gün idi ($p<0,05$). PBYS ölen ve hayatta kalan hastalar arasında istatistiksel olarak anlamlı farklı bulunmadı. Ölen hastaların PPI 6,48 ve hayatta olan hastaların PPI 3,73 olarak bulundu ($p<0,05$). Ölen hastaların palyatif beklenen yaşam süresi ortalama 3,78 gün iken hayatta olan hastaların palyatif beklenen yaşam süresi ortalama 71,42 gün olarak bulundu ($p<0,05$). Yoğun bakım kabulünde malignite en sık görülen primer hastalığı (33 hasta). Ölen hastaların tedavi maliyeti ortalama 3654.50 dolar iken hayatta olan hastaların tedavi maliyeti ortalama 7053.38 dolar olarak bulundu ($p<0,05$).

Sonuç: Gerekli prognostik skorlama sistemleri kullanılarak son dönem hastalar palyatif bakım ünitesine veya hospise alınmalıdır. Yoğun bakımlardaki yatak kapasitesi tedavi edilme şansı olan hastalar için kullanılması sağlanmalıdır. Terminal dönem hastaların palyatif bakım ünitesine ve hospislere yatışı ile gereksiz sağlık harcamalarından kaçınılabileceği düşünülmektedir.

Anahtar Kelimeler: Son dönem hasta, palyatif bakım, yoğun bakım ünitesi, maliyet

Introduction

Developments in the field of medicine, especially innovations in medical technology have allowed to extend life expectancy. The transformation of many diseases that used to be acute and rapidly developing into chronic and severe diseases; made some medical facts more complicated than before. Undoubtedly, the medical problems encountered in the last period of human life and the criteria used to make decisions about these cases have become more intensely debated.

It is still a matter of debate around the world how much benefit the medical interventions applied in end-stage patients who have no hope of recovery and whose death is thought to be inevitable. Many countries show different methods in the management of patients depending on their ethical, cultural, medical, legal and economic structures. The management of these patients has been taken to hospice, palliative care and home care systems and has been separated from the acute care system in developed countries (1,2). How long the treatment of untreatable care will last and whether it can be terminated or not constitute the basis of scientific and ethical discussions. In addition, scientific and ethical circles continue to debate whether the purpose of treatment should focus on the patient's life span or whether it is for life comfort, stopping the treatment, withdrawing life support, resuscitation indication and even the right to life-terminating treatment (3).

In our country, these patients are hospitalized and treated in acute care centers with the principle of "full support until death". In addition, institutional, legal and social pressure is applied to monitor these patients in intensive care units (ICUs) (4). As in the whole world, intensive care beds and resources are limited in our country; the units are special and expensive. ICUs are that units where patients who have a chance to survive after the acute event (organ failure, septic condition, etc.) are followed up and treated. For this reason, these units do not want to use their resources for end-stage patients who do not have a chance for treatment and whose results are known from the beginning.

In this study, we prospectively analyzed the end-stage patients hospitalized in Pamukkale University Faculty of Medicine Anesthesia ICU. It was aimed to evaluate the intensive care processes, their PCAS, expected life expectancy according to palliative prognostic index (PPI), mortality rates, risk factors affecting mortality per patient and cost of these patients.

Materials and Methods

Following the approval of the Pamukkale University Faculty of Medicine Ethics Committee (no: 60116787-020/3413, date: 10.01.2017), the clinical characteristics and laboratory results of the end-stage patients hospitalized in the anesthesiology intensive care of Pamukkale University Faculty of Medicine, Department of Anesthesiology and Reanimation between December 2016 and May 2017 were included. General characteristics and laboratory results were evaluated prospectively for life expectancy and costs were calculated according to the PCAS and PPI.

The demographic data of the patients and the type, location and duration of malignancy were noted in months. At the time of admission to the ICU systolic blood pressure, heart rate and $\text{PaO}_2/\text{FiO}_2$ ratio from arterial blood gas taken were recorded. The acute physiology and chronic health evaluation-II (APACHE-II) score was calculated at the time of hospitalization. Mechanical ventilation (MV) support was recorded as yes/no. If the patient was on ventilation support, this parameter was documented such as non-invasive (NIMV), orotracheal intubation (OTI) or tracheostomy. The organ failure was recorded. Initiation of vasopressors for circulatory failure, RIFLE criteria for renal failure (stage 3 and above), and Child Pugh scoring system for liver failure (Child Pugh B and above) were determined as criteria. ICU stay, intensive care discharge status, hospital stay, discharge status and the situation 3 months after discharge the hospital were recorded by contacting the patient's relatives with the phone numbers on the patient card. Palliative care admission score was determined according to palliative care admission criteria and scoring (5). Mean life expectancy was calculated according to the PPI system. The cost of the patient's treatment was calculated from hospital record. Intensive care treatments were billed in accordance with government health practice statement. Some drugs specified in the statement were invoiced separately.

Statistical Analysis

Data were analyzed with the SPSS 18 (SPSS Inc., Chicago, IL, USA) package program. Continuous variables were given as mean \pm standard deviation, and categorical variables as numbers and percentages. When the parametric test assumptions are provided in independent group comparisons, the test of significance of the difference between two means or analysis of variance in the comparison of differences between groups; when parametric test assumptions were

not met, Mann-Whitney U test or Kruskal-Wallis analysis of variance was used to compare the differences between groups. The relationship between the variables was analyzed by Spearman or Pearson correlation analysis. Chi-square analysis was used to compare categorical variables.

Results

Sixty-one patients included in the study that ages ranged from 33 to 92 years, with a mean age of 64.5 ± 13.01 years. 42.6% (n=26) of the patients were female and 57.3% (n=35) were male. There was no statistically significant difference between died and alive groups for admission results (Table 1). When the reasons for hospitalization of the patients were examined, 39 patients (63.9%) were admitted to the ICU for respiratory failure, 13 patients (21.3%) for general condition problems, and 9 patients for various problems. The primary diseases of the patients admitted to the ICU are given in Table 2. In intensive care admission, malignancy was the most common cause with 33 patients whereas 10 patients were diagnosed with lung ca. In terms of non-cancer primary disease, the most common cause was chronic obstructive pulmonary disease with five patients.

Infection was detected in 47 patients. Thirty-two patients had lung infection and 13 had bloodstream infection. Infection was not found in 14 patients (Table 3). Thirty eight of infected patients were died. Respiratory failure was found in 40 patients, circulatory failure in 36 patients, renal failure in 22 patients, and liver failure in 3 patients. Multiple organ failure was detected in 32 patients, and organ failure was not observed in 7 patients. Vasopressor therapy was initiated in 29 of 48 patients who died, while 7 patients

out of 13 surviving patients received vasopressor therapy. There was no statistically significant difference between the deceased and surviving groups in terms of vasopressor therapy. There was no statistically significant difference between the two groups also in terms of renal replacement therapy (RRT). APACHE-II scores were statistically different in the deceased and surviving groups. The number of days of NIMV, orotracheal intubation and MV of the patients were given in Table 3 and there was no statistically significant difference between the two groups. MV as a tracheostomy were 14.75 ± 7.68 days in the dead group and 27.17 ± 13.67 days in the surviving group. The difference was statistically significant (Table 3).

The mean length of stay in the ICU, the mean hospital stay, the PPI and palliative life expectancy were different statistically significant between the deceased and surviving groups. The average cost of treatment per patient in the patients with exitus was $3654,50 \pm 3081,34$ dollars, while the average cost of treatment per patient in the surviving patients was $7053,38 \pm 5974,67$ dollars, and the difference between them was statistically significant (Table 4).

	Dead (48)	Survived (13)
Age	63.49 ± 12.27	68.23 ± 15.36
Gender (F/M)	20 (41.7%)/28 (58.3%)	6 (46.2%)/7 (53.8%)
PaO ₂ /FiO ₂ ratio	229.17 ± 67.05	199.46 ± 47.70
Systolic blood pressure (mmHg)	117.52 ± 24.09	106.54 ± 24.14
Diastolic blood pressure (mmHg)	66.13 ± 15.44	60.62 ± 12.20
Heart rate (/min)	105.08 ± 21.24	100.08 ± 22.44
3 months after discharge	48 (78.69%)	13 (21.31%)

Lung Ca	10	Acute renal failure	1
COPD	5	Xeroderma pigmentosum	1
Chronic heart failure	3	Multiple myeloma	2
Alzheimer	1	Bladder Ca	3
Neuroblastoma	1	HIV	1
Esophagus Ca	1	Larynx Ca	2
AML	1	Polymyositis	1
Colon Ca	3	Tonsil Ca	1
Cirrhosis	3	CABG	2
Chronic renal failure	1	Cardiac arrest	1
Pancreas Ca	3	Pneumonia	2
Interstitial lung disease	1	Endometrium Ca	1
Over Ca	2	Toxoplasma encephalitis	1
Stomach Ca	3	GIS bleeding	1
Breast Ca	2	Pulmonary embolism	1

Ca: Cancer, COPD: chronic obstructive pulmonary disease, AML: acute myeloid leukemia, HIV: human immunodeficiency virus, CABG: coronary artery bypass graft, GIS: gastrointestinal system

Table 3. APACHE-II score and supportive treatments for patients

	Dead (48)	Survived (13)
APACHE-II score	61.24±13.44*	54.0±12.85
Vasopressor necessity (+/-)	29 (60.4%)/19 (39.6%)	7 (53.8%)/6 (46.2%)
RRT (+/-)	9 (18.8%)/39 (81.3%)	0 (0%)/13 (100%)
Infection (+/-)	38 (79.2%)/10 (20.8%)	9 (69.2%)/4 (30.8%)
NIMV (day)	3.42±3.11 (n=45)	7.60±7.34 (n=12)
MV OTE (day)	8.95±7.26 (n=48)	13.20±5.86 (n=12)
MV tracheostomy (day)	14.75±7.68 (n=24)*	27.17±13.67 (n=10)
Total MV (day)	12.31±11.74 (n=48)*	30.92±20.19 (n=12)

RRT: Renal replacement therapy, NIMV: non-invasive mechanical ventilation, MV: mechanical ventilation, APACHE-II: acute physiology and chronic health evaluation-II, OTI: orotracheal intubation
*p<0.05, between groups

Table 4. Cost, length of ICU, length of hospital and PCAS

	Dead (n=48)	Survived (n=13)	p
Length of ICU (day)	13.83±11.37	30.69±21.90	0.0001*
Length of hospital (day)	15.71±12.65	33.23±20.94	0.003*
PCAS	8.33±1.27	7.67±2.10	0.227
PPI	6.48±2.42	3.73±1.68	0.0001*
Palliative expected life (day)	3.78±24.81	71.42±23.64	0.0001*
Cost of therapy (dollar)	3654.50±3081.34	7053.38±5974.67	0.012*

*p<0.05, between groups
ICU: Intensive care unit, PPI: palliative prognostic index, PCAS: palliative care admission score

Discussion

As stated in the ICU standards, ICUs are equipped with advanced technology devices that aim to support critical patients with serious dysfunction in one or more organ systems, are equipped with advanced technology, monitor the vital signs of the patients 24 hours a day, have intensive and invasive applications, and provide patient treatment and care. Intensive care is the units where service is provided by a multidisciplinary team (6).

Perceiving death as a failure for healthcare workers and measuring the success of ICUs with survival statistics also affect this situation. The main reason behind these is that, despite everything, the motivation to live is kept in

the foreground and concepts such as quality of life, cost-effectiveness, and fair use of limited resources are ignored (7).

Prognosis assessment in intensive unit and palliative care settings is of great importance in order to create a balance in the care of end-stage patients and to contribute to the quality of life of patients and to use resources correctly, because prognosis is an indispensable element in the decision-making process in the selection of end-of-life treatment options. However, a number of studies have shown that survival estimates based on physicians' clinical experience are moderately associated with exact survival (8). Various clinical methods have been developed to predict the prognosis of patients with end-stage terminal illness (9). PPI was validated 245 cancer patients in a single-residence nursing home (10). In our study, we evaluated the processes of end-stage patients hospitalized in our ICU by using PPI and life expectancy according to that study.

In the study of Aygencel and Türkoğlu (11) on end-stage patients based in Turkey, the mean age of 83 patients was 63 years, and clinical data including mean age, gender, disease groups and presence of malignancy were in line with our study, and exitus rates were 5% higher than in our study. Similarly, Brown et al. (12) were followed up in the ICU, and their last-term follow-up was carried out in which the cases with various diseases. The demographic data of their study are parallel with the demographic data of our study. In our study, the mean age of the patients was 63.49±12.27 years in the exitus group and 68.23±15.36 years in the surviving group.

In another Aygencel et al. (13) study, high APACHE-II score at the time of admission to the ICU, presence of sepsis/septic shock at ICU admission and need for vasopressors are considered as poor prognostic factors if the underlying cancer is in remission. In our study, statistically significant differences were found between the APACHE-II, the need for invasive MV, the length of stay in the ICU, and the survivors group. We also found that the NIMV, IMV, and MV lengths of the surviving patients with tracheostomy were longer than those of the died group. It was noteworthy that all nine patients who received RRT were dead. Our finding, which is not in line with the study of Aygencel et al. (13), is that although the patients who needed vasopressors were more in the exitus group in our study but the difference was not statistically significant. In a retrospective study conducted in the USA (14), the length of hospital stay of terminally ill patients was found to be between 11.2 and 12.9 days. Our results seem to be compatible with the

literature. The mean hospital stay of the patients who died was 15.71 ± 12.65 days, while the mean of 33.23 ± 20.94 days for the patients who survived, and the difference between them was statistically significant in our study.

In a study conducted by Maltoni et al. (15) in 14 centers in Italy, the average palliative care score of 45% of the end-stage patients admitted to the ICU was in the range of 5.6-11 days. The mean PCAS in our study was similar to this group. While the mean PCAS of the patients who died was 8.33 ± 1.27 days, the mean PCAS of the patients who survived was 7.67 ± 2.10 days. The difference between groups was not statistically significant. In addition, the relatively high mean PCAS in the died and surviving patient group may be attributed to the inclusion of end-stage patients in both groups.

According to a study conducted in Ireland that found the correlation between PPI and prognosis, the average life expectancy of patients with a PPI score above 6 was 5 days (15). The PPI is used to predict survival in intensive care patients (mean survival according to this scoring system: PPI 0-2 \rightarrow 90 days, PPI 2.1-4.0 \rightarrow 61 days, PPI >4 \rightarrow 12 days) (40). In a study by Arai et al. (16) that tested the accuracy of PPI, it was found that PPI was useful in predicting prognosis. In our study, the PPI of the patients who died was 6.48 ± 2.42 , while the PPI of the patients who survived was 3.73 ± 1.68 ; the difference between them was statistically significant. Expected life expectancy calculated according to PPI, which is based on Karnofsky performance score and scoring according to clinical symptoms and the predictive power of our patients were found to be quite successful. While the palliative life expectancy of the patients who died was 3.78 ± 24.81 days, the palliative life expectancy of the patients who survived was 71.42 ± 23.64 days; the difference between them was statistically significant.

Unfortunately, we could not find a study in which cost analysis was performed, even though there have been recent advances in palliative care in our country. According to the international studies, both palliative care and the cost of care in hospices were found to be lower than in standard hospitals. According to a study conducted in Ohio, while the care in the hospice is \$65 per day, the care of the same patient in the hospital is \$125 (17). In another study, the weekly care fees of those who died at home or in nursing homes without entering the ICU ranged from 150-700 dollars, while the weekly expenditure for those who died in the ICU was around 2550-5000 dollars (18). In our study, the sum of the bills deducted from the patients in the

last period followed up was 26,171 dollars; the average is \$270,6 per day of hospitalization. These costs are calculated according to the package reimbursement system applied by health system according to the level of intensive care patients. Finally, while the average treatment cost per patient for the patients who died was $3654,50 \pm 3081,34$ dollars, the average treatment cost per patient for the surviving patients was $7053,38 \pm 5974,67$ dollars, and the difference between them was statistically significant.

Conclusion

Patients who die due to a disease that cannot be treated or who do not accept treatment should be taken to the palliative care unit or hospital by making a decision together with their primary care physician with prognostic scoring systems. Instead of filling the beds of these patients who have no possibility of recovery in ICUs, the bed capacity in ICUs should be used to patients that have treatment options. At the same time, it is thought that unnecessary cost will be avoided by hospitalizing terminal patients in palliative care units and hospices. In conclusion, with the necessary arrangements, the establishment of appropriate palliative care units for all end-stage patients in our country is necessary for more rational use of limited intensive care resources.

*This article is derived from Semiha Yalçın's thesis on "Evaluation of the End Stage Patients in Intensive Care".

Ethics

Ethics Committee Approval: The study approval was obtained from the Non-Invasive Clinical Research Ethics Committee of Pamukkale University on 10th January 2017 (no: 60116787-020/3413).

Informed Consent: Written consent was obtained at admission.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: H.S., S.Y., Concept: H.S., S.Y., Design: H.S., Data Collection and Process: S.Y., Analysis or Interpretation: H.S., Literature Search: H.S., S.Y., Writing: H.S., S.Y.

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Intensive Care Management of Critical and Severe SARS-CoV-2 Infection in Pregnancy: A Retrospective Observational Study

Gebelikte Kritik ve Ağır SARS-CoV-2 Enfeksiyonunun Yoğun Bakım Yönetimi: Retrospektif Gözlemsel Çalışma

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Presented in: The study was presented as an oral presentation at the annual congress of the Turkish Intensive Care Association in 2022.

ABSTRACT Objective: This study examined the clinical consequences of pregnancy coexisting with severe acute respiratory syndrome coronavirus 2 in the intensive care unit (ICU).

Materials and Methods: The study was designed as a retrospective observational study. After the ethical approval of the local ethics committee, the study was conducted for a period when the number of young coronavirus disease-2019 (COVID-19) cases increased in our country. The patients enrolled in the study were pregnant/puerperal patients followed up in our third-level ICU.

Results: The mean age of 35 pregnant women included in the study was 29.57±4.36 years. Twenty-one of the births (80.8%) were preterm births. Twelve (34.3%) patients received invasive mechanical ventilation (IMV), and 5 (41.7%) of these patients were deceased. Twenty-six (74.3%) underwent a cesarean section (C/S). There were 5 (14.3%) patients who needed extracorporeal membrane oxygenation and 3 (8.5%) patients who needed continuous renal replacement therapy. The 28-day neonatal mortality rate for 26 births was 3.8%. The maternal mortality rate in the ICU was 14.3%.

Conclusion: The preterm birth rate was high in our pregnant patients followed up in the ICU with a diagnosis of COVID-19. Because of clinical and radiological progression in pregnant women, it is difficult to indicate any gestational week in which maternal outcomes are better to undergo C/S. IMV mortality is not higher than in non-pregnant patients, so endotracheal intubation should not be avoided in appropriate patients, whether pregnancy continues or not. The absence of fully vaccinated patients in the study group revealed the protective effect of vaccination during pregnancy.

Keywords: COVID-19, pregnancy, SARS-CoV-2, intensive care unit, extracorporeal membrane oxygenation

ÖZ Amaç: Bu çalışma ile yoğun bakım ünitesinde (YBÜ) ağır akut solunum yolu sendromu-koronavirüs-2 enfeksiyonu ile gebelik birlikteliğinin klinik sonuçlarının incelenmesi amaçlandı.

Gereç ve Yöntem: Çalışma retrospektif gözlemsel bir çalışma olarak tasarlandı. Yerel etik kurulun etik onayının ardından ülkemizde genç koronavirüs hastalığı-2019 (COVID-19) olgu sayısının arttığı bir dönemde çalışma yürütüldü. Çalışmaya alınan hastalar üçüncü basamak YBÜ'de takip edilen gebe/lohusa hastalardır.

Bulgular: Çalışmaya alınan 35 gebenin yaş ortalaması 29,57±4,36 idi. Doğumların 21'i (%80,8) erken doğumdu. On iki (%34,3) hastaya invaziv mekanik ventilasyon (IMV) uygulandı ve bu hastaların 5'i (%41,7) kaybedildi. Yirmi altı (%74,3) hastaya sezaryen (C/S) uygulandı. Ekstrakorporeal membran oksijenasyonu ihtiyacı olan 5 (%14,3) hasta ve sürekli renal replasman tedavisi ihtiyacı olan 3 (%8,5) hasta vardı. Yirmi altı doğum için 28 günlük yenidoğan ölüm oranı %3,8'di. YBÜ'de anne ölüm oranı %14,3 oldu.

Sonuç: COVID-19 tanısı ile YBÜ'de izlenen gebe hastalarımızda erken doğum oranı yüksekti. Gebe kadınlarda klinik ve radyolojik progresyon nedeniyle, C/S yaptırmak için maternal sonuçların daha iyi olduğu herhangi bir gebelik haftasını belirtmek zordur. IMV mortalitesi gebe olmayan hastalara göre daha yüksek olmadığı için uygun hastalarda gebelik devam etse de etmese de endotrakeal entübasyondan kaçınılmamalıdır. Çalışma grubunda aşıları tam olan hastaların bulunmaması gebelikte aşılamanın koruyucu etkisini ortaya koymaktadır.

Anahtar Kelimeler: COVID-19, gebelik, SARS-CoV-2, yoğun bakım ünitesi, ekstrakorporeal membran oksijenasyonu

Introduction

Pregnancy is a high-risk group for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Pregnancy and childbirth generally do not increase the risk of contracting SARS-CoV-2 infection but appear to worsen the clinical course of coronavirus disease-2019 (COVID-19) compared to non-pregnant individuals of the same sex and age; however, most (>90%) infected patients recover without giving birth (1-7). On the other hand, there appears to be an increased incidence of preterm delivery and cesarean delivery, possibly due to severe maternal disease in infected women, particularly in severely or critically ill patients who develop pneumonia (3,6). In a meta-analysis, 339 (0.02%) pregnant women with confirmed COVID-19 died from any cause, approximately 4% of pregnant women needed intensive care management due to COVID-19 progression, 3% of them required invasive mechanical ventilation (IMV) support, and extracorporeal membrane oxygenation (ECMO) was applied 0.2% of the patients (1). Admission rates to the intensive care unit (ICU) for the need for IMV support and ECMO appear to be higher in pregnant and recently pregnant women than non-pregnant women of reproductive age with COVID-19. Maternal complication rates are not different from infected nonpregnant patients. These rates are much higher than the average population (8). There are many articles, meta-analyses, and reviews about the course and clinical results of SARS-CoV-2 in pregnancy. However, there is a need for national and international data on pregnant patients followed up in ICU. This study aims to describe the clinical characteristics, laboratory abnormalities, radiological findings, and clinical outcomes of these unique patients followed up in ICUs.

Materials and Methods

Patients

The study included pregnant/puerperal women followed up in the third-level ICU from March to September 2021. The study was approved by the COVID-19 Scientific Research Platform of the Turkish Ministry of Health (no: 2021-10-14T09_07_08; date: 15.10.2021) and also by the Karadeniz Technical University Scientific Research Ethics Committee (protocol no: 2021/344, date: 15.12.2021). The diagnosis of SARS-CoV-2 pneumonia was based on radiological findings and microbiological results obtained by the polymerase chain

reaction (PCR). Only the patients with severe and critical COVID-19 pneumonia were followed up in our ICU. Severe illness is defined as; Clinical signs of pneumonia (fever, cough, dyspnea, fast breathing) and one of the followings: respiratory rate >30 breaths/minute, severe respiratory distress; or $\text{SaO}_2 < 90\%$ on room air, and critical illness; the presence of acute respiratory distress syndrome (ARDS) or respiratory failure requiring ventilation, sepsis or septic shock (9,10). The patients generally required high-flow nasal cannula (HFNC) or IMV/non-invasive mechanical ventilation (NIMV) due to respiratory failure. There were no exclusion criteria in the study. All pregnant women hospitalized in the ICU for >24 hours were included. The patients were followed up until discharge from the ICU or until they died.

Data Collection

Patient data were obtained from intensive care bedside follow-up charts and electronic records. Pregnancy, delivery, and neonatal data were obtained from electronic medical records and phone calls from patients/patient relatives.

Demographic data of patients, comorbidities, initial laboratory data, ICU scores [acute physiology and chronic health evaluation (APACHE-II), sequential organ failure assessment (SOFA)], radiological evaluations, type of respiratory support at admission and during follow-up, medical treatments for COVID-19, arterial blood gas analyses at admission and $\text{PaO}_2/\text{FiO}_2$ values, MV settings, whether they receive ECMO, continuous renal replacement therapy (CRRT), coupled plasma filtration adsorption (CPFA) treatments, complications related to the disease and pregnancy were recorded.

The venovenous ECMO (VV-ECMO) was applied according to the recommendation of The Extracorporeal Life Support Organization COVID-19 consensus, and the lung protective ventilation strategy was applied in all patients (11). Regarding the pregnancy; the gestational week at the time of diagnosis of COVID-19, the week of birth, the type of delivery [cesarean section (C/S), spontaneous vaginal. etc.], the form of termination of pregnancy (live birth, induced abortion, spontaneous abortion), whether there is postpartum disease progression, the indication of C/S secondary bacterial/fungal infections of the patients were recorded. Pregnant and postpartum women were evaluated at the bedside with daily obstetrics consultations. The duration of intensive care stays, if any mechanical ventilation periods, and patient outcomes were recorded.

Statistical Analysis

Categorical variables are presented as numbers (proportions). Continuous variables are expressed as mean \pm standard deviation or as median [interquartile range (IQR)] and median (minimum-maximum) according to the importance of style and the distributions examined by the Kolmogorov-Smirnov test. All data were analyzed using IBM SPSS V23 (IBM, Chicago, IL, USA). The start of timings in the timeline figure and onset day was determined as a PCR-positive day with an IQR of 25-75. The Sankey diagram was created in Jamovi V2.2.4.

Results

The mean age of 35 pregnant women included in the study was 29.57 ± 4.36 years. The vast majority of pregnant women's (57.1%) blood group was A Rh (+). Only 1 (2.9%) pregnant woman had a history of smoking. The median SOFA score and APACHE-II score of the patients at admission to the ICU were 3 (IQR: 2-8) and 10 (IQR: 9-20), respectively. 82.9% of the patients had no history of comorbidity. None of the 35 patients were fully vaccinated, but only one was infected with COVID-19 for the second time. Bilateral infiltration was detected in chest radiography in 91.4% of the patients on anteroposterior radiographs. Laboratory values and other characteristic values are shown in Table 1.

Six (17.1%) patients were admitted to ICU with IMV support, and in all follow-up periods, 12 (34.3%) patients received IMV support. Twenty one (60%) of the patients received HFNC treatment, and 8 (22.9%) of them were provided with NIMV. The values of the first day of IMV in intubated patients are shown in Table 2. Low dose and pulse dose methylprednisolone were given to 8 (22.9%) and 24 (68.6%) patients. Lopinavir/ritonavir was given to 22 (62.9%) patients; tocilizumab was given to 6 (17.1%) and postpartum patients. Antibiotic treatment was given to 23 patients (62.9%). Antibiotic use was most common in respiratory and urinary tract infections in 11 (31.4%) patients. C/S was applied to 26 (74.3%) patients. There were 5 (14.3%) patients who needed VV-ECMO and 3 (8.5%) patients who needed CRRT. While CPFA was applied to 1 patient, cytokine adsorption was applied to 2 patients (Table 2). The most common complication developed in the patients was pneumothorax/pneumomediastinum, with 11 (31.4%) patients. When the patients were diagnosed with COVID-19, the median gestational week was 31 (IQR: 18-38). The

Table 1. Demographic, clinic and laboratory characteristics of the pregnant patients admitted to intensive care unit due to COVID-19*

Characteristics	
Age, mean \pm SD-year	29.57 \pm 4.36
A rh+ blood type-no. (%)	20 (57.1)
O rh+ blood type-no. (%)	7 (20.0)
Smoking-no. (%)	1 (2.9)
Score points (IQR)	
SOFA score	3 (2-8)
APACHE-II score	10 (9-20)
Comorbidity-no. (%)	
None	29 (82.9)
Gestational diabetes mellitus	2 (5.7)
Preeclampsia	1 (2.9)
Asthma	1 (2.9)
Hypo/hyper thyroidism	2 (5.7)
Vaccine or infection-no. (%)	
None	34 (97.1)
One dose	1 (2.9)
Second time infection	1 (2.9)
Infiltration on X-ray-no. (%)	
Unilateral	3 (8.6)
Bilateral	32 (91.4)
Laboratory values on admission (IQR) [†]	
C-reactive protein-mg/L	90.3 (45.6-123.8)
Procalcitonin- μ g/L	0.11 (0.07-0.26)
White blood cell- 10^3 cells/mm ³	13.1 (9.25-17.08)
Lymphocyte ratio-%	6 (3.7-8.6)
Lymphocyte- 10^3 cells/mm ³	0.74 (0.52-1.08)
Platelet- 10^3 cells/mm ³	233 (179-286)
Haemoglobin-g/dL	10.9 (9.7-11.7)
Creatinine-mg/dL	0.43 (0.35-0.5)
Blood urea nitrogen level-mg/dL	8 (6-12)
D-dimer-mg/L	1.2 (0.92-1.8)
Fibrinogen-mg/dL	472 (387-567)
Ferritin- μ g/L	85.3 (28.9-140.5)
Complications-no. (%)	
Haemothorax	2 (5.7)
Pneumothorax/pneumomediastinum	11 (31.4)
Heart failure	2 (5.7)
AKI	4 (11.4)
Secondary infection [‡]	18 (51.4)
Respiratory tract	11 (31.4)
Urinary tract	11 (31.4)
CRBSI	6 (17.1)
Wound side	1 (2.9)

*Percentages may not total 100 because of rounding. [†]Procalcitonin level was missing for 1 patient, [‡]Some patients had more than one infection source
 IQR: Interquartile range, SOFA: sequential organ failure assessment, APACHE-II: acute physiology and chronic health evaluation-II, AKI: acute kidney injury, CRBSI: catheter related bloodstream infection, IMV: invasive mechanical ventilation, ICU: intensive care unit, ECMO: extracorporeal membrane oxygenation, COVID-19: coronavirus disease-2019

distribution of the patients by weeks of gestation is shown in Table 3. The median week of birth was determined as 34 (IQR: 26-38) weeks. Twenty one (80.8%) of them were preterm births. All 26 deliveries were with C/S. The proportions of all patients who underwent C/S are shown in the Sankey diagram (Figure 1). Among all C/Ss, the rates of C/S due to fetal distress and increased maternal respiratory

distress were 53.8% and 80.8%, respectively. Of the 35 patients admitted to the ICU, 9 (25.7%) were discharged from ICU with ongoing pregnancy. The 28-day neonatal mortality rate for 26 deliveries was 3.8% (Table 3).

Table 2. Treatment of the pregnant patients admitted to intensive care unit due to COVID-19*

Treatments	
Oxygen supports-no. (%)	
IMV at admission	6 (17.1)
IMV	12 (34.3)
HFNC	21 (60)
NIV	8 (22.9%)
Mechanical ventilation parameters on first day (IQR)	
FiO ₂	100 (72.5-100)
PEEP-mmHg	13 (10.25-15)
Tidal volume	445 (347-480)
Respiratory rate-breath/min	23 (17-26)
Plateau pressure-mmHg	26.5 (20.75-31)
Peak pressure-mmHg	34.5 (29.5-40.25)
Medical-no. (%)[†]	
Low dose steroid	8 (22.9%)
Pulse steroid	24 (68.6)
Vasopressor	9 (25.7)
Tocilizumab	6 (17.1)
Lopinavir/ritonavir	22 (62.9)
Antibiotic	23 (62.9)
Prone position	4 (11.4)
Invasive/extracorporeal-no. (%)	
Cesarean section	26 (74.3)
Tube thoracostomy	8 (22.9)
Thoracotomy	2 (5.7)
CRRT	3 (8.5)
CPFA	1 (2.8)
Cytokine adsorption	2 (5.7)
ECMO	5 (14.3)

*Percentages may not total 100 because of rounding. [†]Low dose steroid means 1 mg/kg methylprednisolone/day, pulse steroid 250 mg methylprednisolone/day, IQR: Interquartile range, IMV: invasive mechanical ventilation, HFNC: high flow nasal cannula, NIV: non-invasive ventilation, FiO₂: fraction of inspired oxygen, PO₂: partial pressure of oxygen, pCO₂: partial pressure of carbon dioxide, sO₂: arterial oxygen saturation, CRRT: continuous renal replacement therapy, CPFA: coupled plasma filtration adsorption, ECMO: extracorporeal membrane oxygenation, COVID-19: coronavirus disease-2019

Table 3. Details of pregnancy duration of patients admitted to intensive care unit due to COVID-19*

Diagnoses	
COVID-19 diagnosed, week-(IQR)	31 (18-38)
Diagnosed in 16-24 th week-no. (%)	6 (17.1)
Diagnosed in 25-29 th week-no. (%)	10 (28.6)
Diagnosed in 30-34 th week-no. (%)	10 (28.6)
Diagnosed in >34 th week-no. (%)	9 (25.7)
Birth-no. (%)	26 (74.3)
Week of birth-med (min-max)	34 (26-38)
Preterm births in births-no. (%)	21 (80.8)
C/S in births-no. (%)	26 (100)
C/S in births due to COVID progression-no. (%)	21 (80.8)
Progression after C/S in births-no. (%)	9 (34.6)
Indication of C/S in births-no. (%)[†]	
Fetal distress	14 (53.8)
Increased of maternal respiratory distress	21 (80.8)
Outcome of babies-no. (%)	
Discharge with an ongoing pregnancy	9 (25.7)
28 days of mortality in births	1 (3.8)

*Percentages may not total 100 because of rounding. [†]Some C/S had both indications. IQR: Interquartile range, med: median, min: minimum, max: maximum, C/S: cesarean section, COVID-19: coronavirus disease-2019

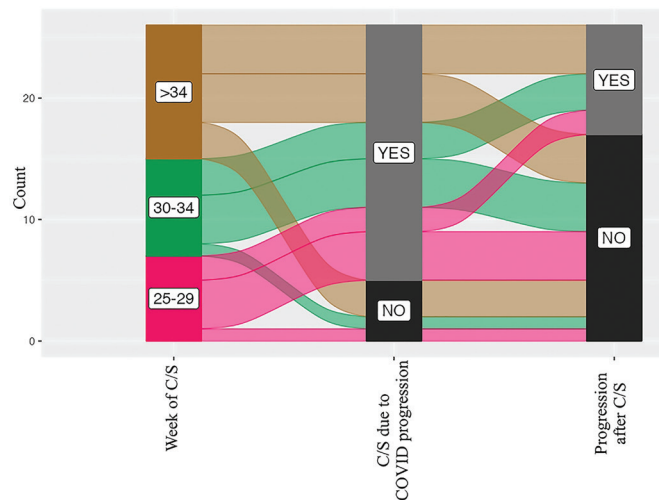


Figure 1. Ratio of C/S due to COVID progression*

*Percentages may not total 100 because of rounding. Count denotes number of cases
C/S: Cesarean section, COVID: coronavirus disease

The timeline of the process from the onset of the disease is given in Figure 2. The median IMV timing of the patients was 11.5 (IQR: 2.75-26) days, and the median ICU stay was 6 (4-11) days. Of the five patients treated with ECMO, 2 (40%) were decannulated from ECMO and discharged from ICU. Thirty (85.7%) of the 35 patients were discharged from the ICU in good health (Table 4).

Discussion

SARS-CoV-2 came into our lives as an unprecedented global health problem and affected different patient groups. One of the most critical patient populations is pregnant women. Until now, the literature data included a pregnant

woman with SARS-CoV-2 requiring intensive care, among all other patients, but merely very few data on homogeneous intensive care data were presented (12-14).

According to existing data, about 13% of pregnant women with COVID-19 have a severe illness, and 4% of these patients need an ICU (1,15-17). The mean age of 35 patients was 29.57±4.36 years, all patients were severe or critically ill, and the mortality rate in ICU was 14.3%. While the mortality rate is 1.2% in pregnant women infected with SARS-CoV-2, mortality can reach up to 90% in intensive care patients on MV (18).

The Centers for Disease Control and Prevention has suggested that pregnancy poses a higher risk for the need for mechanical ventilation or ECMO. Also, these patients' mortality rate appears to be increased (19,20). 34.3% of our patients received IMV support, and 5 (14.3%) needed ECMO. While the mortality rate of the patients in mechanical ventilation was 41.7%, this rate reached 60% in patients who needed ECMO support. Two (40%) of these patients were weaned from ECMO and were discharged from the hospital. While the median ECMO time was 17 days in these patients, two patients who weaned from ECMO could be decannulated on the 10th and 17th days. For patients requiring IMV or ECMO, it is increasingly approved that recovery and extubation (and/or decannulation) is often a lengthy process (21). As a result of a study of pregnant women admitted to ICUs across the United States and 64 non-pregnant women with COVID-19, the frequency and severity of the acute respiratory failure, assessed by receipt of IMV, were similar between groups. Unlike prior viral pandemics (22-25), maternal outcomes among critically ill pregnant women with COVID-19 in this cohort were excellent, with no reported deaths (12).

In contrast to this study, a case series published in Iran reported a very high mortality rate (77.8%) in 9 critically ill pregnant women with COVID-19 (25). Again, as a result of a study including pregnant/puerperal critically ill patients with COVID-19, 8 (42%) were intubated. All patients that were in IMV deceased (13). When we compare our results with the literature, the results are satisfactory in terms of both pregnant/puerperal woman mortality in IMV and overall mortality.

Vaccination is the most important prognostic determinant of disease progression during pregnancy. 82.9% of our ICU patients do not have comorbidities, and 97.1% have never been vaccinated. These data reveal a theatrical public health

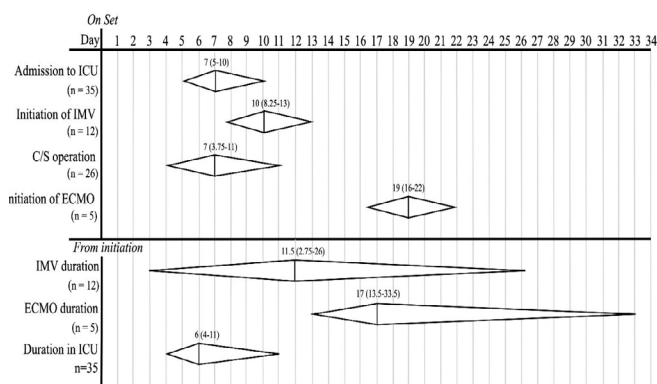


Figure 2. Timeline period of patients admitted to intensive care unit*
 *On set day was determined as COVID-19 PCR positive day. Prism show median (IQR 25-75).
 ICU: Donates intensive care unit, IMV: invasive mechanical ventilation, C/S: cesarean section, ECMO: extracorporeal membrane oxygenation, COVID-19: coronavirus disease-2019, PCR: polymerase chain reaction, IQR: interquartile range

Table 4. Outcomes of the patients admitted to intensive care unit due to COVID-19*	
Duration of IMV, IQR-days	11.5 (2.75-26)
Mortality in IMV-no. (%)	5 (41.7)
Duration of ECMO treatment, IQR-days	17 (13.5-33.5)
Duration of ICU stay, IQR-days	6 (4-11)
Wean from ECMO-no. (%)	2.40
Mortality under ECMO-no. (%)	3.60
Discharge from ICU-no. (%)	30 (85.7)
Mortality in lopinavir/ritonavir givens-no. (%)	3 (13.6)
Mortality in tocilizumab givens-no. (%)	2 (33.3)
Mortality-no. (%)	5 (14.3)
*Percentages may not total 100 because of rounding. IQR: Interquartile range, IMV: invasive mechanical ventilation, ICU: intensive care unit, ECMO: extracorporeal membrane oxygenation, COVID-19: coronavirus disease-2019	

problem. The physicians' recommendations in the follow-up of pregnant women and the press organizations strongly warn especially the pregnant woman about promoting vaccination (26-28).

A complex medical decision-making process is involved in the intensive care management of pregnant women. The decision-making process begins with the informed consent of the patient and their relatives, in line with medical indications and possibilities. While deciding on the birth, many conditions, including preterm birth risks for the fetus, improvement/worsening of the respiratory condition of the mother with delivery, and hemodynamic, inflammatory, and surgical burden, are known to accompany significant surgeries such as C/S, should be evaluated together.

The critically-ill pregnant population has found an 88% rate of preterm delivery, with 94% of these occurring by cesarean delivery (20,29). Similarly, preterm birth was observed in 21 (80.8%) of our patients. The median delivery time of our patients was 34 (IQR: 26-38) weeks of gestation. While the patients were transferred to the ICU on the median 7th day after the diagnosis, they also underwent C/S on the median 7th day and needed IMV support on the median 10th day. Similarly, a study determined the timing of intubation as the ninth day in this patient group (30). Patients who need a high level of oxygen support should be followed up carefully in appropriate centers, especially between 7-10 days from symptom onset or diagnosis.

The top priority question to be answered by a pregnant COVID-19 woman is the timing of delivery. Guidelines on this topic are primarily derived from clinical experience, not clinical trials, and are an area currently supported by very little evidence (31,32). According to the guidelines, an obstetrical ultrasound was performed to confirm fetal viability and gestational age for each patient admitted to ICU after initiating standard medications (antiviral, systemic steroid, and anticoagulant treatments). Afterward, the potential delivery decision is made according to the gestational week, repetitive respiratory evaluations of the mother, and daily fetal evaluations. If delivery is considered based on severe hypoxemia, and especially if the gestational age is less than 32 weeks, other options should be discussed first, including prone position, ECMO, and other advanced ventilator modalities (33). Antenatal corticosteroids and magnesium sulfate for neuroprotection should be given to any pregnant woman with a potentially viable fetus before any preterm delivery (34).

If gestational age is <23+0/7 to 24+0/7 weeks (pre-viable): Delivery is indicated only in the case of maternal cardiopulmonary arrest (resuscitative cesarean delivery) with a gestational age of ≥ 20 weeks.

If gestational age is between 23+0/7 to 24+0/7 and 31+6/7 weeks: Despite optimization of all treatments in the unreliable fetal condition in the setting of refractory hypoxemia, an antenatal corticosteroid is administered.

If the gestational age is between 32+0/7 and 33+6/7 weeks: In daily fetal and maternal evaluations: if it is necessary to increase PEEP or FiO_2 to maintain mothers' arterial blood gas at $PaO_2 > 70$ mmHg or $SaO_2 > 95\%$ level, delivery should be considered in two situations; 1) In case of non-reassuring fetal status, without waiting for corticosteroid administration, 2) In case of mechanical ventilation requiring PEEP > 10 cmH₂O or ECMO requirement (especially if an antenatal corticosteroid course has been completed).

If gestational age is $\geq 34+0/7$ weeks: An antenatal corticosteroid course can be applied, but it should not delay preterm delivery. In case of any permanent deterioration in maternal respiratory status, delivery is considered.

This decision protocol for birth is primarily based on limited available data and personal experience. The primary purpose is to provide an initial plan for institutions (32-34). Considering our results, the main reason in 21 (80.8%) patients who underwent C/S was deterioration in maternal respiratory parameters due to COVID-19 progression. While the clinical condition after C/S improved in most of our patients, the clinical picture after C/S deteriorated in 9 (34.6%) patients, and all patients who died were in this group.

Relieving pressure (from the pressure because of the gravid uterus during pregnancy) may be beneficial for lung mechanics, a potential concern for immune restoration in the early post-partum period (35,36). One of our patients was transferred to the operating room with IMV and ECMO for emergent C/S, and live birth occurred. However, the mother died under ECMO due to refractory septic shock on the 32 days of follow-up. Two out of 5 patients admitted to VV-ECMO were successfully decannulated and discharged. Not only can ECMO be life-saving in this patient group, but it also requires experience in applying ECMO and complication management. Beforehand, rescue maneuvers such as lung protective mechanical ventilation and prone position should be tried in all patients (11). Since mortality is known to be high in intubated patients with COVID-19 ARDS, there is

generally a tendency to avoid intubation. Our study's IMV mortality was 41.7%, which was not higher than the non-pregnant patient population. However, delaying intubation in hypoxemic pregnant women may cause fatal consequences for both the mother and fetus. During pregnancy, the chest wall and lung compliance decrease by approximately 30%, and the functional residual capacity decreases. Because of reduced chest wall compliance caused by the gravid uterus, increased plateau airway pressures may be noted. In these patients, higher PEEP is recommended in mechanical ventilation with a plateau pressure of <35 cmH₂O to prevent atelectasis and hypoxemia from developing due to compression by the gravid uterus. "Permissive hypercapnia," applied in ARDS mechanical ventilation management, should be avoided in these patients as it may cause fetal acidosis. Other approaches should be implemented in the standard ARDS protocol (37,38).

In this precious and unique patient group, the number of studies that compile only the results of intensive care patients is very few, so this study makes a significant contribution to the existing data. In other respects, the limitations of our study are; the lack of long-term follow-up data, the insufficiency to compare the data with the non-pregnant population, and the lack of obtaining SARS-CoV-2 test results of newborns.

Conclusion

As a result, 35 critically and severely ill pregnant ICU patients diagnosed with COVID-19 were screened in this study. The rate of preterm birth with cesarean delivery was found to be increased. Due to clinical and radiological progression in pregnant women, it is difficult to indicate any gestational week in which maternal outcomes are better to undergo C/S. However, pregnancy termination improves the

mother's respiratory parameters by eliminating the problems caused by the uterus during pregnancy and increasing respiratory functions. There is no clear evidence that C/S delivery in the pre-viable period improves the patient's clinical condition. IMV mortality in pregnant SARS-CoV-2 patients is not higher than in non-pregnant patients, so whether or not the pregnancy continues, intubation should not be avoided in appropriate patients to avoid maternal hypoxia. However, mechanical ventilation is not an indication of delivery on its own. The absence of vaccinated and comorbid patients in our study group reveals the potential protective effect of the vaccine in this patient group. Such studies can provide valuable guidance to physicians following pregnant women with severe COVID-19.

Ethics

Ethics Committee Approval: The study was approved by the COVID-19 Scientific Research Platform of the Turkish Ministry of Health (no: 2021-10-14T09_07_08; date: 15.10.2021) and also by the Karadeniz Technical University Scientific Research Ethics Committee (protocol no: 2021/344 date: 15.12.2021).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: A.O.K., M.P.K., O.A., Ö.D., F.Ö., Y.B., T.Ö., Design: A.O.K., M.P.K., Data Collection and Process: A.O.K., M.P.K., A.P., O.A., Ö.D., Analysis or Interpretation: A.O.K., M.P.K., F.Ö., Literature Search: A.P., Ö.D., Writing: A.O.K., M.P.K., A.P., O.A., Ö.D., F.Ö., Y.B.

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Evaluation of the Relationship Between the Levels of Hope and Anxiety in Family Caregivers of Patients in Intensive Care Units

Yoğun Bakımda Yatan Hastaların Aile Üyelerinin Umud ve Kaygı Düzeyi Arasındaki İlişkinin Değerlendirilmesi

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ABSTRACT Objective: Management of the intensive care process by family caregivers and high levels of hope may have positive effects on the recovery process of the intensive care unit (ICU) patients. This study analyzes the relationship between the levels of hope and anxiety in family caregivers of patients in ICUs.

Materials and Methods: Family caregivers of the patients, who were hospitalized at seven adult ICUs in city Istanbul, constituted the universe of the study. A sample of the study comprised 99 voluntary family caregivers. Descriptive and sociodemographic Information form, the Dispositional Hope scale, and State-Trait Anxiety scale were used for data collection. One-Way analysis of variance, independent sample t-test, and Pearson's correlation was used for data analysis.

Results: In the study, the hope levels of the participants were found to be "high" and their anxiety levels were found to be "moderate." Patients' age, and the family caregivers' marital status, and levels of education and income did not affect the levels of hope and anxiety. However, age, the changes in family relations and life at home, and being sufficiently informed about the patient's condition influenced the levels of anxiety and hope in family caregivers.

Conclusion: There was a negative relationship between the levels of hope and anxiety in family caregivers of the adult ICU patients.

Keywords: Anxiety, family caregivers, hope, intensive care unit, nursing

ÖZ Amaç: Yoğun bakım sürecinin aile üyeleri tarafından yönetilmesi ve umudun yüksek olması, yoğun bakım ünitesi (YBÜ) hastalarının iyileşme sürecine olumlu etki edebilir. Bu araştırma, YBÜ'de yatan hastaların aile üyelerinin umut ve kaygı düzeyi arasındaki ilişkiyi incelemek amacıyla yapılmıştır. **Gereç ve Yöntem:** Araştırmanın evrenini yedi farklı YBÜ'de tedavi gören hastaların aile üyeleri oluşturmuştur. Araştırmanın örneklemini ise araştırmaya katılmaya gönüllü olan 99 kişiden oluşmaktadır. Araştırmanın verileri tanımlayıcı bilgiler formu, Sürekli Umud ölçeği, Durumluk ve Sürekli Kaygı ölçeği kullanılarak toplanmıştır. Araştırma verilerinin analizinde, tek yönlü varyans analizi, bağımsız örneklemelerde t-testi, Pearson korelasyon analizi kullanılmıştır.

Bulgular: Araştırmada katılımcıların umut düzeyleri "yüksek", kaygı düzeyleri ise "orta" düzeyde bulunmuştur. Hastanın yaşının ve aile üyelerinin medeni durumunun, eğitim, gelir düzeyinin umut ve kaygı düzeylerini etkilemediği saptanmıştır. Aile üyelerinin yaşının, evlerinde ve aile ilişkilerinde değişiklik yaşanmasının, yeterli bilgilendirilme durumunun ise umut ve kaygı düzeyinde farklı şekillerde değişikliğe sebep olduğu belirlenmiştir.

Sonuç: Araştırmada yoğun bakımda yatan hastaların aile üyelerinin umut düzeyi yükseldikçe, kaygı düzeyinin azaldığı tespit edilmiştir.

Anahtar Kelimeler: Kaygı, hasta yakını, umut, yoğun bakım ünitesi, hemşirelik

Introduction

Intensive care units (ICUs) are closed environments with special and technologically complex equipment, where patients with serious health problems receive treatment and care (1). While critical patients in ICUs are experiencing a crisis, their families have experiencing an emotional crisis with them. The patients needs the support of their family to overcome the crisis they has experienced. Although ICUs seem to be a patient-oriented approach, the family should also be addressed in this process in line with a holistic approach. In this crisis period, the family also has needs that must be met (2-4). The processes of treatment and care in the ICUs influence both the patients and their relatives and friends. caregivers as a part of patient care is a fundamental element of holistic care. Hospitalization of a individuals, inability to take part in care, restrictions on patient visit and care, complex equipment in the ICUs, lack of information, fear of losing the patient, the change in roles and financial concerns result with stress and anxiety in family members (5,6).

Consequently, family caregivers may suffer from physical, economic and psychosocial problems, which, in turn, may cause despair. However, personal traits may influence this outcome. While some of the caregivers can manage the process of caregiving to a family member, others may be negatively influenced by the process. Personal traits may influence the feelings, behaviors, motivations, determination, success, coping skills, self-esteem, social support and expectations of the caregivers (7). Management of the process by family caregivers and high levels of hope may have positive effects on the recovery process of the ICU patients.

Different studies is emphasized the positive impacts of identifying the needs of the family members, meeting these needs, raising hope and giving emotional support on patient recovery (6,8,9). it is reported that understanding the needs of the family members of who have patients in the ICU will contribute to effective communication with health care professionals, reduce the stress levels of patients' relatives, improve the quality of care, have positive effects on patient (10). Family caregivers demand the healthcare professionals to provide a proper care for their patients. Effective communication with the family caregivers and informing the latter about the medical conditions of the patients are the primary demands (11). In a qualitative study,

the family members of the patients who are hospitalized in the ICU define their thoughts and feelings about the process as a state between uncertainty, hope and hopelessness, and a sad process involving complex emotions. Relatives of the patients stated that they had difficulties in the economic and hospital processes and that their needs had changed. They also mentioned their psychosocial support needs (12).

In Turkey, various patient-centered studies have been conducted on the level of hope, but most of these studies dealt with the dimension of hopelessness (13-15). However, existing studies have not dealt with the levels of anxiety and hope in family members of the ICU patients. In order to fill this gap, this study aimed to determine the relationship between the levels of hope and anxiety in family members of the ICU patients.

Materials and Methods

This descriptive study was done between 4-14 November 2020 in seven adult ICUs. Family caregivers of 227 patients, who received treatment in the adult ICUs during the period constituted the universe. Sample of the study comprised 99 family caregivers, who agreed to participate. Voluntary, family caregivers of literate, above the age of 18 years, whose patients were hospitalized in the adult ICU for at least four days were included to the study.

Research Questions

Research questions included the followings:

1. What is the level of anxiety in family caregivers of the ICU patients?
2. What is the level of hope in family caregivers of the ICU patients?
3. Is there a relationship between the levels of hope and anxiety in family caregivers of the ICU patients?

Measurements

Descriptive and sociodemographic information form, Dispositional Hope scale (DHS), and State-Trait Anxiety scale (STAI) were used for data collection. Descriptive and sociodemographic information form was prepared by the researchers in line with the literature and included 19 questions on sociodemographic characteristics, such as gender, marital and working status, as well as the experiences of the family givers that may influence their levels of hope and anxiety (13,16,17).

The DHS was developed by Snyder et al. (18) and adapted into Turkish by Tarhan and Bacanlı (19). The scale was composed of four negative statements acting as filters and 8 items in two subscales, namely, alternative ways thinking (items 1, 4, 6, and 8) and actuating thinking (Items 2, 9, 10 and 12). Items were scored on a 4-point Likert scale, ranging from definitely false to definitely true. Possible scores ranged between 8 and 64, with higher scores indicating higher level of hope (19). Cronbach's alpha in the Turkish version of the DHS and our study were 0.83 and 0.64, respectively.

The STAI was a 40-item self-report scale, translated into Turkish by Öner and Le Compte (20) to measure separate dimensions of state and trait anxiety. State anxiety referred to anxiety experienced in a particular situation and was measured by the 20-item STAI-S subscale. On the other hand, the trait anxiety was a permanent personality trait and a stable tendency to experience anxiety across many situations, which was measured by the 20-item STAI-T subscale. Some of the items in the STAI-S (Items 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20) and the STAI-T (Items 21, 26, 27, 30, 33, 36 and 39) were reverse-coded. Possible scores to be obtained from the STAI ranged between 20 and 80, with lower scores indicating lower levels of anxiety (21). Cronbach's alphas of the STAI-T and the STAI-S in the Turkish version of the scale were 0.83 and 0.94, respectively. In our study, the Cronbach's alphas were 0.81 and 0.89, respectively.

Data Collection and Evaluation

Data were collected at the hospital in November 2020. Due to the pandemic process, there was a delay in the start time and official permission process. Participants were informed about the aim of the study before data collection. Data was collected face-to-face at the hospital during visiting hours. While collecting data, attention was paid to the use of social distance and masks due to the pandemic.

Statistical Analysis

Data was analyzed by using SPSS 21.0 statistical software. Number, percentage, mean and standard deviation were used for descriptive statistics. Since data met normal distribution, independent sample t-test and One-Way analysis of variance (ANOVA) and Pearson's correlation analysis were used for statistical analysis. Since the number of items in the scales varied, mean scores were used in Pearson's correlation analysis. Statistical significance was set at $p < 0.05$.

Ethics Committee Approval: This study was approved by the Acibadem University Clinical Research Ethics Committee of the university (decision no: 2019-17/35, date: 07.11.2019). Permission to use the scales were obtained via e-mail. When the visit ban was lifted in hospitals, data were collected face-to-face when family caregivers came to visit.

Informed Consent: Participants were informed about the aim of the study and written and verbal informed consent were obtained.

Results

The data of the study were analyzed under four headings. These are experiences during the patients' ICU stay and sociodemographic characteristics, levels of hope and anxiety according to sociodemographic characteristics and the experiences of family caregivers, relationship between the levels of anxiety and hope in family caregivers.

Experiences During the Patients' ICU Stay and Sociodemographic Characteristics

Table 1 presented of the experiences of the family caregivers during the patients' ICU stay and sociodemographic characteristics. Accordingly, 52.5% of the family caregivers were female, 57.6% were above the age of 30 years and 72.7% of the patients were above the age of 50 years. Besides, 63.6% of the participants were married, 76.8% were graduates of high school or above, 33.3% were parents of the patients and 82.8% did not have any illness. Finally, 73.7% of the participants were working and 57.6% had an income equal to expenses. Table 2 presented the mean scores obtained from the DHS and STAI. Family caregivers experienced a number of changes during the patients' ICU stay. Accordingly, 30.3% experienced changes in professional life, 34.3% had financial problems, 55.6% had changes in life at home and 46.5% experienced changes in family relations during the patients' ICU stay. Besides, 59.6% could communicate with the patient but 84.8% were not sufficiently informed about patients' conditions.

Levels of hope according to sociodemographic characteristics and the experiences of family caregivers.

There was no statistically significant relationship between the DHS scores and the sociodemographic characteristics of age, gender, marital and professional status, education level, and the age of the patients. Besides, there was no significant relationship between the DHS scores and the

Table 1. Experiences during the patients' adult intensive care units stay and sociodemographic characteristics (n=99)

Sociodemographic variables		n (%)
Mean age of participants	36.01±11.71 years	
Mean age of patients	59.08±18.65 years	
Gender	Female	52 (52.5)
	Male	47 (47.5)
Marital status	Married	63 (63.6)
	Single	36 (36.4)
Level of education	Primary school and below	23 (23.2)
	High school and above	76 (76.8)
Relationship with the patient	Spouse	11 (11.1)
	Child	7 (7.1)
	Parent	33 (33.3)
	Other	48 (48.5)
Illnesses	No	82 (82.8)
	Yes	17 (17.2)
Working status	Does not work	26 (26.3)
	Working	73 (73.7)
Income status	Less than expenses	23 (23.2)
	Equal to expenses	57 (57.6)
	More than expenses	19 (19.2)
Change in professional life	No	69 (69.7)
	Yes	30 (30.3)
Have you experience financial problems when your relative has been in intensive care?	No	65 (65.7)
	Yes	34 (34.3)
Has there been any change in your home life since your relative has been in intensive care?	No	44 (44.4)
	Yes	55 (55.6)
Have your family relations changed after your relative is admitted to the intensive care unit?	No	53 (53.5)
	Yes	46 (46.5)
Can you communicate with the patient?	No	40 (40.4)
	Yes	59 (59.6)
Were you being sufficiently informed about your patient's condition	No	15 (15.2)
	Yes	84 (84.8)

experiences of financial problems, communication with the patient and the changes in professional life, family relations and life at home. Finally, there was a significant relationship between being sufficiently informed and the scores obtained from the actuating thinking subscale of the DHS ($t=-1.800, p=0.043$) (Table 3). Participants, who believed that they were not sufficiently informed about patient's conditions obtained significantly lower scores from the actuating thinking subscale.

Levels of anxiety according to sociodemographic characteristics and the experiences of family caregivers.

We found a statistically significant relationship between the age of the family caregivers and the scores obtained from the STAI-S ($t=-2.050, p=0.04$). The level of state anxiety for the participants above the age of 30 years was significantly higher than those at 30 years of age or below. Besides, there was a statistically significant relationship between gender and the STAI-T scores ($t=2.081, p=0.04$). Trait anxiety was significantly higher in female participants.

We also found a statistically significant relationship between the STAI-S scores, financial problems and the change in life at home ($t=-3.509, p=0.00$). State anxiety was significantly higher for the participants, who experienced financial problems and change in life at home during the patient's ICU stay. Besides, there was also a statistically significant relationship between the STAI-S scores and experiencing change in family relations ($t=-2.924, p=0.00$). Finally, communication with the patient was statistically significantly related with STAI-S scores ($t=-1.837, p=0.042$). State anxiety was significantly higher for the family caregivers that could communicate with the patient during the ICU stay (Table 4).

Table 2. Mean scores obtained from the dispositional hope scale and the state-trait anxiety scale (n=99)	
	Mean ± SD
DHS	
Alternative ways thinking	6.18±1.34
Actuating thinking	6.27±1.06
DHS total	6.22±1.10
STAI	
STAI-S	2.26±0.50
STAI-T	2.14±0.38
SD: Standard deviation, DHS: Dispositional Hope scale, STAI: State-Trait Anxiety scale	

Table 3. Distribution of the dispositional hope scale scores according to sociodemographic variables and experiences (n=99)

Variables	DHS											
	Alternative ways thinking				Actuating thinking				DHS total			
	n	Mean ± SD	t	p	n	Mean ± SD	t	p	n	Mean ± SD	t	p
Participants' age												
18-30 years	42	6.37±1.22	1.179	0.24	42	6.45±0.84	1.466	0.15	42	6.41±0.95	1.431	0.16
Above 30 years	57	6.05±1.42			57	6.13±1.19			57	6.09±1.19		
Patients' age												
18-50 years	27	6.34±1.09	0.691	0.49	27	6.45±0.93	1.048	0.30	27	6.39±0.91	0.929	0.36
Above 50 years	72	6.13±1.43			72	6.20±1.11			72	6.16±1.16		
Gender												
Female	52	6.18±1.26	-0.052	0.96	52	6.24±0.87	-0.291	0.77	52	6.21±0.97	-0.172	0.86
Male	47	6.19±1.44			47	6.30±1.25			47	6.25±1.24		
Marital status												
Married	63	6.25±1.25	0.668	0.51	63	6.22±1.01	-0.590	0.56	63	6.24±1.02	0.122	0.90
Single	36	6.06±1.49			36	6.35±1.16			36	6.21±1.24		
Education level												
Primary school and below	23	5.96±1.49	-0.946	0.35	23	5.97±1.36	-1.564	0.12	23	5.96±1.31	-1.334	0.19
High school and above	76	6.26±1.30			76	6.36±0.95			76	6.31±1.03		
Working status												
Does not work	26	5.89±1.44	-1.306	0.20	26	6.02±1.17	-1.348	0.18	26	5.96±1.23	-1.452	0.15
Working	73	6.29±1.30			73	6.35±1.01			73	6.32±1.04		
Experiences of family caregivers												
No change in professional life	69	6.05±1.35	-1.565	0.12	69	6.23±0.90	-0.437	0.66	69	6.14±1.02	-1.163	0.25
Changes occurred in professional life	30	6.50±1.29			30	6.34±1.39			30	6.42±1.25		
Did not experience financial problems	65	6.33±1.26	1.452	0.15	65	6.38±0.93	1.534	0.13	65	6.35±0.99	1.632	0.11
Experienced financial problems	34	5.91±1.47			34	6.04±1.26			34	5.98±1.26		
No change in life at home	44	6.02±1.38	-1.103	0.27	44	6.03±1.25	-1.948	0.054	44	6.03±1.22	-1.615	0.11
Changes occurred in life at home	55	6.32±1.31			55	6.45±0.86			55	6.38±0.97		
No change in family relations	53	6.12±1.49	-0.490	0.63	53	6.19±1.25	-0.767	0.44	53	6.16±1.27	-0.670	0.50
Changes occurred in family relations	46	6.26±1.17			46	6.35±0.80			46	6.30±0.87		
Could not communicate with the patient	40	6.16±1.39	-0.125	0.90	40	6.41±0.89	1.142	0.26	40	6.29±1.06	0.473	0.64
Could communicate with the patient	59	6.20±1.32			59	6.16±1.16			59	6.18±1.13		
Family caregivers were not sufficiently informed about patient's condition	15	6.08±1.23	-0.330	0.74	15	5.92±0.57	-1.800	0.043*	15	6.07±1.02	-0.588	0.56
Family caregivers were sufficiently informed about patient's condition	84	6.20±1.37			84	6.45±0.62			84	6.25±1.12		

DHS: Dispositional Hope scale, SD: standard deviation

Table 4. Distribution of the state-trait anxiety scale scores according to sociodemographic variables and experiences (n=99)

Variables	STAI							
	STAI-S				STAI-T			
	n	Mean ± SD	t	p	n	Mean ± SD	t	p
Participants' age								
18-30 years	42	2.15±0.52	-2.050	0.04*	42	2.06±0.40	-1.800	0.08
Above 30 years	57	2.35±0.47			57	2.20±0.36		
Patients' age								
18-50 years	27	2.27±0.58	0.116	0.91	27	2.07±0.45	-1.108	0.27
Above 50 years	72	2.26±0.47			72	2.16±0.36		
Gender								
Female	52	2.31±0.48	0.945	0.35	52	2.21±0.35	2.081	0.04*
Male	47	2.21±0.53			47	2.05±0.40		
Marital status								
Married	63	2.29±0.51	0.688	0.49	63	2.17±0.38	1.073	0.29
Single	36	2.22±0.49			36	2.08±0.39		
Education level								
Primary school and below	23	2.38±0.48	1.152	0.25	23	2.24±0.37	1.345	0.18
High school and above	76	2.24±0.51			76	2.11±0.39		
Working status								
Does not work	26	2.26±0.52	-0.025	0.98	26	2.18±0.41	0.692	0.49
Working	73	2.27±0.50			73	2.12±0.38		
Experiences of family caregivers								
No change in professional life	69	2.20±0.50	-1.983	0.05	69	2.13±0.39	-0.214	0.83
Changes occurred in professional life	30	2.42±0.49			30	2.15±0.38		
Did not experience financial problems	65	2.14±0.46	-3.509	0.00*	65	2.09±0.39	-1.905	0.06
Experienced financial problems	34	2.50±0.49			34	2.24±0.36		
No change in life at home	44	2.10±0.49	-3.509	0.00*	44	2.05±0.40	-1.905	0.052
Changes occurred in life at home	55	2.40±0.47			55	2.21±0.36		
No change in family relations	53	2.13±0.52	-2.924	0.00*	53	2.08±0.41	-1.574	0.12
Changes occurred in family relations	46	2.42±0.43			46	2.20±0.34		
Could not communicate with the patient	40	2.19±0.49	-1.837	0.042*	40	2.10±0.40	-0.825	0.41
Could communicate with the patient	59	2.45±0.40			59	2.16±0.38		
Family caregivers were not sufficiently informed about patient's condition	15	2.41±0.51	1.218	0.23	15	2.18±0.40	0.491	0.62
Family caregivers were sufficiently informed about patient's condition	84	2.24±0.50			84	2.13±0.38		
*p<0.05 STAI: State-Trait Anxiety scale, SD: standard deviation								

Table 5. The relationship between hope and anxiety* (n=99)

DHS \ STAI	STAI-S	STAI-T
Alternative ways thinking	-0.11	-0.24**
Actuating thinking	-0.04	-0.24**
DHS total	-0.09	-0.31***

*Pearson's correlation coefficient, **p<0.05, ***p<0.01
 DHS: Dispositional Hope scale, STAI: State-Trait Anxiety scale

Relationship Between the Levels of Hope and Anxiety in Family Caregivers

Table 5 presented the correlation between the scores obtained from the DHS and the STAI. Accordingly, there was no statistically significant relationship between the scores obtained from the STAI-S, DHS (r=-0.09, p>0.05) and its subscales of alternative ways thinking (r=-0.11, p>0.05), and actuating thinking (r=-0.04, p>0.05). On the other hand, we found a negative and statistically significant relationship between the scores obtained from the STAI-T, DHS (r=-0.31, p<0.05) and its subscales of alternative ways thinking (r=-0.24, p<0.05) and actuating thinking (r=-0.34, p<0.05). In other words, trait anxiety decreased as the levels of hope increased.

Discussion

This study analyzed the effects of sociodemographic characteristics and experiences of the family caregivers of the ICU patients on the levels of hope and anxiety in the members. Similar to the literature, the majority of the members were female and the mean age of the patients in the ICUs was high (22-24). Mean age of the family caregivers had no significant effect on the levels of hope, but the level of state anxiety elevated as their ages increased. Özyazicioğlu and Tüfekci (14) reported that the levels of hope and state anxiety elevated as the age increased in mothers of babies in the ICUs. As people get older, they experience negative events, including death of relatives and friends, so that their levels of state anxiety may increase over time. In another study on the caregivers of cancer patients, age did not have an effect on the level of hope (13). Although events, such as death, illnesses and experiences in the ICUs are difficult to cope with for everyone, they create more anxiety in the family caregivers of the ICU patients. In our study, the majority of the ICU patients were above the age of 50 years, whereas the family caregivers above the age of 30 years were mostly spouses or the children of the patients.

In our study, trait anxiety had a significant relationship with the gender of the family caregivers. The levels of anxiety among the female family caregivers of the ICU patients were also high in other studies (25). However, another study on the level of hope did not find a significant effect of gender (13). Higher levels of trait anxiety in female participants in our study may be explained with reference to the Turkish culture, which assigns the role and responsibility of patient care to Turkish women. Besides, parallel to the literature, we did not find a significant relationship between education level, marital status and the levels of anxiety and hope (13,15,26,27). In this sense, the family caregivers established a relationship with the patient irrespective of their marital or education status.

In our study, working status and the changes in professional life did not have an effect on the levels of anxiety and hope. This finding may be related with the fact that the caregivers were not permitted to stay with the patients but could only visit them during certain hours so that their professional life remained unaffected. However, financial problems elevated the levels of state anxiety of the participants. The study of Agård and Harder (28) reported that the family caregivers of the ICU patients also experienced financial problems but neglected these problems and focused on their patients.

The changes in family relations and life at home during the patients' ICU stay increased the levels of state anxiety in the family caregivers. Fear of losing loved ones and concerns about the future may cause changes in family relations, which, in turn, may trigger anxiety (29). The roles and responsibilities of the ICU patients have to be performed by other patients during the hospital stay and the family caregivers may be negatively influenced by this role change.

The participants, who could communicate with the patients had higher levels of state trait. This finding may be related with the fact that the participants, who could see the patients, also witnessed their pain and other health problems. Family caregivers demanded to take part in patient care and touch the patients even the patients could not speak with them. A study on the needs of critical care family caregivers also noted that touching was considered as a way of connection to the patient although the patient could not give a respond (30).

Lack of information on patient's condition increased actuating thinking in the participants. Clear, understandable and honest information on patient's condition is the primary

need of the family caregivers of the ICU patients. Providing information in a comprehensible way is reported to decrease the levels of anxiety in family caregivers. Various studies underlined the need for true and complete information about patient's condition to prevent the family caregivers to cherish a false hope. In conclusion, honest information provided by the health professionals may increase the level of hope and decrease the levels of anxiety in family caregivers (31-33).

This study had two main limitations. Firstly, the study was conducted in November 2020, during the coronavirus disease-2019 (COVID-19) pandemic. Changes in the rules for visiting patients during the pandemic and the effects of the pandemic on the participants constituted a limitation. Visitors were restricted in hospitals due to the pandemic. Although permission was obtained from the ethics committee, the study permit was difficult to obtain from the hospital. Secondly, due to the restrictions imposed during the COVID-19 pandemic, data collection was completed in 10 days. Research data was collected in a short time and the number of volunteers was reduced.

The diagnoses of all patients hospitalized in the adult ICU were included in this study. However, different diagnoses and the hope and anxiety of family caregivers were not discussed separately.

Conclusion

This study found that being female and being above the age of 30 years were the main sociodemographic factors increasing the levels of anxiety in family caregivers. We did not find any effect of marital and working status and education level on the participants' levels of hope and

anxiety. Although changes in the participants' professional life did not have an effect on their levels of hope and anxiety, the financial problems associated with taking care of the ICU patients increased the level of state anxiety. Besides, the participants, who were sufficiently informed about patient's condition and could not communicate with the patient, had lower levels of anxiety. Finally, the level of anxiety was negatively associated with the level of hope.

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Ethics

Ethics Committee Approval: This study was approved by the Acibadem University Clinical Research Ethics Committee of the university (decision no: 2019-17/35, date: 07.11.2019). Permission to use the scales were obtained via e-mail. When the visit ban was lifted in hospitals, data were collected face-to-face when family caregivers came to visit.

Informed Consent: Participants were informed about the aim of the study and written and verbal informed consent were obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: R.S.K., E.A., E.U., Design: E.A., R.S.K., E.U., Data Collection and Process: R.S.K., E.A., Analysis or Interpretation: R.S.K., E.A., E.U., Literature Search: R.S.K., E.A., Writing: R.S.K., E.A., E.U.

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Dolaşım Ölümü Sonrası Organ Bağışı Hakkında Türk Hekimlerinin Bilgi ve Tutumları

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ÖZ Amaç: Organ bağışı (OB) ülkemizde hala istenen seviyeye ulaşamamaktadır. Dünyada yeni bir OB şekli daha uygulanmaktadır. Dolaşım ölümü (DÖ) gerçekleşmiş hastalardan aile onamı ile OB olabilmektedir. Türk hekimlerin dolaşım ölümü sonrası organ bağışı (DÖB) ile ilgili tutumlarını ve bilgi düzeylerini ölçmek için bu çalışma yapılmıştır.

Gereç ve Yöntem: Üç kısımdan oluşan anket soruları mail yoluyla uzman hekimlere ulaştırıldı. Birinci bölümde sosyodemografik özellikleri, ikinci bölümde OB ile ilgili tutum ve davranışları, üçüncü bölümde DÖB ile ilgili bilgi düzeyleri ölçülmüştür.

Bulgular: İki yüz elli sekiz katılımcının %51,9'u kadın, %48,1'i erkekti. %52,3'ü cerrahi branşta, %47,7'si dahili branşta uzmanlaşmıştı. %39,1'i yoğun bakımda, %25,9'u acil serviste, %21,3'ü ameliyathanede çalışmaktaydı. Tüm hekimler OB'nin önemi konusunda hemfikir. OB'de bulunma oranları düşük olsa da cerrahi branşlarda, dahili branşa göre anlamlı derecede yüksek olduğu görüldü ($p=0,02$). OB'de bulunanların çoğu bu durumu ailesi ile paylaşmıştı (sırasıyla cerrahi hekimler %83,3, dahili hekimler %66,6). Cerrahi branşların beyin ölümü veya organ nakliyle ilgili eğitim alma yüzdesi yüksekti. Ancak her iki grupta DÖB tanımı çok az bilinmekteydi (sırasıyla %2,9, %0,8). Bilgi düzeyleri incelendiğinde, yalnızca beş soruda (bunlar OB ve donör bakımı ile ilgili önermelerdi) cerrahi branş hekimlerinin doğru yanıt verme oranı daha yüksekti. Dolaşım ölümü ile ilgili teorik bilgi önermeleri, her iki grupta da yanlış yanıtlendi.

Sonuç: 1995 yılından beri bilinen DÖB'nin Türk hekimler tarafından bilinirliğini artırmak için yeni araştırmalar yapılmasına ve tıp eğitiminin güncel konuları içermesine ihtiyaç vardır. Ülkemizde yasalama gerçekleştiği anda, hekimlerin farkındalığının da oluşmuş olması, OB sayılarını artıracaktır.

Anahtar Kelimeler: Dolaşım ölümü, organ bağışı, yoğun bakım

ABSTRACT Objective: Organ donation (OD) still cannot reach the desired level in our country. A new form of OD is being implemented in the world. OD can be performed with family consent from patients with circulatory death (CD). This study was conducted to measure the attitudes and knowledge levels of Turkish physicians about organ donation after circulatory death (DCD).

Materials and Methods: Three-part survey questions were sent to specialist physicians via e-mail. In the first part, their sociodemographic characteristics, in the second part their attitudes and behaviors about OD, and in the third part, their knowledge levels about DCD were measured.

Results: 51.9% of the 258 participants were female and 48.1% were male. 52.3% specialized in surgery, 47.7% specialized in internal medicine. 39.1% were working in the intensive care unit, 25.9% were working in the emergency room, and 21.3% were working in the operating room. All physicians agreed on the importance of OD. Although OD rates were low, this rate was found to be significantly higher in surgical branches compared with internal branches ($p=0.02$). Most organ donors shared this situation with their families (respectively, surgical physicians 83.3%, internal physicians 66.6%). The percentage of surgical branches receiving education on brain death or organ transplantation was high. However, the definition of DCD in both groups was little known (2.9%, 0.8%, respectively). When their knowledge levels were examined, only five questions (these were propositions about OD and donor care) were higher for the surgical physicians to answer correctly. Theoretical knowledge propositions about CD were answered incorrectly in both groups.

Conclusion: To increase the awareness of Turkish physicians about DCD, which has been known since 1995, there is a need for new research and medical education to include current issues. Therefore, as soon as the legislation is enacted in our country, the number of ODs will increase.

Keywords: Circulatory death, organ donation, critical care

Giriş

Organ nakli tüm dünyada olduğu gibi ülkemizde de kanayan bir sağlık yarısı olarak devam etmektedir. Dünyada ve ülkemizde de organ transplantasyonu bekleyen hasta sayısı günden güne artmaktadır. Bu durum kadavradan organ transplantasyonunun önemini gözler önüne sermektedir. En son açıklanan uluslararası istatistiklere göre Türkiye nüfusu (83 milyon) başına düşen toplam organ bağış sayısı 499 olup, milyon kişi başına düşen bağış (Per Million Persons = PMP) değeri 6,0'dır. Bu olguların 147 tanesi 60 yaşın üzerindeki beyin ölümü olgularıdır. Diğer bağışlar canlı bağışçıdan sağlanmıştır (1). Kadavradan organ transplantasyonu için potansiyel donör aday hastalarda beyin ölümü tanısını koyabilmek önem arz etmektedir. Beyin ölümü sonrası organ bağışı için aile görüşmeleri önem kazanmaktadır.

Oysa dünyada organ bağışı için bir yol daha bulunmaktadır. Dolaşım ölüm tanısından sonra da hasta yakınları organ bağışında bulunabilmektedir. İlk olarak 1995'de Hollanda'da tanımlanan "Maastricht sınıflandırması" ile dünya organ bağışı için bir yol daha olduğunu kabul etmeye başlamıştır (2). Kabul edilen bu dolaşım ölümü kavramı ile hastanede veya hastane dışında gerçekleşen kontrolsüz dolaşım ölümlerinde hasta yakınlarının onamı ile organ nakli gerçekleştirilebilmektedir. Ayrıca ciddi kas-iskelet sistemi hastalığı, omurilik yaralanması gibi durumlarda doktor hastaya uygulanacak tedaviden fayda görmeyeceğini düşünüyor ve desteklerin kesilmesinden sonra geçecek "dokunmama süresi" sonunda hastanın dolaşım arresti olacağını öngörüyorsa, ailenin onayı ile kontrollü bir şekilde dolaşım ölümü gerçekleştirilebilmektedir. Bazı ülkelerde uygulamaya başlanan bu yöntem ile organ nakli bekleyen hasta sayıları düşürülmektedir. Ülkemizde ise bu yöntem organ bağışı için henüz yasalaşmamıştır.

Bu araştırmanın birinci amacı, hekimlerimizin dolaşım ölümü sonrası organ bağışı ile ilgili tutum ve davranışlarını ölçmektir. Çalışmanın ikinci amacı ise hekimlerimizin dolaşım ölümü sonrası organ bağışı ile ilgili bilgi düzeylerini ölçmektir. Bu amaçla yapılan anket gönüllü katılımcılara uygulanmıştır.

Gereç ve Yöntem

Araştırmanın Tipi ve Katılımcı Seçimi:

Bu araştırma için öncelikle gerekli etik kurul izinleri alınmıştır (Izmir Demokrasi Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu, karar no: 2022/04-01,

tarih: 06.04.2022). Önceden hazırlanmış olan anket, internet üzerinden katılımcılara ulaştırılmıştır. Katılımcılar araştırmanın konusu ve anketin içeriği ile ilgili bilgilendirilmiştir. Dolaşım ölümü ile karşılaşma sıklığı yüksek olan acil servis, ameliyathane ve yoğun bakımlarda hasta takip eden hekimlere anket ulaştırılmıştır. Çalışmaya dahil olmak isteyen katılımcılar anketi tamamlamıştır.

Dahil olma kriterleri araştırmaya katılmaya gönüllü olmak ve aktif olarak hekimlik yapıyor olmak idi. Dışlanma kriterleri ise gönüllü olmamak ve aktif hekimlik yapmıyor olmak olarak belirlendi.

Anket Yapısı

Gönüllü katılımcılara yöneltilen anket üç ana kısımdan oluşmaktadır. Birinci bölümde sosyodemografik özellikler sorgulanmıştır. Katılımcıların yaşı, cinsiyeti, medeni durumu, mesleği, uzmanlık alanı, meslekte geçirdiği süre, meslekte en uzun hangi birimde çalıştığı, hangi kurumda çalıştığı bu bölümde sorgulanmıştır.

İkinci bölümde katılımcıların dolaşım ölümü sonrası organ bağışı ile ilgili tutum ve davranışlarını ölçen 11 adet soru sorulmuştur. Üçüncü bölümde ise katılımcılara dolaşım ölümü sonrası organ bağışı ile ilgili bilgi düzeylerini ölçen 11 adet soru sorulmuştur (Tablo 1-3). Bu sorular Rodrigue ve ark.'nın (3) yazılı izin alınarak, yurtdışında yoğun bakım çalışanları üzerine yaptıkları anketten esinlenerek oluşturuldu.

İstatistiksel Analiz

Katılımcıların tutum ve davranış düzeyini ölçen soruları evet veya hayır olarak, bilgi düzeyini ölçen soruları ise doğru veya yanlış olarak cevaplamaları istenmiştir. Kategorik olarak alınan cevaplar SPSS programı kullanılarak analiz edilmiştir. Çalışmadan elde edilen verilerin özetlenmesinde tanımlayıcı istatistikler, sürekli değişkenler için dağılıma bağlı olarak ortalama olarak verilmiştir. Kategorik değişkenler sayı ve yüzde olarak özetlenmiştir. Sayısal değişkenlerin normallik testi Kolmogorov-Smirnov testi ile kontrol edilmiştir. Bağımsız iki grup karşılaştırılmalarında, sayısal değişkenlerin normal dağılım göstermediği durumlarda ise Mann-Whitney U testi kullanılmıştır. Kategorik değişkenler arasındaki farklılık karşılaştırmalarında 2x2 tablolarda Pearson ki-kare, ortalamaların karşılaştırılmasında Student's t-testi kullanılmıştır. İstatistiksel analizler SPSS 24 programı kullanılarak yapılmıştır. İstatistiksel analizlerde anlamlılık düzeyi 0,05 (p-değeri) olarak dikkate alınmıştır.

Bulgular

Katılımcıların %51,9'u kadın, %48,1'i erkekti. Katılımcıların %52,3'ü cerrahi bir branşta ihtisas yapmıştı. Ankete cevap verenlerin çoğunluğu (%60,8) eğitim ve araştırma hastanesinde görev yapmaktaydı. Şu an en yoğun olarak çalıştıkları birim sorulduğunda ise, %39,1'i yoğun bakımda, %25,9'u acil serviste, %21,3'ü ameliyathanede görev yaptıklarını beyan ettiler. Anketi cevaplayan hekimler içerisinde cerrahi branştaki hekimlerin beyin ölümü ile karşılaşma sıklığı, dahili branşlara göre daha yüksekti (Tablo 1).

Katılımcıların dolaşım ölümü sonrası organ bağışına bakış açılarını ve hazır bulunuşluklarını ölçen sorular irdelendiğinde, katılımcılara bu bağlamda 13 adet soru yöneltilti. Sorulara evet ya da hayır şeklinde yanıt vermeleri istendi. Tüm hekimler organ bağışının önemi konusunda hemfikir. Ancak

organ bağışında bulunma oranları düşüktü. Cerrahi branşlarda bu oranın, dahili branşa göre anlamlı derecede yüksek olduğu görüldü ($p=0,02$). Organ bağışında bulunanların çoğunun bu durumu ailesi ile paylaştığı tespit edildi (cerrahi hekim bağışçıların %83,3'ü, dahili hekim bağışçıların %66,6'sı). Beyin ölümü bağışçısı ve canlı bağışçıdan başka bir organ bağışı yönteminin iki grupta da çok az bilindiği anlaşıldı (sırasıyla %2,9, %0,8). Cerrahi branşların beyin ölümü veya organ nakli ile ilgili eğitim alma yüzdesinin daha yüksek olduğu görüldü. Ancak her iki grubun da dolaşım ölümü sonrası organ bağışı tanımını daha önce çok az duyduğu saptandı (Tablo 2).

Katılımcıların dolaşım ölümü sonrası organ bağışına bakış açılarını ve hazır bulunuşluklarını ölçen sorular sonrasında, dolaşım ölümü sonrası organ bağışının tanımı ile ilgili hatırlatıcı bir bilgi paragrafı verildi. Devamında dolaşım ölümü sonrası organ bağışı ile ilgili bilgi düzeyleri sorgulandı. Bu

Tablo 1. Katılımcıların sosyodemografik özellikleri

		n (%)	Yaş ortalaması	Medeni durum (evli/bekar)		
Cinsiyet	Kadın	134 (%51,9)	38,8±1,8	114/20		
	Erkek	124 (%48,1)	42,6±2,2	96/28		
	Toplam	258 (%100)	40,2±0,6	210/48		
		n (%)	Meslekteki ortalama süre (yıl)			
Branş	Cerrahi branş	135 (%52,3)	18,9±2,3			
	Dahili branş	123 (%47,7)	14,6±1,7			
	Toplam	258 (%100)	16,6±1,6			
		Eğitim ve araştırma hastanesi	Üniversite hastanesi	Özel hastane	Toplam	
Çalıştığı kurum	Cerrahi branş	76 (%29,4)	45 (%17,4)	14 (%5,4)	135 (%52,3)	
	Dahili branş	81 (%31,4)	30 (%11,7)	12 (%4,7)	123 (%47,7)	
	Toplam	157 (%60,8)	75 (%29,1)	26 (%10,1)	258 (%100)	
		Acil servis	Yoğun bakım	Ameliyathane	Diğer (Poliklinik, yataklı servis vb.)	Toplam
En yoğun çalıştıkları birim	Cerrahi branş	11 (%4,2)	65 (%25,1)	55 (%21,3)	4 (%1,5)	135 (%52,3)
	Dahili branş	56 (%21,7)	36 (%13,9)	-	31 (%12)	123 (%47,7)
	Toplam	67 (%25,9)	101 (%39,1)	55 (%21,3)	35 (%13,5)	258 (%100)
		Hiç karşılaşmıyorum	Haftada birkaç kez karşılaşmıyorum	Ayda birkaç kez karşılaşmıyorum	Toplam	
Beyin ölümü veya organ nakli ile karşılaşma sıklığınız nedir?	Cerrahi branş	74 (%54,8)	28 (%20,7)	33 (%24,5)	135 (%100)	
	Dahili branş	102 (%83)	6 (%4,8)	15 (%12,2)	123 (%100)	
	Toplam	176 (%68,2)	34 (%13,1)	48 (%18,7)	258 (%100)	

amaçla 11 adet soru soruldu. Yanıtlar doğru veya yanlış olmak üzere 2 seçenekten oluşmaktaydı. Buna göre katılımcıların branşlarına göre bu sorulara doğru yanıtlama durumları Tablo 3'te gösterildi. Yalnızca 5 soruya cerrahi branş hekimleri tarafından istatistiksel olarak anlamlı şekilde yüksek oranda doğru yanıt verildi. Bu sorular donör bakımı ve organ bağıışı ile ilgili önermelerdi.

Tartışma

Organ nakli birçok hastalığa çözüm getirecek bir tedavidir. Ülkemizde nakil için en büyük engellerden biri beyin ölümü gibi güvenilir bir şekilde hastanın ölümünü belgelemek ve hasta yakınlarının onamıyla organ bağıışı sürecini başlatmaktır. Beyin ölümü seçici durumlarda koyulan bir tanıdır. İsmen çok yaygın olarak bilinen bu tanı ile ilgili eğitimler ve bilimsel yayın

çalışmaları devam etmektedir. Dolaşım ölümü ise dünyada yıllardır konulan bir tanı olmasına rağmen ülkemizde yeni bir kavramdır. Hekimlerin bu konudaki tutumlarını incelediğimiz araştırmamızda cerrahi branş hekimlerinin organ bağıışında bulunma sıklığının, beyin ölümü veya organ nakli ile ilgili eğitim alma ve güncel bilgileri takip etme sıklığının, dahili branşlara göre daha yüksek olduğu görüldü. Hekimlerin dolaşım ölümü ve organ bağıışı konusundaki bilgi düzeyleri incelendiğinde, yalnızca beş soruda cerrahi branş hekimlerinin doğru yanıt verme oranı daha yüksek bulundu. Bu sorular incelendiğinde organ bağıışı ve donör bakımı ile ilgili önermeler olduğu görüldü. Bu durumun nedeninin beyin ölümü ve organ bağıışı konusuna daha aşina olmaları, daha sık tahmin edebilmeleri olduğu düşünüldü. Dolaşım ölümü ile ilgili önermeleri doğru bilme sıklığının ise her iki grupta da çok düşük oranlarda olduğu saptandı.

Tablo 2. Katılımcıların organ bağıışı ile ilgili tutum ve davranışları

	Cerrahi branş			Dahili branş			p*
	Evet (n/%)	Hayır (n/%)	Toplam (n/%)	Evet (n/%)	Hayır (n/%)	Toplam (n/%)	
Organ bağıışının önemli bir konu olduğunu düşünüyor musunuz?	135 (%100)	0	135 (%100)	123 (%100)	0	123 (%100)	-
Kendiniz organ bağıışında bulundunuz mu?	36 (%26,6)	99 (%73,4)	135 (%100)	6 (%4,8)	117 (%95,2)	123 (%100)	0,04
Organ bağıışında bulduysanız, bunu ailenizle paylaştınız mı?	30 (%83,3)	6 (%16,7)	36 (%100)	4 (%66,6)	2 (%33,4)	6 (%100)	-
Organ bağıışı bekleyen yakınınız var mı?	6 (%4,4)	129 (%95,6)	135 (%100)	5 (%4)	118 (%96)	123 (%100)	-
Sağlıklı gönüllü bir bireyden organ bağıışı yapılabilir mi?	133 (%98,6)	2 (%1,4)	135 (%100)	122 (%99,2)	1 (%0,8)	123 (%100)	-
Beyin ölümü tanısı sonrası organ bağıışı yapılabilir mi?	135 (%100)	0	135 (%100)	122 (%99,2)	1 (%0,8)	123 (%100)	-
Beyin ölümü bağıışçısı ve canlı verici bağıışçıdan başka ülkemizde ya da dünyada başka bir organ bağıışı yöntemi biliyor musunuz?	4 (%2,9)	131 (%97,1)	135 (%100)	1 (%0,8)	122 (%99,2)	123 (%100)	-
Daha önce beyin ölümü veya organ nakli ile ilgili eğitim aldınız mı?	73 (%61,5)	52 (%38,5)	135 (%100)	28 (%22,8)	95 (%77,2)	123 (%100)	0,02
Beyin ölümü veya organ nakli ile ilgili güncel bilgileri takip ediyor musunuz?	62 (%45,9)	73 (%54,1)	135 (%100)	6 (%4,8)	117 (%95,2)	123 (%100)	0,01
Dolaşım ölümü sonrası organ bağıışı tanımını daha önce duydunuz mu?	3 (%2,2)	132 (%97,8)	135 (%100)	0	123 (%100)	123 (%100)	-
Hastada dolaşımın durması sonucu gelişen dolaşım ölümü sonucunda organ nakli yapılabilir mi?	3 (%2,2)	132 (%97,8)	135 (%100)	0	123 (%100)	123 (%100)	-

*p-değeri yalnızca 0,05'in altında olan sorular için yazılmıştır

Tablo 3. Katılımcıların dolaşım ölümü sonrası organ bağışi ile ilgili bilgi düzeyleri

Katılımcılara sorulan önerme	Gerçek yanıt	Cerrahi branş			Dahili branş			p*
		Doğru yanıt n/%	Yanlış yanıt n/%	Toplam n/%	Doğru yanıt n/%	Yanlış yanıt n/%	Toplam n/%	
Olay yerinde, yolda veya acil serviste ani kontrolsüz ölüm yaşayan kişiler, kalp atışı olmayan potansiyel dolaşım ölümü bağışçlarıdır.	Doğru	7 (%5,1)	128 (%94,9)	135 (%100)	1 (%0,8)	122 (%99,2)	123 (%100)	-
Kontrolsüz dolaşım ölümü, ölümün gerçekleştiği yere ve iskemiyin süresine göre sınıflandırılır.	Doğru	5 (%3,7)	130 (%96,3)	135 (%100)	0	123 (%100)	123 (%100)	-
Ölüm, dolaşım ve solunumun geri dönüşü olmayan bir şekilde kesilmesinden sonra ilan edilir.	Doğru	133 (%98,6)	2 (%1,4)	135 (%100)	121 (%98,4)	2 (%1,6)	123 (%100)	-
Ölüm tespiti, yoğun bakım hekimi, organ nakil ekibi veya organ tedarik kuruluşunun resmi temsilcisi tarafından yapılabilir.	Yanlış	98 (%72,5)	37 (%27,5)	135 (%100)	11 (%8,9)	112 (%91,1)	123 (%100)	0,01
Klasik kadavradan organ nakli şeklinde, ameliyathanede kontrollü kalp durmasının ardından beyin ölümü gerçekleşen bir donörden nakil için organlar alınır.	Doğru	118 (%87,4)	17 (%12,6)	135 (%100)	98 (%79,6)	25 (%20,4)	123 (%100)	-
Donör bakımı başlamadan önce beyin ölümü kriterleri yerine getirilmelidir.	Yanlış	103 (%76,2)	22 (%23,8)	135 (%100)	36 (%29,3)	87 (%70,7)	123 (%100)	0,02
Kontrollü dolaşım ölümünde, yaşam desteğinin kesilmesinden sonra, 60 dakika içinde ölüm meydana gelmeli ve bundan sonra tüm organ kurtarma çabaları durdurulmalıdır.	Yanlış	16 (%11,9)	119 (%88,1)	135 (%100)	21 (%27,1)	102 (%82,9)	123 (%100)	-
Kontrollü dolaşım ölümünde, organ nakli sürecinin başlayabilmesi için, yaşam desteklerinin çekilmesinden sonra, beş dakikalık sürekli nabızsızlık veya asistoli olmalıdır.	Doğru	14 (%10,4)	121 (%89,6)	135 (%100)	8 (%6,6)	115 (%93,4)	123 (%100)	-
Kontrollü dolaşım ölümünde, yaşam desteğinin kesildiği andan ölüme kadar aile üyelerinin hazır bulunmasına izin verilir.	Doğru	25 (%18,6)	110 (%81,4)	135 (%100)	3 (%2,5)	120 (%97,5)	123 (%100)	0,05
Organ nakli kuruluşunun resmi bir temsilcisinin yaşam desteğini sonlandırma kararına katılmasına izin verilir.	Yanlış	96 (%71,1)	39 (%28,9)	135 (%100)	16 (%13,1)	107 (%86,9)	123 (%100)	0,01
Yaşam desteği sadece ameliyathanede durdurulabilir.	Yanlış	66 (%48,8)	69 (%51,2)	135 (%100)	28 (%22,8)	95 (%77,2)	123 (%100)	0,04

*p-değeri yalnızca 0,05'in altında olan önermeler için yazılmıştır

Dünyadaki organ nakli sayılarını artırabilmek için yeni uygulamalar gündeme gelmiştir. Dolaşım ölümü kavramı da bunlardan biridir. Bu sayede hastanın yaşam şansı olmadığı belgelenmekte ve organ nakli süreci başlatılabilmektedir. İlk tanımı 1995 yılında Hollanda'da yapılan dolaşım ölümü kavramı zaman içerisinde sınıflandırılmış ve farklı ülkelerde kabul görmüştür. Bu ilk sınıflamada hastalar 4 kategoriye ayrılmıştır. Kategori 1; hastaneye vardığında dolaşım ve solunumu olmayan hastalardır. Hayata döndürülemeyen hastane dışı kaza mağdurlarını içerir. Ölen bu hastalar, organlarının bağışa uygun görülmesi halinde acil servise nakledilerek bağışçı olabilirler. Bağış için kabul kriterlerinden biri, 45 dakikadan daha kısa bir sıcak iskemi süresidir. Kategori 2; başarısız resüsitasyon hastalarını içerir. Acil tıbbi servisler tarafından resüsite edilirken kardiyopulmoner resüsitasyon başarısız olursa, başarısız canlandırma olarak ilan edilebilir. İlk Maastricht toplantısında, beyin ölümüne eşdeğer bir durum sağlamak için kardiyak/dolaşım arrestinden sonra 10 dakikalık bir "dokunmama" periyodu, normotermide beyne 10 dakika kan dolaşımı olmaması olarak önerildi. Yargı yetkisine bağlı olarak 2 dakika [Amerika Birleşik Devletleri (ABD)] ile 20 dakika (İtalya) arasında bir aralık hala mevcut olmasına rağmen, geçmiş yıllarda çoğu ülkede tıp toplulukları ve yetkilileri tarafından 5 dakikalık bir süre benimsenmiştir. Sonrasında hasta yakınlarının onayı varsa, hasta soğutmaya geçilerek organları alınabilir. Kategori 3; kardiyak ya da dolaşım ölümü beklenen hastaları içerir. Esas olarak kardiorespiratuvar destek olmak üzere, yaşamı idame ettirici tedavilerin planlı bir şekilde kesilmesinden sonra dolaşım ölümünün meydana geldiği hastaları içerir. Tedavinin devamının fayda sağlamayacağı durumlarda, aileyle birlikte verilen karar sonrasında, desteklerin kesilmesi ile kardiyak arrest meydana gelir. Önceden belirlenen dokunmama süresinin sonrasında, soğutmaya geçilir. Kategori 4; beyin ölümü gerçekleşen bir donörde kardiyak arrest olmasıdır. Beyin ölümü tanısı konulduktan sonra ve donör yönetimi sırasında beklenmedik bir kardiyak arrest geçiren hastaları içerir. Bu durumda, sağlık profesyonellerinin öncelikle organların yeterli dolaşımını yeniden sağlamaya çalışması muhtemeldir. Ancak başarısız olduğunda hasta dolaşım ölümü sonrası organ bağışı için düşünülebilir.

Sonrasında 2011 yılında Madrid'de konunun uzmanları tarafından eklenen bir dizi alt kategori ile, Modifiye Maastricht Sınıflaması oluşturuldu. Burada Kategori 1 ve 2 "KontROLSÜZ Dolaşım Ölümü" olarak sınıflandırıldı. Kategori 3 ve 4 ise "Kontrollü Dolaşım Ölümü" olarak sınıflandırıldı (4).

Diğer bir düzenleme, sekiz farklı ülkeyi içeren Eurotransplant organizasyonunun, Hollanda, Belçika ve Lüksemburg'da ötenazi sonrası organ bağışı olasılığını resmi olarak tanınmasıyla ilgiliydi. Burada daha da detaylandırılarak (beklenen kardiyak arrest olgusu olup olmadığı, karyak arrestin yeri, tanık olup olamaması, resüsitasyon olup olmadığı gibi detaylar) eksiksiz bir sınıflama oluşturulmaya çalışıldı. Ayrıca ötenazi veya tıbbi yardımlı dolaşım ölümünün içeren beşinci bir kategori de eklendi (5).

2013 yılında Paris'te düzenlenen "Dolaşım Ölümü sonrası Organ Bağışı Konferansı", özellikle dolaşım ölümü sonrası bağış (DÖB) ile ilgili olarak kullanılan Maastricht Sınıflandırmasını, tanımlarını ve terminolojisini netleştirmek için yapıldı. Bu tanımları gözden geçiren "Avrupa Çalışma Grubu"nda İngiltere, Fransa, İspanya ve Eurotransplant bölgesinden üyeler yer aldı. Burada orijinal Maastricht Sınıflandırmasının değiştirilmesi ve yeni gelişmelere göre güncellenmesi, ancak nispeten basitliği ve anlaşılabilirliğinin bozulmadan korunması konusunda anlaşmaya varıldı. Böylece yalnızca bağış ve organ naklinde sağlık profesyoneline değil, aynı zamanda etik, psikolojik ve yasal konularla ilgilenenlere ve bu alanla ilgilenen tıp dışı okuyuculara da yardımcı olabilmek hedeflendi. Kullanılan terimler tek tek açıklanarak netleştirildi (6).

Sonrasında bu konu araştırmacıların ilgi odağı oldu. İngiltere'de Kootstra ve ark. (7), transplantasyon için donör böbrek sıkıntısı göz önüne alarak, kalp atmayan donör böbreklerin kullanımına odaklandı. Kalp atmayan donör böbreklerinin kullanımının en büyük dezavantajı, birincil işlevsizliğe yol açan ciddi iskemik hasar olasılığıdır. Bu nedenle, iskemik olarak hasar görmüş böbreklerin canlılık değerlendirmesi çok önemlidir. Bu nedenle, bir makine perfüzyon programı yeniden başlatıldı. Makine perfüzyonu, perfüzyon özelliklerinin analizi ve perfüzata enzim salınımının ölçülmesi yoluyla canlılık değerlendirmesine olanak tanıdı. Bu sayede makine perfüzyonu ile bakılan 100 kalp atmayan donör böbreğinden, 71 böbrek nakledilmiş ve 29 böbrek atıldı. Dokuz böbrek hemen çalışmaya başladı, 51 böbrek fonksiyon gecikmesi gösterdi ve 11 böbreğin hiç çalışmadığı görüldü. Bu sayede organ nakillerinin önü açıldı (7).

ABD'de ölüm ilanı için geçerli iki temel yöntem de kabul edilmektedir. Ölümün nörolojik olarak belirlenmesi, beyin sapı da dahil olmak üzere tüm beynin geri dönüşü olmayan işlev kaybına dayanır. Ölümün dolaşım ile belirlenmesi, dolaşım fonksiyonunun geri döndürülemez şekilde kesilmesine dayanır. DÖB, ciddi kas-iskelet sistemi hastalığı, omurilik

yaralanması veya geri dönüşü olmayan beyin hasarı olan ve beyin ölümü kriterlerini karşılamayan hastanede yatan hastalarla koordineli bir adım dizisini içerir. Genellikle DÖB politikaları ve protokolleri tıp merkezlerinde farklılık gösterir, ancak temel adımlar ve bunların sırası genellikle aynıdır ve şu şekilde sıralanabilir: (1) ailenin ventilatör veya mekanik desteği geri çekme kararı, (2) DÖB uygunluğunun değerlendirilmesi, (3) kayıtlı bağışçı statüsünün veya bağış taleplerinin teyidi, (4) ventilatör veya mekanik desteğin geri çekilmesi, (5) premortem müdahaleler (arteriyel veya venöz kateter takılması, vazodilatör başlanması, antikoagulan uygulanması gibi), (6) dolaşım ölümü tanısı ile ölüm ilanı ve organın çıkarılması (8). Son on yılda beyin ölümü sonrası organ bağışında bir miktar artış olsa da ölümün dolaşımda belirlenmesinden sonra bağıştaki artış çok daha çarpıcı olmuştur. Son 15 yılda ABD'de DÖB donörlerinin sayısında 10 kattan fazla, temin edilen ve nakledilen DÖB organlarının sayısında 5 kattan fazla artış olmuştur (9). DÖB akciğer, kalp ve pankreas nakli konusunda artan deneyimler olmasına rağmen, DÖB donörlerinden alınan böbrekler ve karaciğerler çoğunlukla nakledilmiştir (10-12). DÖB'yi en üst düzeye çıkarmak, talep (nakil bekleyen hasta sayısı) ve arz (nakledilebilir organ sayısı) açığının genişlemeye devam ettiği günümüz pandemi koşullarında daha fazla nakledilebilir organ sağladığı için önemlidir.

Araştırmalar, sağlık hizmeti sunucularının organ bağış tutumlarının, ölen kişinin bağış niyetinin bilinmediği durumlarda aile izin oranları için kritik öneme sahip olduğunu göstermiştir. Aileler sağlık hizmeti sağlayıcılarının bağış desteklediğini ve bağış tartışmaya açık olduğunu algıladıklarında, beyin ölümünün ardından bağış onaylama olasılıkları önemli ölçüde daha yüksektir (13,14). Bununla birlikte ilginç bir şekilde, sağlık hizmeti sağlayıcıları beyin ölümünden sonra yapılan bağışa kıyasla DÖB'ye karşı daha az olumlu tutumlara sahip görünmektedir (15-18).

Rodrigue ve ark.'nın (3) yoğun bakım biriminde çalışanlar üzerinde yaptığı bir anket çalışmasında, çalışanların konu ile ilgili bilgi düzeyleri ölçüldü. Uzun bir süredir ABD'de yasalarla tanımlanmış bir ölüm şekli olan dolaşım ölümü ile ilgili sorulara katılımcıların verdiği yanıtlar tek tek irdelendiğinde, bazı maddelere katılımcıların ancak yarısının doğru cevap verebildiği görüldü. Bu nedenle bu konu hakkında sağlık çalışanlarının eğitilmesinin önemi vurgulandı. Çünkü yoğun bakım hizmeti sağlayıcıları arasında DÖB politikaları hakkında olumsuz tutum ve yetersiz bilgi, potansiyel bağışçıların uygun şekilde belirlenmesi, organ nakli koordinatörlerine zamanında sevk, aile üyeleriyle organ bağışını tartışmaya isteklilik ve

DÖB politikalarının tutarlı bir şekilde uygulanması için önemli sonuçlar doğurabilir (3).

Tüm bu gelişmelerin ışığında, dünyada pek çok ülkede bilinen ve yasal düzenlemeler ile uygulamaya başlanan ölüm şekli ve organ bağış yolu ile ilgili ülkemizde yasal düzenleme olmadığı gibi, bu konuda herhangi bir yayın da bulunmamaktadır. Hekimlerimizin bu konudaki bilgi düzeyini ölçmek ve farkındalığı artırmak için bu çalışmada, Türk hekimlerinin bu konuya bakış açıları ve bilgi düzeyleri ölçüldü. Ülkemizde yasal çerçevelerle sınırları çizilmemiş olan bu ölüm şeklinin hekimler arasında oldukça az oranda bilindiği ve sorulara verilen doğru cevap oranlarının yurtdışı yayınlara göre oldukça düşük olduğu görüldü. Cerrahi ve dahili branş hekimleri arasındaki fark incelendiğinde yalnızca beş soruda belirgin fark olduğu saptandı. Branşlardaki farklılık gereği anesteziyoloji, beyin cerrahisi, kalp damar cerrahisi, genel cerrahi gibi beyin ölümü tanısı ve organ nakli ile daha sık karşılaşan hekimlerin, dolaşım ölümü ile ilgili dahili branşlara göre daha fazla bilgi sahibi olduğu görüldü. Bu çalışmanın bu konudaki ilk araştırma olması nedeni ile pek çok katılımcının bu kavram ile yeni tanıştığı düşünüldü.

Ülkemizde bu organ bağış şekli henüz yasallaşmamıştır. Dolayısıyla uygulamada hala mevcut değildir. Bu nedenle konuyu yakından takip eden ve yurtdışı yayınları okuyan sağlık çalışanlarının bu konuda daha bilgili olduğu düşünüldü. Bunun çalışmamız için bir limitasyon olduğu kanaatindeyiz.

Sonuç

Dolaşım ölümü ile ilgili ülkemizde yapılan bu ilk çalışmada katılımcıların doğru yanıt oranlarının düşük olduğu görüldü. Cerrahi branş hekimleri tarafından beyin ölümü ve organ nakli konusuna daha fazla aşina olduğu için bazı önermeler daha yüksek oranda doğru yanıtlandı. Hekimlerin farkındalığını artıracak yeni çalışmalara ihtiyaç bulunmaktadır.

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Investigation of the Relationship Between Workload Perception and the Work-life Balance of Intensive Care Nurses Working During the COVID-19 Pandemic: A Web-based Cross-sectional Study

COVID-19 Pandemisi Sırasında Çalışan Yoğun Bakım Hemşirelerinin İş Yükü Algısı ile İş-yaşam Dengesi Arasındaki İlişkinin İncelenmesi: Web Tabanlı Kesitsel Bir Çalışma

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ABSTRACT Objective: This study was conducted to investigate the relationships between workload perception and the work-life balance of intensive care nurses working during the pandemic.

Materials and Methods: Descriptive and cross-sectional research was conducted with 325 intensive care nurses who were members of the Turkish Intensive Care Nurses Association. Data were collected via WhatsApp using Google Surveys for a Nurse Information form, the Individual Workload Perception scale, and the Work-Life Balance scale. Pearson's correlation and regression analyses were used for the data analysis in addition to descriptive statistics.

Results: The total average score of the Personal Workload Scale of the intensive care nurses was 3.26 ± 0.60 [minimum (min): 1.71; maximum (max): 4.87] and the total average score of the Work-life Balance scale was 2.79 ± 0.710 (min: 1.3; max: 4.9). The Workload scale total average score significantly increased the Work-life Balance total average score ($\beta=0.658$). Daily work time in the intensive care unit significantly decreased the work-life balance total average score ($\beta=-0.160$).

Conclusion: Intensive care nurses' workload perception and work-life balance were at a moderate level. Workload and long working hours deteriorate the work-life balance of intensive care nurses. Administrative and organizational regulations to enhance the work-life balance of the intensive care nurses by decreasing the workload can be effective in reaching the desired patient care results.

Keywords: COVID-19, work-life balance, workload, pandemic, intensive care, intensive care nursing

ÖZ Amaç: Bu araştırma, pandemi döneminde çalışan yoğun bakım hemşirelerinin iş yükü algısı ile iş-yaşam dengesi arasındaki ilişkileri araştırmak amacıyla yapıldı.

Gereç ve Yöntem: Araştırma, Türkiye Yoğun Bakım Hemşireleri Derneği üyesi toplam 325 yoğun bakım hemşiresi ile tanımlayıcı ve kesitsel tipte yapıldı. Veriler, Google Anketi ile Hemşire Bilgi formu, Bireysel İş Yükü Algısı ölçeği ve İş-Yaşam Dengesi ölçeği kullanılarak WhatsApp aracılığıyla toplandı. Verilerin analizinde tanımlayıcı istatistiklere ek olarak Pearson korelasyon ve regresyon analizleri kullanıldı.

Bulgular: Yoğun bakım hemşirelerinin Kişisel İş Yükü ölçeği toplam puan ortalaması $3,26 \pm 0,60$ [minimum (min): 1,71; maksimum (maks): 4,87], İş-Yaşam Dengesi ölçeği toplam ortalama puanı $2,79 \pm 0,710$ (min: 1,3; maks: 4,9). İş Yükü ölçeği toplam ortalama puanı, İş-Yaşam Dengesi toplam ortalama puanını önemli ölçüde artırdı ($\beta=0,658$). Yoğun bakımda günlük çalışma süresi iş-yaşam dengesi toplam ortalama puanını ($\beta=-0,160$) önemli ölçüde azalttı.

Sonuç: Yoğun bakım hemşirelerinin iş yükü algısı ve iş-yaşam dengesi orta düzeydeydi. İş yükü ve uzun çalışma saatleri yoğun bakım hemşirelerinin iş-yaşam dengesini bozmaktadır. Yoğun bakım hemşirelerinin iş yükünü azaltarak iş-yaşam dengesini geliştirmeye yönelik idari ve organizasyonel düzenlemeler, istenilen hasta bakımı sonuçlarına ulaşmada etkili olabilir.

Anahtar Kelimeler: COVID-19, iş yaşam dengesi, iş yoğunluğu, pandemi, yoğun bakım, yoğun bakım hemşireliği

Introduction

With the rapid spread of coronavirus disease (COVID) across the entire world after first emerging in Wuhan, China in December 2019, the World Health Organization declared the COVID-19 pandemic on January 30th, 2020. COVID-19 has left an unprecedented mark on world history. According to worldometer data on March 22th, 2021, there are 123,947,810 cases and 2,729,181 deaths reported worldwide (1). The United States of America, Brazil, and India (respectively) ranked highest in the table, and Turkey ranked ninth in case increases.

Therefore, the need for intensive care unit (ICU) beds and nurses have increased significantly during the COVID-19 pandemic (2-4). Units such as operating rooms and recovery rooms have been transformed into ICUs to meet the need for ICU beds. Nurses working at these units and other units (cardiology, etc.) who do not have intensive care experience have been assigned to ICUs to meet the need for intensive care nurses (5-8).

Intensive care nurses worked selflessly at the forefront of the fight against the pandemic by abiding by their altruistic principles and fulfilled their duties with outstanding performance. During the pandemic, in contrast to recommendations in international guidelines, intensive care nurses had to work long daily shifts (12 hours and more), wear personal protective equipment (PPE) for long hours (6 hours and more), stay away from their families/children/loved ones for days due to the risk of contamination, and work under difficult conditions and workloads, often without meeting their basic human needs (e.g. nutrition, sleep, rest) (2,7,8).

“Workload” is generally defined as various pressures that affect an employee’s performance and reactions. “Workload perception” represents how the work performed is perceived by the individuals besides the duration of work. With the physical conditions of the work environment, the negative relationships between the managers and co-workers are perceived as pressure by employees and this increases the workload perception negatively (9). Due to the COVID-19 pandemic, intensive care nurses had to work long hours in a complex work environment and in addition to the physical symptoms such as tiredness and sleeplessness, they experienced grief, despair, and disappointment caused by providing service to patients with critical conditions who required challenging care management. Their work-life balance could be deteriorated because of all these negative experience (10).

Work-life balance is the ability to simultaneously keep the five areas of life (work, family, friends, health, and mental state) in balance. According to another definition, it is the creation of a balance between the responsibilities at work and personal life. In this context, in a balanced life, an area of life should not negatively affect another (11).

Factors such as the increasing number of suspected or diagnosed cases of COVID-19, heavy workload of the ICU, increased patient volume, long and intense shifts, lack of PPE, being deprived of personal rights, not being able to visit loved ones because of the fear of carrying the virus, and feeling inadequately supported may cause nurses’ mental burden to increase. Work and life should be properly balanced to prevent this.

Nurses are undoubtedly among the most important members of healthcare professionals who have been under the most strain since the beginning of the pandemic and depleted the most, both physically and mentally. Therefore, what intensive care nurses have been going through during the pandemic, how they have been feeling, how they perceive their workload, and how they manage to balance work and life should be a topic of investigation.

Although some studies investigated the psychological states of nurses during the pandemic (12,13), studies investigating the relationship between workload perception and the work-life balance of intensive care nurses during the COVID-19 pandemic are absent. Therefore, it is thought that this study would benefit the nursing literature and be a guide for studies on nurses during the pandemic.

Accordingly, we aimed to investigate the relationship between intensive care nurses’ workload perception and work-life balance during the COVID-19 pandemic:

- What are the workload perception levels of intensive care nurses who worked during the COVID-19 pandemic?
- How is the work-life balance of intensive care nurses who worked during the COVID-19 pandemic?
- Is there a relationship between the workload perception levels and work-life balances of intensive care nurses who worked during the COVID-19 pandemic?

Materials and Methods

Research Type

The research is a cross-sectional, descriptive and correlational study.

Research Population and Sample

The population of the research comprised intensive care nurses who were members of the Turkish Intensive Care Nurses Association ($n=925$). This formula [$n= Nt^2pq/d^2(N-1)+t^2pq$; N: Number of individuals in the population, n: Number of individuals to be included in the sample, p: The odds of the incident happening, q: The odds of the incident not happening, t: The theoretical value found in the t table at the particular degree of freedom and determined margin of error, d: Sampling error accepted according to the odds of the incident happening] was used for calculating the sample size. According to the sampling calculation, the needed sample size with $\pm 5\%$ sampling error and in 95% confidence interval was calculated as $n=925 \times (1.96)^2 \times (0.5) \times (0.5) / (0.05)^2 \times (925-1) + (1.96)^2 \times (0.5) \times (0.5) = 272$ for the non-homogeneous population. The research was completed with a total of 325 nurses (35% of the population).

Data Collection Tools

The data of the study were collected using the "Nurse Information form," the "Individual Workload Perception scale," and the "Work-Life Balance scale."

1. Nurse Information Form: This form consists of a total of 14 questions on socio-demographic characteristics (e.g. age, sex, marital status, education status) and occupational characteristics (e.g. time working in the ICU, institution, occupation).

2. Individual Workload Perception Scale: This scale was developed by Cox (14) and validity-reliability studies were conducted by Cox (14) to measure the perceptions of healthcare professionals towards the work environment. In 2007, the Turkish validity and reliability studies of the scale were performed by Saygılı (15). The scale includes five dimensions and a total of 31 items that evaluate the work environment perceptions of the employees [Administrative support (8 items), Co-worker support (8 items), Unit support (6 items), Workload characteristics of the work environment (6 items), Intention to continue the current job (3 items)]. The 5-point Likert-type scale is scored as "Totally disagree (1), Disagree (2), Indecisive (3), Agree (4) and Totally agree (5)". The lowest and highest scores that can be obtained from the scale are 31 and 155, respectively. An increase in the score of the intention to continue the current job dimension indicates that the intention to continue the current job has decreased. An increase in the other dimensions is positively correlated. The increase in the score of the overall scale indicates a

positive individual workload perception, which means that the individuals perceive less workload. Cronbach's alpha coefficient of the scale is between 0.61-0.90. Cronbach's alpha coefficient of the scale was found as 0.940 in this study.

3. Work-life Balance Scale: This 5-point Likert-scale, developed by Apaydin to identify the work-life balance perception, is evaluated as "5=Totally agree, 4=Mostly agree, 3=Somewhat agree, 2=Slightly agree, 1=Totally disagree." It consists of four dimensions and a total of 20 items [Work-life concordance (6 items), Neglecting life (6 items), Allocating time for oneself (4 items), and Life consisting of just work (4 items)] (16). Cronbach's alpha coefficient of the scale in the original study was 0.91 and the reliability of the four dimensions was found as 0.88, 0.81, 0.77, and 0.79, respectively (16). Cronbach's alpha coefficient was found high as 0.914 for this study.

Data Collection Process

Data of the research were collected between January-March, 2021. Data collection tools were sent to nurses via WhatsApp as "Google Surveys" and the nurses were asked to complete the related forms by clicking the "Google Surveys" link in the message. The survey link of the research was sent to the Turkish Intensive Care Nurses Association and approval was obtained from the board of the Association. The survey was sent to all nurses who were members of the Association from the social media accounts of the Association and via WhatsApp to the phone numbers obtained from the member management system of the Association. It was ensured that only the nurses working in COVID-19 ICUs responded to the survey. First, a survey link was sent to all intensive care nurses by bulk message. Then, the messages were sent to the nurses twice a week during the research to remind them to complete the survey.

Ethical Considerations

The Human Rights Declaration of Helsinki was abided by throughout the study. Nurses' voluntariness and willingness to participate in the study were respected. Written approval was obtained from the Ministry of Health Scientific Research Committee for data collection. Then, by using this approval, written consent was obtained from the Local Istanbul Medipol University Non-invasive Clinical Research Ethics Committee of a university (decision no: 58, date: 21.01.2021). Consent was also obtained from the board

of the Turkish Intensive Care Nurses Association. Written consent of the nurses who volunteered to participate in the research was obtained by asking them to click the "I agree to complete the online survey form" statement in the message that was sent to their mobile phones.

Statistical Analysis

Data collected in the research were analysed using the Statistical Package for the Social Sciences (SPSS) for Windows Ver. 22.0 program. Number, percentage, average, and standard deviation were used as descriptive statistical methods to evaluate the data. The t-test was used to compare the qualitative continuous data of two independent groups and One-Way analysis of variance (ANOVA) was used to compare the qualitative continuous data of more than two groups. The Scheffe test was used as a descriptive post-hoc analysis to identify the differences following ANOVA. Pearson correlation and regression analysis was used between the continuous variables of the research. The level of significance was accepted at $p < 0.05$.

Results

Among the nurses, 73.8% ($n=240$) were age over 40 years, 79.1% ($n=257$) were female, 68.6% ($n=223$) were single, 67.7% ($n=220$) had a Bachelor's degree. About half (49.2%) ($n=160$) of the nurses were working at training and research hospitals, 47.1% ($n=153$) were working in ICUs for less than one year, and 32.9% ($n=107$) were working as a nurse for less than a year. The number of beds was 13 and more in the ICUs where 63.1% ($n=205$) of the nurses were working and 78.8% ($n=256$) of the nurses were working in tertiary level ICUs. The majority (84.3%, $n=274$) of the nurses were working as bedside nurses and 56.9% ($n=185$) were working in ICUs for over 12 hours.

Regarding the Workload scale, the average total score of the manager support dimension was 3.426 ± 0.912 [minimum (min): 1; maximum (max): 5], the average total score of the co-worker support dimension was 3.459 ± 0.680 (min: 1.62; max: 5), the average score of the unit support dimension was 2.840 ± 0.793 (min: 1; max: 4.67), the average score of the work environment dimension was 3.341 ± 0.651 (min: 1.71; max: 5), the average score of the intention to continue the current job was 2.939 ± 1.089 (min: 1; max: 5), and the average total score of the overall scale was 3.262 ± 0.604 (min: 1.71; max: 4.87).

For the Work-life Balance scale, the average score of the work-life concordance dimension was 2.885 ± 0.793 (min: 1; max: 5), the average score of the neglecting life dimension was 3.417 ± 0.846 (min: 1; max: 5), the average score of the allocating time for oneself dimension was 3.112 ± 0.850 (min: 1; max: 5), the average score of the life consisting of just work dimension was 3.253 ± 0.896 (min: 1; max: 5), and the average total score of the overall scale was 2.792 ± 0.710 (min: 1.3; max: 4.9).

The relationships between the characteristics of nurses and the Workload scale and Work-Life Balance scale are examined in Table 1.

The results of the regression analysis performed to identify the cause-effect relationship between the Workload scale average total score and age, sex, marital status, number of children, educational status, time of working in the ICU, time of working as a nurse, number of beds in the ICU, level of ICU, shift length in the ICU, duties in the ICU, and Work-life balance average total score was found significant ($F=17.203$; $p=0.000$; $p < 0.05$).

The total change in the general level of the work-life balance was 37.5% in workload, age, sex, marital status, number of children, educational status, working time in intensive care, working time in nursing, number of beds in intensive care, level of intensive care unit, and shift length in the ICU was explained by the duty of nurses in the ICU ($R^2=0.375$). The average total score of the Workload scale increased the average total score of Work-life Balance ($\beta=0.658$). A shift length in the ICU decreased the average total score of work-life balance ($\beta=-0.160$).

Discussion

The concept of workload perception is the perception of an individual that the work assigned is more than it should be. If not mathematically calculated, it is stated that it is an abstract, perception-based concept. However, it is emphasized that how work is perceived by employees should be investigated as much as the time of work (17). It is known that intensive care nurses, who were at the forefront of the fight against the COVID-19 pandemic, had numerous stressful experiences in a difficult and complex environment (7,18,19). This study was conducted with the thought that the workload perception and work-life balance of intensive care nurses during the pandemic was an important topic of investigation.

Table 1. The correlational analysis between the nurses' characteristics and their workload and work-life balance

	Age	Sex	Marital status	Number of children	Educational status	Time of working at intensive care unit	Time of working as a nurse	Number of beds in intensive care unit	Level of intensive care unit	Daily time of work at intensive care unit	Duty in intensive care unit	Total workload	Total work-life balance
Age	r	1.000											
	p	<0.001											
Sex	r	1.000											
	p	<0.001											
Marital status	r	0.481**	1.000										
	p	<0.001	<0.001										
Number of children	r	0.735**	0.607**	1.000									
	p	<0.001	<0.001	<0.001									
Educational status	r	0.217**	0.165**	0.159**	1.000								
	p	<0.001	0.003	0.004	<0.001								
Time of working at intensive care unit	r	0.708**	0.474**	0.580**	0.142*	1.000							
	p	<0.001	<0.001	<0.001	0.010	<0.001							
Time of working as a nurse	r	0.759**	0.530**	0.607**	0.088	0.823**	1.000						
	p	<0.001	<0.001	<0.001	0.113	<0.001	<0.001						
Number of beds in the intensive care unit	r	-0.095	-0.106	-0.049	0.055	-0.060	-0.181**	1.000					
	p	0.088	0.057	0.378	0.320	0.283	0.001	<0.001					
Level of intensive care unit	r	-0.022	-0.100	-0.041	0.220**	0.047	-0.089	0.337**	1.000				
	p	0.687	0.072	0.464	<0.001	0.396	0.111	<0.001	<0.001				
Daily time of work at intensive care unit	r	-0.174**	-0.057	-0.143**	0.115*	-0.141*	-0.115*	0.111*	0.194**	1.000			
	p	0.002	0.309	0.010	0.038	0.011	0.039	0.045	<0.001	<0.001			
Duty in intensive care unit	r	-0.439**	0.014	-0.335**	-0.136*	-0.455**	-0.392**	0.122*	0.066	0.257**	1.000		
	p	0.000	0.802	<0.001	0.014	<0.001	<0.001	0.028	0.237	<0.001	<0.001		
Total workload	r	0.082	0.059	0.078	-0.038	-0.018	-0.044	-0.034	-0.006	-0.264**	-0.119*	1.000	
	p	0.140	0.292	0.159	0.493	0.750	0.426	0.538	0.919	<0.001	0.031	<0.001	
Total work-life balance	r	0.194**	0.056	0.148**	-0.045	0.088	0.114*	-0.075	-0.070	-0.289**	-0.157**	0.597**	1.000
	p	<0.001	0.314	0.007	0.419	0.114	0.040	0.179	0.210	<0.001	0.005	<0.001	<0.001

*<0.05, **<0.01

In our study, it was found that nurses' manager and co-worker support perceptions were high (positive), and unit support, work environment and intention to continue in the current job perceptions were moderate. The overall workload perception of the nurses was also moderate. Similar to our study, another study found that the individual workload perception of nurses was positive at the highest level for the co-worker support dimension and the lowest level for the manager support dimension (17). In another study investigating the workload perception and workload of the surgical intensive care nurses, the median nursing activity score, which indirectly indicates the workload perception and workload of the nurses was found high (20). In a study conducted by Ozyer (21) to measure workload perception, work-related stress, and medical error attitudes of nurses working in surgical clinics, it was found that the manager support dimension was the most positively perceived dimension related to the work environment (21). In another study conducted by Karacabay et al. (22) with surgical nurses, it was found that nurses' workload perceptions were low; nurses perceived co-worker support positively; nurses perceived a high level of individual workload for manager support, intention to continue work, and unit support dimensions. Hoogendoorn et al. (23) stated that no significant relationship was present between the observed workload per nurse and perceived nursing workload. Unfortunately, no observation or mathematical calculations were made to calculate the workload of the intensive care nurses due to the pandemic conditions. It is suggested to use objective nursing workload measurement tools such as the Nursing Activities score in studies conducted to identify the workload of intensive care nurses. Moreover, it is stated that perceived nursing workload has a significant relationship with the disease severity score of patients in the ICU and the experience of nurses (23).

On the other hand, it is stated that the workload perception of intensive care nurses is related to the number of patients per nurse due to the complexity and intensity of patient care, and the increase in the workload increases the risk of burnout for nurses (24). In a study that investigated the experience of nurses during the COVID-19 pandemic with a mixed method, statements such as "The bond we made as front-line heroes will never be broken . . . unless you were in it, you will never understand fully" and "I am proud to be a nurse" of nurses proves that the nurses became aware of their power and strengths during the fight against

the pandemic (25). The positive perception of the co-worker support dimension of workload perception in our research may be associated with this evidence.

In our study, nurses' neglecting life dimension was high; work-life concordance, allocating time for oneself, life consisting of just work dimensions, and overall work-life balance was at a moderate level. Work-life balance is defined as an individual living their life as "being at work when they are at work and home when they are home" (26).

In a study, it is stated that the participants allocate 80% of their time to their work and only 20% of their time to their social lives. It was found that those who received social support (manager, co-worker, spouse) were able to balance the time allocated to work and personal lives (27). In our study, it is an expected result that the nurses neglected their lives due to the COVID-19 pandemic and managed a moderate level of work-life balance because, especially at the beginning of the pandemic, intensive care nurses in our country preferred to stay apart from their families and loved ones, staying at dormitories or hotels due to the risk of infecting their families. Moreover, they had difficulties in meeting their basic needs (e.g. drinking water, eating, resting) and had to work extensively with PPE (7).

In our study, the overall level of the work-life balance increased as the overall workload decreased. Employees with excessive workload experience emotional burnout when they cannot get any support to balance their roles in work and life. Flexible work regulations may enhance the work-life balance, which is a satisfying participation level or "concordance" between the multiple roles an individual has in life. The philosophy of the work-life balance is based on the principle that work life and personal life support each other in achieving both (28). On the other hand, an imbalance between work and life emerges when one of these roles has too much pressure and makes it difficult to meet the demands and needs of the role (10). In our country, flexible work hours were introduced during the pandemic in clinics where no patients with COVID-19 received care. However, intensive care nurses were not included in this regulation. Instead, the working hours were regulated as 12 hours of block shifts following each other or 24 hours of shifts twice per week. The Turkish Intensive Care Nurses Association presented three different reports to the Ministry of Health to provide humanistic work conditions for intensive care nurses during the pandemic. Unfortunately, the necessary regulations were not fully made. Therefore,

it was an expected result that our study found an increase in the work-life balance with the decrease in the workload. In our study, long daily work hours in ICUs decreased the overall level of work-life balance. In a study by Oyama and Fukahori (29), a significant relationship was found between nurses' long working hours and their physical and mental health. For long working hours to not deteriorate the work-life balance and maintain a healthy workforce, it is suggested that the work environment should be organized and after-work activities such as fitness, aerobics, dance, and yoga should be organized. Moreover, it is suggested that activities such as aerobics, dance, yoga, mindfulness interventions, and outside should be organized after work or during breaks for nurses who spend more than 50% of their time at work; these activities would be very beneficial in increasing the quality of patient care (27). In another study conducted in Japan, it was detected that the work-life balance levels of nurses were extremely low, nurses spent most of their time working, and annual leave had a positive effect on the work-life balance (30). In a study by Nurumal et al. (31), it was found that working fixed shifts had a significant relationship with work-life balance, and the work-life balance levels of nurses working fixed shifts were higher. The intensive care nurses could not spend their free time doing fun activities because they had difficulties in even meeting basic activities of life. Moreover, holding tight to their altruistic values by neglecting their own lives was enough to disrupt their work-life balance.

Intensive care nurses stated that constantly donning and doffing PPE or working with the same equipment all day was a reason for physical exhaustion per. Moreover, nurses provided emotional and mental support for the patients in addition to the complex care and treatment because the patients could not see their relatives due to the visiting restrictions in ICUs (25).

Workload perception is associated with overall job satisfaction. Workload is an indicator of the pressure and urgency of the work environment. Too much expectation and/or insufficient resources may cause work pressure to increase. Nursing capacity should be planned according to the Nursing Activities score, disease severity, and the education status of nurses to balance the workload of nurses (23).

With the transition to the normalization period, while the number of COVID-19 cases with the mutated virus increases

rapidly, the pressure of work on nurses has been substantially increasing all over the world. Therefore, all employees who are at the forefront during the pandemic, particularly intensive care nurses, need to balance their work and life. Nurses and institutions should work together to maintain a positive work-life balance and combat the pandemic (32).

The limitations of the research include collecting data only from nurses working in COVID-19 ICUs, not being able to perform workload calculations specific to the units in which the nurses worked due to the pandemic, and the unwillingness of the nurses to participate in the research due to their busy work schedule caused by the pandemic.

Conclusion

In our study, workload perception and the work-life balance of the intensive care nurses were at a moderate level. It was identified that excessive workload and long work hours in the ICU deteriorated the work-life balance of nurses. Measurement tools including objective mathematical calculations to identify the workload of intensive care nurses can be used to evaluate workload perception. Moreover, it can be suggested to approach work-life balance with different variables such as physical and mental health.

Ethics

Ethics Committee Approval: This study written consent was obtained from the İstanbul Medipol University Non-Invasive Clinical Research Ethics Committee (decision no: 58, date: 21.01.2021).

Informed Consent: Then, the data were collected after the permission of the hospital authorities, the satisfaction of the nurses, and an explanation of the nature and objectives of the research.

Peer-review: Externally peer-reviewed.

Authorship Contributions:

Concept: F.A., B.T., Design: F.A., B.T., Data Collection and Process: B.T., F.A., Analysis or Interpretation: F.A., B.T., Literature Search: F.A., B.T., Writing: F.A., B.T.

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

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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 21st 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,

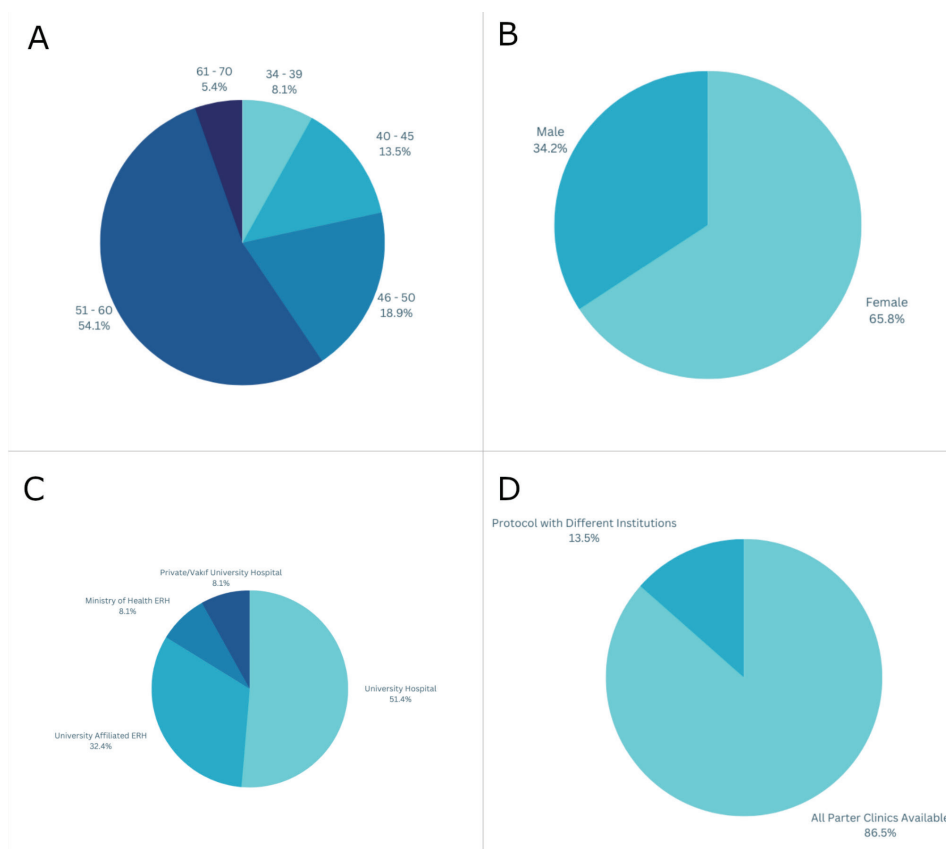


Figure 1. Characteristics of educational staff. Panel A: age groups, panel B: gender, panel C: institution, panel D: intensive care subspecialty education program

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

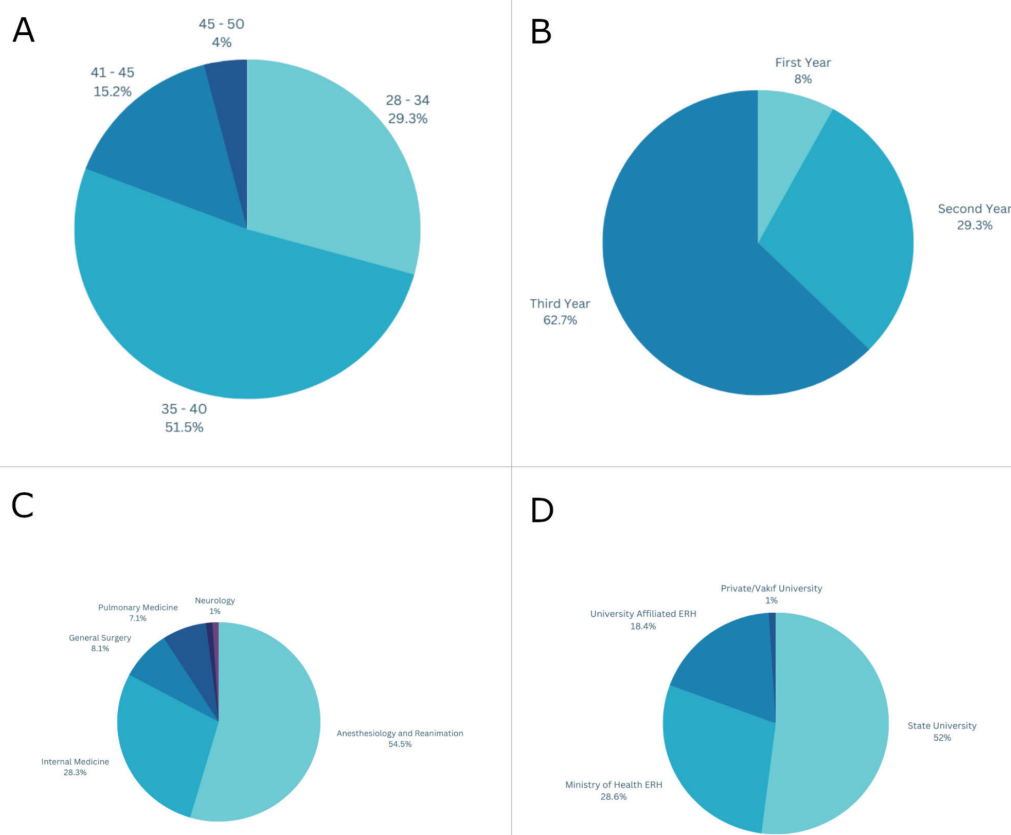


Figure 2. Characteristics of research assistants. Panel A: age groups, panel B: year in education, panel C: main specialty, panel D: institution of subspecialty education

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

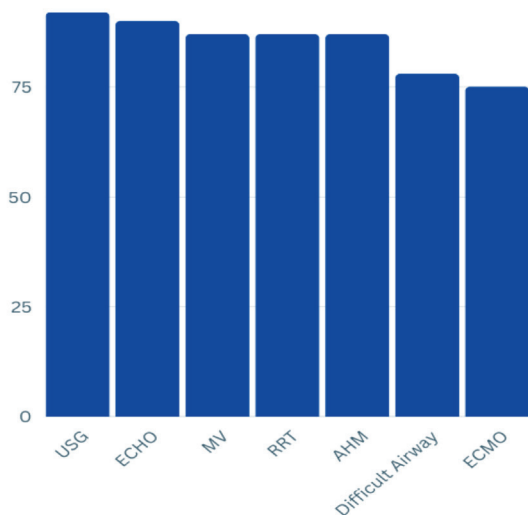


Figure 3. Additional training topics addressed by research assistants
 USG: Ultrasonography, ECHO: echocardiography, MV: mechanical ventilation, RRT: renal replacement therapy, AHM: advanced hemodynamic monitoring, ECMO: extracorporeal membrane oxygenation

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 2nd and 3rd 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

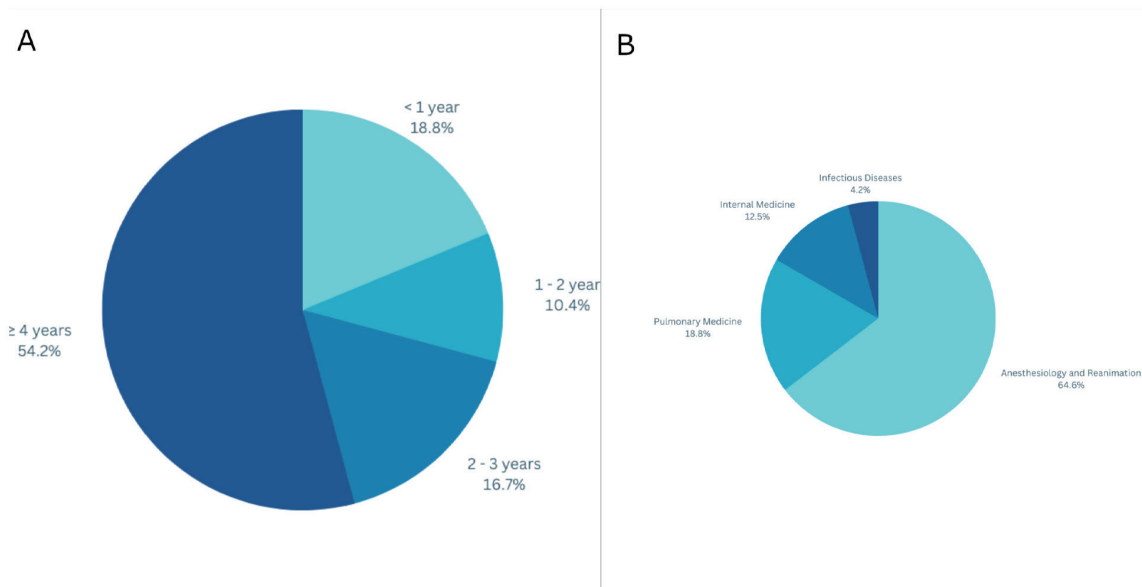


Figure 4. Characteristics of intensive care specialists. Panel A: years in specialty, panel B: main specialty

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 3rd 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.

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.

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Coronaphobia, Job Satisfaction, and Languishing Levels of Intensive Care Nurses: A Cross-sectional and Correlational Study

Yoğun Bakım Hemşirelerinin Koronafobi, İş Doyumu ve Duygusal Yorgunluk Düzeyleri: Kesitsel ve Korelasyonel Bir Çalışma

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ABSTRACT Objective: This study investigated the association between coronaphobia, job satisfaction, and languishing levels in intensive care nurses.

Materials and Methods: This cross-sectional and correlational study was conducted with 106 intensive care nurses. The coronavirus disease-2019 phobia scale, Mental Health Continuum-Short form, and Nurse Job Satisfaction scale were used for data collection.

Results: The total score of coronaphobia was 49.41 ± 12.39 , 36.57 ± 13.60 for the mental health continuum, and 94.28 ± 12.82 for nurse job satisfaction. There was a weak correlation between coronaphobia and emotional well-being. There was no relationship between coronaphobia and nurse job satisfaction. However, there was a moderate positive relationship between the mental health continuum and nurse job satisfaction.

Conclusion: Intensive care nurses had a moderate mental health continuum in languishing. Psychosocial support and psychological counseling should be provided to intensive care nurses to eliminate feelings of emptiness, improve their concentration and motivation, and increase their working capacity.

Keywords: Intensive care unit, nurse, coronaphobia, job satisfaction, languishing

ÖZ Amaç: Bu çalışma, yoğun bakım hemşirelerinin koronafobi, iş doyumunu ve duygusal yorgunluk düzeyleri arasındaki ilişkiyi araştırmayı amaçlamıştır.

Gereç ve Yöntem: Bu kesitsel ve ilişkisel araştırma, 106 yoğun bakım hemşiresi ile yürütülmüştür. Veri toplama aracı olarak koronavirüs hastalığı-2019 fobi ölçeği, Ruh Sağlığı Sürekliliği-Kısa formu ve Hemşire İş Doyumu ölçeği kullanılmıştır.

Bulgular: Koronafobi toplam puanı $49,41 \pm 12,39$, ruh sağlığı sürekliliği toplam puanı $36,57 \pm 13,60$ ve hemşire iş doyumunu toplam puanı $94,28 \pm 12,82$ bulunmuştur. Koronafobi ile duygusal iyi oluş arasında zayıf bir ilişki bulunmuştur. Koronafobi ile hemşire iş doyumunu arasında bir ilişki saptanmamıştır. Bununla birlikte, ruh sağlığı sürekliliği ile hemşire iş tatmini arasında orta düzeyde pozitif bir ilişki olduğu belirlenmiştir.

Sonuç: Yoğun bakım hemşirelerinin, duygusal yorgunluk açısından orta düzeyde bir ruh sağlığı sürekliliğine sahip oldukları belirlenmiştir. Yoğun bakım hemşirelerine boşluk hissini gidermek, konsantrasyon ve motivasyonlarını artırmak, çalışma kapasitelerini geliştirmek için psikososyal destek ve psikolojik danışmanlık verilmelidir.

Anahtar Kelimeler: Yoğun bakım, hemşire, koronafobi, iş doyumunu, duygusal yorgunluk

Introduction

The coronavirus disease-2019 (COVID-19) pandemic, in addition to its emergence as a global health emergency, has also negatively affected people socioeconomically and psychologically. Increasing death rates, unemployment rates, disruptions in education, and protective measures such as quarantine and masks contributed to this. As a result, people have a fear of contracting COVID-19. Coronaphobia, which means fear or anxiety about catching COVID-19, has increased the rate of people using antianxiety drugs to cope with anxiety and stress (1). Coronaphobia is an overtriggered response to the fear of contagion of the virus. It causes excessive anxiety about the physiological symptoms accompanying COVID-19, personal and work-related problems, security problems, and an increase in self-protective behaviors, being away from crowded environments and people, and a significant deterioration in daily life functioning (2).

Coronaphobia, stress, and isolation associated with extended lockdown and existing concerns related to new variants that cause burnout and anxiety. These psychological changes have caused the feeling of languishing (3,4). A sense of languishing is accepted as one of the powerful emotions of 2021. Languishing is the state of not flowing or moving and containing nothing. It includes having trouble concentrating, not functioning at total capacity, decreased motivation, and disrupted ability to focus. It isn't burnout and depression because people still have energy and do not feel hopeless (5). Languishing is defined as feeling empty, slowing down, feeling helpless, losing motivation, not wanting to work, having trouble concentrating, and delaying responsibilities (6). While it indicates depression, it is considered a line between flourishing and lack of well-being. It is a very common problem and is considered as an indicator for many mental disorders (5).

During the COVID-19 pandemic, health personnel experienced significant problems that negatively affect their mental health, such as deterioration in social interaction, difficulty in fulfilling their roles, fear, and anxiety. As the cases and workload increased during the pandemic, the intense work tempo and insufficient staff caused the work-life balance to deteriorate and psychological problems (7). According to Fronda and Labrague (8), more than half of frontline nurses experienced coronaphobia; some wanted to leave their jobs and lost their professional motivation.

Another study showed that the prevalence of coronaphobia was 54.76% (9).

Although there are not many studies on coronaphobia in intensive care nurses, studies are showing that they experience high levels of death anxiety, work-related burnout, posttraumatic stress disorder, depression, anxiety, and stress (10,11). Intensive care nurses faced physical and mental symptoms and social problems during the COVID-19 pandemic (12). They stated that while caring for patients, they were worried about catching the disease, their work-related responsibilities increased, and they had difficulty completing their work. The condition of the patients was very variable. They could not get enough support from the manager nurses (13).

Nurse leaders have an essential role in actively supporting nurses, creating good study conditions, accessing adequate materials and staff, and rewarding them during and after the COVID-19 pandemic (14). Unfortunately, intensive care nurses reported that they were not supported by health and government officials and institution managers (10). The complexity and crowdedness of the working environment, working with different health equipment, and applying other treatment methods make safe, intensive nursing care difficult. Intensive care nurses have problems providing health care because they have deficiencies and work in a caring environment with adverse conditions. It is even subject to moral stress (15).

A healthy work environment is essential. An unhealthy work environment causes mental problems such as fatigue, boredom, anxiety, depression, moral distress, and thoughts of death (16). Intensive care nurses should be supported regarding the symptoms of mental disorders, stress management, and professional and personal development during the COVID-19 pandemic because fear of contracting an illness has been associated with reduced professional satisfaction and higher turnover intention. An unhealthy work environment, insufficient equipment, insufficient number of nurses, problems in performing their professional roles, and lack of professional promotion opportunities negatively affect the job satisfaction of nurses (17).

The study aimed to investigate the association between coronaphobia, job satisfaction, and the languishing levels of intensive care nurses. The research questions are:

- Is there a significant relationship between intensive care nurses' coronaphobia and job satisfaction?

- Is there a significant relationship between intensive care nurses' coronaphobia and languishing levels?
- Is there a significant relationship between intensive care nurses' languishing and job satisfaction levels?
- What are the predictors of intensive care nurses' languishing levels?

Materials and Methods

Design

This cross-sectional and correlational study was done following the guidelines of the Strengthening Reporting of Observational Studies in Epidemiology.

Sample

The study sample consisted of intensive care nurses during the COVID-19 pandemic in Northeastern Turkey from June to July 2022. For the survey, 200 nurses from seven intensive care units were invited using a convenience sampling strategy. In total, 106 nurses filled out the questionnaire. The mean age of the nurses was 31.95 ± 8.84 .

The criteria for inclusion in the study were working in intensive care units during the COVID-19 pandemic and volunteering to participate in the study. Those who completed the questionnaires incompletely and refused to participate in the study were excluded from the study.

Data Collection Instruments

Nurse Information Form: The researchers developed the form by related literature (7-9). It consisted of eight sociodemographic characteristics (age, gender, marital status, education, working years, types of shifts, working position, and working unit).

The COVID-19 Phobia Scale (C19P-S): The scale was developed by Arpacı et al. (18). The scale consisted of 20 items and four factors. The items of the five-point Likert scale are scored between 1 and 5. The lowest score obtained from the scale is 20, and the highest score is 100. High scores indicate a high phobia. In the original study, Cronbach's alpha for the scale's total score was 0.92, 0.87 for the psychological subdimension, 0.82 for the psychosomatic subdimension, 0.79 for the economic dimension, and 0.79 for the social dimension (18). In this study, Cronbach's alpha coefficient of C19P-S was 0.92, 0.83 for the psychological subdimension, 0.86 for the psychosomatic, 0.72 for the social, and 0.75 for the economic.

The Mental Health Continuum-Short Form (MHC-SF):

The scale was developed by Keyes et al. (19) to measure emotional, social, and psychological well-being. The short form includes 14 items and consists of three sub-dimensions: "emotional well-being, psychological well-being, and social well-being." The scale also shows flourishing and languishing mental health. The items are scored between 0 and 5. The lowest score obtained from the scale is 0, and the highest score is 70. Higher scores indicate flourishing, and lower scores indicate languishing. Demirci and Akın (20) carried out a Turkish reliability and validity study. In this study, Cronbach's alpha coefficient of the MHC-SF was 0.92, 0.87 for "emotional well-being" subdimension, 0.82 for "social well-being" subdimension, and 0.89 for "psychological well-being" subdimension.

Nurse Job Satisfaction Scale (NJSS): The scale was developed by Muya et al. (21). Türe-Yılmaz and Yıldırım (22) carried out a Turkish reliability and validity study. The scale consists of 27 items and four subdimensions. The items of the five-point Likert scale are scored between 1 and 5. The lowest score obtained from the scale is 27, and the highest score is 135. Higher scores show high job satisfaction. In this study, the Cronbach's alpha coefficient of the NJSS was 0.88, 0.79 for the positive emotion toward work subdimension, 0.95 for the appropriate support from superiors subdimension, 0.68 for perceived significance in the workplace, and 0.65 for the pleasant working environment sub-dimension.

Ethical Considerations

Before starting the study, written approval was obtained from the Clinical Research Ethics Committee of Aksaray University, numbered 2022/12-05 (date: 23.06.2022). The sample consisted of nurses who voluntarily participated in the research. Written and verbal consent were obtained from all participants.

Statistical Analysis

SPSS 24 was used to analyze the data. Data were presented with descriptive statistics. The normality analyses were performed with Kolmogorov-Smirnov. The Pearson correlation test was used to determine the correlation between intensive care nurses' coronaphobia, languishing, and job satisfaction scores. Multiple Linear Regression analysis was used to identify predictors of languishing in intensive care nurses. Statistical significance was set at $p < 0.05$.

Results

Table 1 shows the sociodemographic characteristics of the participants. Of the nurses, 91.5% were female, 56.6% were single, and 81.1% were with bachelor's degree. Of them, 49.1% worked for 1-5 years, and 90.6% performed day and night. Of the nurses, 92.5% worked as department nurses, and 43.4% worked in the COVID-19 intensive care unit.

Table 2 shows the mean scores of C19P-S, MHC-SF, and NJSS. The mean score of coronaphobia was 49.41 ± 12.39 , psychological subdimension 18.12 ± 4.65 , psychosomatic subdimension 9.95 ± 3.63 , social subdimension 13.13 ± 3.58 ,

Table 1. Nurses' sociodemographic characteristics		
Valuables	n	%
Gender		
Female	97	91.5
Male	9	8.5
Marital status		
Single	60	56.6
Married	46	43.4
Education		
High school	6	5.7
Associate degree	9	8.5
Bachelor's degree	86	81.1
Master's degree	5	4.7
Working years		
<1	6	5.7
1-5	52	49.1
6-10	9	8.5
11-15	6	5.7
16-20	14	13.2
≥ 21	19	17.9
Type of shift		
Always day shift	7	6.6
Always night shift	3	2.8
Shifting (day and night)	96	90.6
Working position		
Department nurse	98	92.5
Nurse-in-charge	8	7.5
Working unit		
COVID-19 intensive care unit	46	43.4
Other intensive care units	60	56.6
COVID-19: Coronavirus disease-2019		

and economic subdimension 8.20 ± 2.67 . The mean score of the mental health continuum was 36.57 ± 13.60 , emotional well-being 7.53 ± 3.44 , social well-being 10.48 ± 5.31 , and psychological well-being 18.55 ± 6.88 . The mean score of nurse job satisfaction was 94.28 ± 12.82 , positive feelings about work 29.91 ± 4.80 , appropriate support from superiors 19.47 ± 6.15 , perceived importance at work 27.88 ± 3.35 , and pleasant working environment 17.00 ± 3.60 .

Table 3 shows the correlation findings between the scales. There was a weak and negative relationship between coronaphobia and emotional well-being ($r = -0.208$, $p < 0.01$). There was a weak and negative relationship between the social dimension of coronaphobia with emotional well-being ($r = -0.228$, $p < 0.01$) and social well-being ($r = -0.192$, $p < 0.01$). There was no relationship between coronaphobia and nurse job satisfaction ($p > 0.05$). However, there was a moderate and positive relationship between mental health continuum and nurse job satisfaction ($r = 0.497$), positive feelings about work ($r = 0.459$), perceived importance at work ($r = 0.417$), and pleasant working environment ($r = 0.476$; $p < 0.05$).

The model in Table 4 explained 62.2% of the nurses' mental health continuum ($F = 15.914$, $p < 0.001$) and revealed the most important predictors. In order of importance, the predictors were pleasant working environment ($\beta = 0.368$, $p < 0.001$), positive feelings about work ($\beta = 0.223$, $p = 0.025$), nurse's age ($\beta = 0.194$, $p = 0.018$), and perceived importance at work ($\beta = 0.192$, $p = 0.048$).

Discussion

This study showed that intensive care nurses had a moderate mental health continuum in languishing. Their psychological, psychosomatic, and social well-being levels were moderate. Nurses were exposed to various family and work-related problems that disrupted their mental health during the pandemic (23). Intensive care nurses reported symptoms of anxiety, depression, and posttraumatic stress disorder, and the COVID-19 pandemic greatly impacted their mental well-being (24). Nurses' mental health was affected by the COVID-19 pandemic, and nurses presented higher depression, anxiety, and stress levels (25). Studies revealed that nurses experienced burnout, anxiety, posttraumatic stress disorder, and depression (26,27). Hospital nurses and nursing assistants experienced physical and mental burnout, lack of effort to solve problems, lack of interest, concern, or sympathy, psychological symptoms, and

cognitive issues (28). Although studies conducted in the early stages of the pandemic showed that nurses' mental well-being was low, it was moderate in this study. This study, which was conducted at a time when the adverse effects of

the pandemic were diminishing, showed that nurses were still at risk of languishing.

The present study found a weak and negative relationship between coronaphobia with emotional and social well-being.

Table 2. The mean scores of C19P-S, MHC-SF, and NJSS

Scales	Mean ± SD	Min-max	Cronbach's alpha value
Total C19P-S	49.41±12.39	22-82	0.920
Psychological	18.12±4.65	8-28	0.828
Psychosomatic	9.95±3.63	5-23	0.865
Social	13.13±3.58	5-21	0.724
Economic	8.20±2.67	4-20	0.748
Total MHC-SF	36.57±13.60	3-64	0.921
Emotional well-being	7.53±3.44	0-15	0.872
Social well-being	10.48±5.31	0-24	0.819
Psychological well-being	18.55±6.88	1-30	0.895
Total NJSS	94.28±12.82	44-119	0.876
Positive feelings about work	29.91±4.80	13-40	0.788
Appropriate support from superiors	19.47±6.15	6-30	0.948
Perceived importance at work	27.88±3.35	13-35	0.678
Pleasant working environment	17.00±3.60	7-26	0.652

C19P-S: The coronavirus disease-2019 phobia scale, MHC-SF: The Mental Health Continuum-Short form, NJSS: Nurse Job Satisfaction scale, SD: standard deviation, min-max: minimum-maximum

Table 3. The correlation findings between C19P-S, MHC-SF, and NJSS scores

	Total C19P-S	Psychological	Psychosomatic	Social	Economic	Total MHC-SF	Emotional well-being	Social well-being	Psychological well-being
Total MHC-SF	-0.180	-0.113	-0.129	-0.166	-0.163	-	-	-	-
Emotional well-being	-0.208*	-0.116	-0.142	-0.228*	-0.175	-	-	-	-
Social well-being	-0.186	-0.150	-0.096	-0.192*	-0.129	-	-	-	-
Psychological well-being	-0.115	-0.047	-0.133	-0.074	-0.136	-	-	-	-
Total NJSS	-0.084	0.022	-0.149	-0.055	-0.077	0.497**	0.436**	0.509**	0.381**
Positive feelings about work	-0.087	-0.012	-0.118	-0.085	-0.144	0.459**	0.439**	0.415**	0.390**
Appropriate support from superiors	-0.079	-0.049	-0.067	-0.062	-0.027	0.229*	0.197*	0.271**	0.143
Perceived importance at work	-0.047	0.065	-0.145	0.017	-0.153	0.417**	0.349**	0.389**	0.348**
Pleasant working environment	-0.092	-0.021	-0.133	-0.093	0.006	0.476**	0.404**	0.541**	0.305**

*p<0.01; **p<0.05
C19P-S: The coronavirus disease-2019 phobia scale, MHC-SF: The Mental Health Continuum-Short form, NJSS: Nurse Job Satisfaction scale

Table 4. Predictors of mental health continuum by regression analysis

Valuables	B	SD	β	t	p	R	R ²
Positive feelings about work	0.631	0.277	0.223	2.276	0.025	0.622	0.387
Perceived importance at work	0.779	0.390	0.192	1.998	0.048	-	-
Pleasant working environment	1.390	0.330	0.368	4.212	0.000	-	-
Age	0.299	0.124	0.194	2.407	0.018	-	-

F=15.914, p=0.000
SD: Standard deviation

So, languishing was associated with coronaphobia. Similarly, Yayla and Eskici Ilgin (7) found a significant association between coronaphobia and psychological well-being in nurses. Again, in a study with doctors, coronaphobia was associated with psychological and emotional well-being (29). In a study conducted with individuals living in the community, fear of COVID-19 was related to spiritual well-being (30). No other study investigated the relationship between coronaphobia and languishing, that is, social, emotional, and psychological well-being. Although there is a relationship between the variables in this study, more studies on the subject are needed.

The present study revealed that coronaphobia was not associated with nurse job satisfaction. Labrague and De Los Santos (9) reported that coronaphobia could negatively affect nurses' job performance, job satisfaction, and job satisfaction during the pandemic. The nurses who recovered from COVID-19 frequently also revealed feeling abandoned, frustrated, suffering in a bad mood, willing to quit their jobs, and experiencing coronaphobia (31). During the pandemic, studies reported that nurses' physical and emotional workload increased, resulting in burnout and decreased job satisfaction (32,33). However, these studies did not investigate the relationship between coronaphobia and job satisfaction. This study showed that coronaphobia was not associated with job satisfaction.

The present study found a moderate positive relationship between the mental health continuum and nurse job satisfaction. In other words, languishing was associated with job satisfaction. Similarly, Da Rosa et al. (34) found that job dissatisfaction was related to nurses' emotional distress and psychological symptoms during the COVID-19 pandemic. Mcloughlin et al. (35) revealed that junior psychiatry doctors experienced increased burnout and decreased psychological well-being. Staff shortages, longer hours, and less experience during the COVID-19 pandemic were significant factors in terms of burnout and psychological well-being. Psychiatric

nurses experienced decreased job satisfaction during the COVID-19 pandemic, and job satisfaction was associated with job burnout (36). It was determined that depression, considered one of the indicators of psychological well-being, was related to the job satisfaction of nurses during the pandemic. As depression increased, job satisfaction decreased (37).

Finally, this study revealed that a nurse's age was a significant predictor of psychological, social, and emotional well-being, namely, languishing. In a study conducted during the pandemic period, it was determined that the age of nurses affects their level of psychological well-being (27). Studies found that younger nurses had low psychological well-being (38,39). Younger healthcare workers experienced more significant anxiety and depressive symptoms and lower psychological well-being during the COVID-19 pandemic (40). Due to younger age, inexperience can cause them to experience an inability to adapt and cope with the pandemic, changing and aggravating working conditions. Older nurses' challenges over the years may have improved and strengthened their coping and problem-solving skills.

This study has some limitations. The study was conducted in a small sample. Languishing should also be explored in larger samples. The results of this study cannot be generalized to all nurses. A cross-sectional and correlational research design was used. With qualitative methods, phenomenological studies can be conducted, and a more in-depth analysis of the subject can be made.

Conclusion

In this study, the languishing levels of nurses are moderate. Moreover, coronaphobia is associated with languishing but not with nurse job satisfaction. Moreover, there is a significant relationship between languishing and nurse job satisfaction. A pleasant working environment, positive feelings about work, nurses' age, and perceived

importance at work are the most important predictors of languishing.

Languishing is a sense of stagnation and emptiness. It includes having trouble concentrating, not functioning at total capacity, decreased motivation, and disrupted ability to focus. Intensive care nurses should receive psychosocial support and psychological counseling to eliminate the feeling of emptiness, improve their concentration and motivation, and increase their working capacity. Those experiencing severe coronaphobia should be identified, and how it affects their motivation, work capacity, and mental health should be described. Job satisfaction of intensive care nurses should be increased, working conditions should be regulated, and work environments should be structured. Manager nurses have a great responsibility for the nurse to perceive themselves as essential and have positive feelings about their profession. They should also take responsibility for being a good role model, showing good examples, motivating, praising, rewarding, leading the effect of their work on patient care outcomes, and organizing webinars. Manager nurses should periodically evaluate the mental health and job satisfaction of intensive care nurses and convey their results to the relevant authorities. It should be in constant interaction

and cooperation with intensive care nurses. They can benefit from resilience training, motivational interviews, and mindfulness-based stress reduction programs.

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Ethics

Ethics Committee Approval: Written approval was obtained from the Clinical Research Ethics Committee of Aksaray University, numbered 2022/12-05 (date: 23.06.2022).

Informed Consent: Written informed consent from the nurses who agreed to participate in the study was obtained in order to conduct the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: A.B., E.B.Y., A.Y., Design: A.B., E.B.Y., A.Y., Data Collection and Process: A.B., Analysis or Interpretation: E.B.Y., A.Y., Literature Search: E.B.Y., A.Y., Writing: A.B., E.B.Y., A.Y.

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Palyatif Bakım Kliniğine Kabulde Tespit Edilen Basınç Yarası ile Norton ve Braden Skalası Skorlarının Uyumu

Pressure Ulcers on Admission to Palliative Care Unit and Scores on Norton and Braden Scales

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Sunulan: Bu çalışma 18 Aralık 2020 tarihinde Onkoloji Hemşireliği Kongresi'nde ve 3. Palyatif Bakım E-Kongrede sözel bildiri olarak sunulmuştur.

ÖZ Amaç: Palyatif bakım kliniklerine (PBK) kabul edilen hastaların çoğunluğu ileri yaş olup bası yarası (BY) açısından yüksek risk içermektedirler. Hastaların kabul anında BY skorları bakılması önerilmektedir. Bu çalışmada PBK'ye kabul anında açılmış olan BY ile Norton ve Braden skorlarının uyumu, BY skalalarının duyarlılık ve özgüllükleri arasındaki farkları incelemeyi amaçladık.

Gereç ve Yöntem: Kesitsel analiz içeren çalışmada üçüncü basamak bir sağlık kuruluşuna entegre PBK'de 2017-2019 yılları arasında yatan hastaların kayıtları retrospektif olarak incelendi. Demografik ve klinik verileri, BY yeri, sayısı ve evresine yönelik verileri bulunan, Norton ve Braden BY riski değerlendirilmiş olan hastalar çalışmaya alındı. Yatış anında BY durumu ile risk skorları arasındaki uyum incelendi.

Bulgular: Çalışmaya 566 olgu alındı [medyan (minimum-maksimum) yaş: 68 (19-97), erkek: 328 (%58)]. Kabulde 181 hastada (%32) BY vardı (sakrum: %80). Norton skalasına göre tüm olguların 269'u (%47,5) BY riski altındaydı ve bunların %48,7'sinde (n=131) BY açılmıştı. Braden skalasına göre 475 (%83,9) hasta BY riski altındaydı ve bunların %37,5'inde (n=178) halihazırda açılmış BY vardı. Norton skalasına göre düşük BY riski altında olan 297 olgunun %16'sında (n=50) açılmış BY vardı. BY olanların %27,6'sında Norton skoru düşük değildi. Braden skalasına göre düşük BY riski altında olan 91 olgunun sadece %3,3'ünde (n=3) BY vardı. Eşik Norton skorunun BY varlığına ilişkin sensitivitesi %48,9, spesifitesi %83,2 hesaplandı. Eşik Braden skorunun BY varlığına ilişkin sensitivitesi %66,9, spesifitesi %99,0 hesaplandı.

Sonuç: Norton ve Braden skorlarına göre risk altında olan olguların yaklaşık yarısında önceden açılmış BY vardı. Her iki skorlama ölçeğinin mevcut BY varlığı açısından sensitivitesi düşük bulundu. Diğer yandan, her iki skalaya göre eşik rakamların spesifite değerleri kabul edilebilir bulundu.

Anahtar Kelimeler: Palyatif bakım, basınç yarası, Norton skalası, Braden skalası

ABSTRACT Objective: Pressure ulcers (PU) are common in patients admitted to palliative care clinics (PCC). Progressive nutritional deficiency, incontinence, and limitation of movement increase the risk of new PU formation. Purpose: To examine the risk of PU in patients hospitalized in PCC and the rate of wounds on admission.

Materials and Methods: We retrospectively analyzed patients hospitalized between 2017 and 2019 in a PCC integrated into a tertiary health institution. Patients with demographic and clinical data, data on the region, number, and stage of PU, and Norton and Braden pressure risk scores were enrolled. Patients with scores 11 on the Norton scale and 18 on the Braden scale were considered to be at higher risk for PU.

Results: The final analysis included 566 patients [mean age: 68 years, male: 328 (58%)]. On admission, PU was recorded in 181 patients (32%) (sacrum: 80%). According to the Norton scale, 269 (47.5%) of all cases were under the risk of PU and 48.7% (n=131) of them already had PU. According to the Braden scale, 475 (83.9%) patients were at risk of PU, and 37.5% (n=178) of them already had PU. Among subjects with a low Norton score (n=297), 16% (n=50) already had PUs. Among subjects with PUs, the Norton score was not high 27.6%. Only 3.3% (n=3) of 91 patients whose Braden score was not low already had a PU. The sensitivity and specificity of the Norton score in the prediction of PU were 48.9% and 83.2%, respectively. The sensitivity and specificity of the Braden score in the prediction of PU were 66.9% and 99.0%, respectively.

Conclusion: Physical PU examination on admission to PCC and during follow-up can identify a significant number of cases. The utility of Norton and Braden scores to estimate the occurrence of PUs may be limited in the palliative care setting or patients.

Keywords: Palliative care, pressure ulcer, Norton scale, Braden scale

Giriş

Basınç yaraları (BY), genellikle kemik çıkıntısı üzerinde, tıbbi veya diğer cihazların basısı ile ilişkili, deri ve altta yatan yumuşak dokunun lokalize hasarıdır (1,2). Tedavisi uzun süreli ve yüksek maliyetlidir. Yaşam kalitesini önemli ölçüde bozar (3). Yoğun bakım ve rehabilitasyon alanındaki ilerlemeler beklenen yaşam süresini uzatmakla birlikte BY olan yatağa bağımlı hasta sayısı da artmaktadır. Palyatif bakım kliniklerine (PBK) kabul edilen hastaların çoğunluğu ileri yaş olup BY açısından yüksek risk içermektedirler. Yaşlı, inkontinanslı, beslenme yetersizliği bulunan immobil palyatif bakım hastalarında gelişebilecek BY'nin tedavisi zor, uzun süreli, yüksek maliyetlidir. Bu grup hastalarda BY'nin oluşmasını önlenmek önemlidir. Hastaların servise kabul anında BY risk ölçeklerinin kullanılması, hastaların bakım planlarının oluşturulması riskin azaltılmasına önemli katkı sağlayacaktır (3).

BY, dokuda meydana gelen hasara ve etiyolojik faktöre göre sınıflandırılmaktadır. Ulusal Bası Yarası Danışma Paneli (*National Pressure Ulcer Advisory Panel*, NPUAP) tarafından 2016 yılında yapılan güncellemeye göre BY evre I, II, III, IV, evrelendirilemeyen BY, derin doku BY, medikal alet kaynaklı BY ve mukoz membran BY olarak sınıflandırılmaktadır (1).

Mekanik yüklenmeye bağlı dokunun maruz kaldığı basınç kapiller perfüzyonu azaltır ve lokal doku iskemisine neden olur (4,5). Ayrıca nem ve ısı sorunları, beslenme eksikliği, ileri yaş, aktivite yetersizliği, hipotansiyon, kronik hastalıklar, bazı ilaçlar da doku toleransını etkileyerek BY oluşma riskini artırır (4,5). Deride sürtünme kuvvetinin etkisiyle oluşan sıyrılmalar basıncın etkisiyle birleştiğinde derin doku yaralanmalarına neden olabilir (6). Deri ve deri altı doku yer çekimine karşı pozisyonunu koruma eğiliminde iken iskelet ve derin bağ dokusu yer çekimi yönünde kayma eğilimindedir. İki doku arasındaki bu zıt durum kapiller hasara yol açan makaslanma kuvveti olarak adlandırılmaktadır (7,8). Kapiller hasar, basıncın etkisiyle birleştiği zaman ise kapiller tıkanıklık, beraberinde doku iskemisi ve sonuç olarak hücrel hasar ve yaralanma meydana gelmektedir (8).

Üriner ve/veya fekal inkontians, fistül ya da yara bölgesindeki akıntılar derinin nemliliğini artırarak, deriyi yumuşatarak esneme özelliği etkiler ve sürtünme kuvvetinin etkisiyle yaralanmalara yatkınlık oluşturur. Ayrıca, beslenme eksikliğine bağlı kan albuminin değerinin düşmesi neticesinde kolaylaşan doku ödemi de derinin gerilme kuvvetini azaltır ve BY riskini artırır. Yağ dokusu kaybı ile karakterize kanser kaşeksisi gibi durumlarda da kemik çıkıntılarında BY gelişme

riski artar (6,9). Hareket kabiliyeti olmayan hastalar BY geliştiğini hissetseler bile hareket kabiliyetleri olmadığından pozisyon değiştiremezler. Bu yüzden riskli hastalarda sık pozisyon değişimi yapılmalıdır. Yaşa bağlı olarak da deri esnekliği ve gerilme kapasitesi azalır, travma ve yaralanmalara yatkınlık artar (10-12).

NPUAP ve Avrupa Bası Yarası Danışma Paneli, BY'nin önlenmesi için yatarak tedavi görmek üzere hastaneye kabul edilen her hastanın öncelikli olarak bir risk değerlendirme aracı ile risk değerlendirmesinin yapılmasını önermektedir (1). Braden, Norton, Waterlow ve Jackson/Cubbin gibi kanıta dayalı geliştirilmiş BY değerlendirme ölçekleri bu amaçla kullanılabilir.

Hasta güvenliğini tehdit eden sorunlardan biri olan BY'nin oluşumunu engellemede önemli adım risk değerlendirmesidir (1). Norton ve Braden ölçeği PBK'de kullanılmaktadır. Çalışmamızda PBK'de yatan hastalarda Norton ölçeği ve Braden ölçeği ile yatış anındaki BY oranları arasındaki ilişkiyi incelemeyi amaçladık.

Gereç ve Yöntem

2017-2019 yılları arasında bir eğitim araştırma hastanesi PBK'de yatan, bilgilendirilmiş onamı alınan 18 yaş ve üzeri 566 hastanın yatış anında BY olma durumu, yeri, evresi, Braden ve Norton BY ölçeği değerleri, hastaların yaşı, cinsiyeti retrospektif olarak hasta dosyalarından tarandı. Braden skalasında 18 ve daha düşük skor, Norton skalasında 11 ve daha düşük skor yüksek riskli olarak kabul edildi.

Braden Değerlendirme Ölçeği: Braden BY ölçeğinin Türkçeye uyarlanması Oğuz ve Olgun (13,14) tarafından 1997'de yapılmış ve BY gelişme riskinin değerlendirilmesinde geçerli-güvenilir bir araç olduğu saptanmıştır. Genel hasta popülasyonu için geliştirilmesine rağmen yoğun bakım kliniklerinde yaygın olarak kullanılmaktadır. Ölçek duyuşsal algılama, aktivite, hareketlilik, nemlilik, sürtünme-yırtılma, beslenme risk faktörlerinin değerlendirmesini kapsamaktadır (14,15). Ölçeğin uygulamasının daha az zaman alması ve hızlı değerlendirme sağlaması zamanı etkin kullanmak adına birer avantajdır. Ancak değerlendiriciler arası yorum farklılıkları içermesi, hastaların çoğunu riskli olarak değerlendirmesi önemli dezavantajlardır (15,16). Toplam puan 6-23 arasında değişir. Toplam puana göre 12 puan ve altı yüksek riskli, 13-14 puan riskli, 15-16 puan düşük riskli olarak değerlendirilmekte, 75 yaş üstü kişilerde ise 15-18 puan düşük riskli olarak kabul edilmektedir (15,17).

Norton Değerlendirme Ölçeği: BY riski tanılamak için literatürde yer alan ilk ölçektir. Norton tarafından geliştirilmiştir. Hastanede yatan yaşlı hastaların sistematik olarak değerlendirilmesine dayanır. Bu ölçekte beş risk faktörü değerlendirilir. Bunlar, fiziksel durum, mental durum, aktivite durumu, mobilite ve inkontinanstır. Toplam puanı 5-20 arasında değişir ve her bir risk faktörü 1-4 arasında puanlandırılır. On iki ve üzeri haftada bir kez BY riski yeniden ölçülürken 1-11 arası yüksek risk kabul edilip her gün BY riski ölçülür. Bu ölçekte hastanın beslenme ve ağrı düzeyi değerlendirilmediği için gerçeği tam olarak ortaya koymadığı gözlenmiştir (18,19).

Etik Kurul Onamı: Sağlık Bilimleri Üniversitesi Girişimsel Olmayan Araştırmalar Etik Kurul onayı alındı (proje/karar no: 19/196, tarih: 14.05.2019). Hasta ve yakınlarından bilgilendirme onam formu alındı.

Gülhane Eğitim ve Araştırma Hastanesi Tıpta Uzmanlık Eğitim Kurulu tarafından izin alınmıştır (tarih: 26.09.2019).

İstatistiksel Analiz

Tüm karşılaştırmalarda p-değeri <0,05 anlamlı olarak kabul edildi. İstatistiksel analizler SPSS (SPSS Inc., Chicago, IL, USA, Ver. 22.0) kullanarak yapıldı. Sürekli değişkenlerin normal dağılıma uygunluğu Shapiro-Wilk testiyle incelendi. Sürekli değişkenler ortalama ve standart sapma; ortanca ve çeyrekler arası açıklık ve minimum-maksimum değerler olarak sunuldu. Nominal değişkenler oran olarak sunuldu. Eşik Norton ve Braden skorlarının BY varlığını gösterebilmesi açısından sensitivite ve spesifite hesapları alıcı işletim karakteristik eğrisi analizi yöntemi ile hesaplandı.

Bulgular

Çalışmaya 566 olgu alındı [medyan (minimum-maksimum) yaş: 68 (19-97), erkek cinsiyet: %58]. Kabulde 181 hastada (%32) BY vardı. Braden BY skoru en düşük 6, Norton BY skoru en düşük 5 bulundu. Ortalama Braden BY skoru 14,9;

Norton BY skoru ortalama 12,4 hesaplandı (Tablo 1). BY sakrum-koksiks, trokanter, topuk, dirsek, iskial tuberosit, ense alanlarında görülmekteydi. BY olan hastaların %79'unda tek alanda, %13'ünde iki alanda, %3,9 üç alanda, %3,3 dört alanda ve %0,6 beş alanda BY vardı. Evre 2 BY oranı %30,9, evre 3 BY %25, evre 1 BY %19, evre 4 BY %23 idi (Tablo 2).

Braden skoru olguların büyük çoğunda (%83,9) yatış esnasında 18 ve altında bulunmuştur. Bu hastaların %37,5'inde ise BY'nin ilk kabulde mevcut olduğunu gördük. Bu bağlamda, Braden ≤ 18 skorunun var olan BY varlığı açısından sensitivitesi %66,92, spesifitesi ise %99 idi. Braden skorunun eşik altında düşük olması BY olasılığını göstermek açısından %66,92 başarılıdır. Bu rakam, sensitivite açısından testin kuvvetinin yetersiz olduğuna işaret etmektedir. Braden skoru düşük olmayan 91 olgunun sadece %3,3'ünde (n=3) açılmış BY vardı (Tablo 3).

Braden skorunun eşik üzerinde olması, yani riskin düşük beklendiği olgularda açılmış BY olmadığı %99 oranında doğru tahmin edilebilmiştir ve bu, yüksek skorda BY olmadığını tahmin ettirme gücünün kuvvetli olduğuna işaret etmektedir (Tablo 4).

Norton skoru olguların yaklaşık yarısında (%47,5), yatış esnasında 11 ve altında bulunmuştur (Tablo 5). Çalışmamızda hastaların %48,7'sinde ise yatış sırasında açılmış BY olduğunu gördük. Bu bağlamda, Norton ≤ 11 skorunun var olan BY varlığı açısından sensitivitesi %48,88, spesifitesi ise %83,6 idi. Bunun anlamı, Norton BY skorunun eşik altında düşük olması BY olasılığını göstermek açısından %48,88 başarılıdır. Bu rakam, sensitivite açısından testin kuvvetinin oldukça yetersiz olduğuna işaret etmektedir. Diğer yandan, Norton skorunun eşik üzerinde olması, yani riskin düşük beklendiği olgularda açılmış BY olmadığı, %83,6 oranında doğru tahmin edilebilmiştir ve bu, yüksek skorda BY olmadığını tahmin ettirme gücünün kabul edilebilir olduğuna işaret etmektedir (Tablo 5).

Tablo 1. Hastaların Norton ve Braden BY skalaları yüzde oranları

Hasta sayısı						
n=566	Ortalama	SS	Medyan	IQR	Min.	Maks.
Yaş	68,1	17,5	71	21	19	97
BBYS*	14,9	3,5	15	5	6	23
NBYS*	12,4	3,9	12	5	5	20

BY: Basınç yarası, BBYS: Braden basınç yarası skalası, IQR: çeyrek açıklığı, min: en düşük, NBYS: Norton basınç yarası skalası, maks: en yüksek, SS: standart sapma

Tablo 2. Hastaların BY yeri evresi ve yüzde oranları		
Hasta sayısı n=566	n	%
Yatışta basınç yarası yok	385	68,00
Yatışta basınç yarası var	181	32,00
Tek alanda basınç yarası var	143	79,00
2 alanda basınç yarası var	24,00	13,30
3 alanda basınç yarası var	7,00	3,90
4 alanda basınç yarası var	6,00	3,30
5 alanda basınç yarası var	1,00	0,60
Basınç yarası evreleri (n=181)		
Evre 1	36,00	19,90
Evre 2	56,00	30,90
Evre 3	46,00	25,40
Evre 4	43,00	23,80
Sakrum-koksiks	145	80,10
Sol topuk	8	4,40
Sağ trokanter	6	3,30
Sağ topuk	6	3,30
Sol iskiyal tuberosit	3	1,70
Sol alt bacak	3	1,70
Sağ skapula	2	1,10
Omurga	2	1,10
Sol trokanter	2	1,10
Dirsek	1	0,60
Sağ iskiyal tuberosit	1	0,60
Sağ üst bacak ön yüz	1	0,60
Ense	1	0,60
Basınç yarası (BY) en sık sakrum/koksiks (%80), daha sonra her iki topuk bölgesinde kaydedildi (sağ %4,4 ve sol %3,30). En az BY ensede (%0,6) gözlemlendi		

Tablo 3. Hastalarda Braden basınç yarası skalası ve bası yarası olma/olmama oranları		
Hasta sayısı n=566	n	%
Braden ≤18	475	83,9
Braden ≤18 ve basınç yarası var	178	37,5
Braden ≤18 ve basınç yarası yok	297	62,5
Braden >18	91	16,1
Braden >18 ve basınç yarası var	3	3,3
Braden >18 ve basınç yarası yok	88	96,7

Tartışma

Çalışmamızda PBK'ye yatış anında BY olan hastaların %52'si yoğun bakım ünitelerinden, %38'i servis ve %8,7'si

Tablo 4. Braden BY skalası ve BY duyarlılık özgüllük prevalans ve pozitif/negatif olasılık oranları değerleri		
Braden duyarlılık ve özgüllük oranları ve yüzdeleri		
İstatistik	Değer (%)	%95 GA
Duyarlılık	66,9*	%60,91 ila %72,54
Özgüllük	99,0*	%97,11 ila %99,79
Pozitif olasılık oranı	66,9*	%21,64 ila %206,97
Negatif olasılık oranı	0,33	%0,28 ila %0,40
Hastalık yaygınlığı	47,0	%42,82 ila %51,20
Pozitif öngörme değeri	98,3	%95,05 ila %99,46
BY: Basınç yarası, GA: güven aralığı, *Braden ≤18 skorunun var olan BY varlığı açısından duyarlılığı %66,92, özgüllüğü ise %99 idi		

Tablo 5. Hastalarda Norton BY skalası ve BY olma/olmama oranları		
n=566	n	%
Norton ≤11	269,00*	47,5
Norton ≤11 ve basınç yarası var	131	48,7
Norton >11	297	53,5
Norton >11 ve basınç yarası var	50*	16
*Norton skalasına göre; basınç yarası (BY) riski: n=269, %47,5, mevcut BY: n=131, %48,7		
*Norton skoru düşük olmayan 297 olgunun %16'sında (n=50) halihazırda açılmış BY vardı		

evden kabul edilmişlerdi. Hastaların %32'sinde BY vardı. BY olan hastaların yarısı yoğun bakımlardan alınmıştı. Yoğun bakımlarda uzamış yatış süresi, hastaların hareket kabiliyetlerinin olmaması, beslenme yetersizliği, ileri yaş, hipotansiyon, inotrop infüzyonu kullanma durumu, bazı ilaçların yan etkileri BY oluşmasında predispozan faktörlerdir (20-22). Yebes ve ark.'nın (21) yoğun bakımda yatan 150 hasta üzerinde BY oluşmasında predispozan faktörleri inceledikleri çalışmada BY insidansı çok yüksekti (%26,7). En sık görülen risk faktörleri enfeksiyon, yoğun bakımda kalış süresi ve yüksek akut fizyolojik ve kronik sağlık değerlendirmesi-II skoru idi. Yapılan diğer bir çalışmada evre 1 hariç tutulduğunda, BY prevalansı, yoğun bakım hastaları için %11 ve yoğun bakımda olmayan hastalar için %3 olarak bulunmuştur (23). Bu çalışmada hastane kaynaklı BY en sık görüldüğü bölge sakrum/koksiks olup çoğu evre 2 idi. Bizim çalışmamızda da yatış anında en sık rastlanan BY alanı benzer şekilde sakrum/koksiks ve BY tipi de evre 2 idi. PBK'ye daha kabul anında BY olması hastaların bakım yükünü artırması, BY tedavisinin maliyetinin yüksek olması, taburcu süresinin uzaması ve yaşam kalitesini olumsuz etkilemesi açısından önemlidir (24).

Gerek yoğun bakımlar gerekse PBK, hatta bakım evlerinde BY koruyucu önlemleri alınmalıdır. Norton skalası en basit olanı olup, şuur durumu, aktivite, mobilite ve inkontinansı değerlendirir. Braden skalası ise daha detaylı sorgulama ve risk derecelendirmesi yapmakla beraber (nütrisyon durumu, sürtünme/yırtılma da eklenmiştir) bu skalanın BY gelişme riskini öngörmeye düşük kalibrasyon gücüne sahip olduğu bildirilmiştir (25).

Ranzani ve ark.'nın (26) yaptıkları çalışmada Braden ölçeği iyi bir ayrımcılığa sahip olmakla birlikte performansı en ağır hastalar için düşük bulunmuştur. Bizim çalışmamızda da benzer şekilde Braden risk skoru 18'in altında olan hastalarda BY açılma oranı duyarlılığı %66,9 ile düşüktü. Ranzani ve ark. (26) Braden ölçeğine, yaş, cinsiyet, diabetes mellitus, hematolojik malignite, periferik arter hastalığı, hipotansiyon ve ventilatör desteği gibi parametreleri ekleyerek BY tahmin gücünü artırmışlardır. Yoğun bakım ünitesine kabulde ölçülen orijinal Braden ölçeği ağır hastalar için doğru olmasa da BY tahmini için değerli bir araçtır sonucuna ulaşmışlardır. Benzer şekilde çalışmamızda PBK'ye yatan hastaların yatış anındaki BY ve yatış anındaki Braden BY skoru 18 ve üzerindeki 91 hastanın 3'ü hariç 88'inde (spesifite %99) BY'nin olmadığı görüldü. Braden BY skoru yüksek olan hastalarda BY gelişmeyeceğini öngörmektedir. Braden BY skoru 18 ve altındaki hastalarda BY'nin beklenilenden daha az olması (duyarlılığın düşük olması) eşlik eden bulgu ve tanıların Braden BY skorunda kullanılmamasından kaynaklandığı düşünülmektedir (26).

Norton BY skoru 11'den düşük olan hastaların kabulünde BY olma (duyarlılık) oranı %48,88 iken 11'den yüksek olduğunda BY olmama özgüllük %83,16 idi. Norton BY skorunun, Braden BY skoruna göre duyarlılık ve özgüllüğünün daha düşük olması beslenme ve sürtünme parametrelerinin Braden skorunda kullanılması olabilir. Beslenme eksiklikleri, malnütrisyon gerek yağ dokusu gerekse kas dokusunda yıkıma sebep olarak BY oluşmasını hızlandırabilir (24). Norton BY skorunun kullanımında, hastayı mental durum, aktivite, hareketlilik ve inkontinans özellikleri bakımından somut ve ölçülebilir değerlendirmesine rağmen fiziksel duruma ilişkin değerlendirmenin iyi, orta, kötü, çok kötü gibi olması değerlendirenin yorumuna açık olduğunu göstermektedir. Bu değerlendirme özelliği nedeniyle ölçeği kullanarak yapılan değerlendirmeler arasında farklılıklar olabilmektedir. Ölçekte ayrıca BY gelişiminde risk faktörü olarak tanımlanmış olan beslenme ve deri durumuna yönelik değerlendirmelerin bulunmaması önemli sınırlılıklara neden olmaktadır (26).

Braden, Norton ve Waterlow ölçeği ile yapılan diğer bir çalışmada risk ölçekleri yararlı olmakla birlikte hemşirelerin klinik yargıları ile birlikte kullanılması tavsiye edilmektedir (27). Braden BY skalasının en iyi duyarlılık/özgüllük oranına (duyarlılık/özgüllük sırasıyla %57,1/%67,5) ve makul basınç ülseri risk öngörüsüne sahip olduğu gösterilmiştir (28). Aynı çalışmada Norton ölçeğinin de duyarlılık (%46,8), özgüllük (%61,8) ve risk tahmini için Braden BY skorundan daha düşük değerlere sahip olduğu gösterilmiştir (28). Bizim çalışmamızda da Braden BY skoru duyarlılık/özgüllük oranları (%66,9/%99) Norton BY skoru duyarlılık/özgüllük oranlarından (%48,88/%83,16) daha yüksekti. Çalışmamızda Braden BY skoru, pozitif likelihood oranı %95 güven aralığı (GA), olasılık oranı (OO): 66,9 (21,64-206,97) (Tablo 4) ve Norton için pozitif likelihood oranı %95 GA OO: 3,29 (2,19-3,85) olarak bulundu (Tablo 6). Braden BY ölçeği gerek sensitivite gerekse spesifite açısından Norton BY ölçeğinden daha iyi tahmin gücünün beslenme parametresi ve derinin nem özelliğinden kaynaklandığı düşünülebilir. Çin'deki akut bakım hastanelerinde deri tipi ve vücut yapısının eklenmesiyle modifiye Braden ölçeği kullanılarak yapılan diğer bir çalışmada Norton BY skorunun Braden BY skorundan daha az duyarlı ve özgül olmasında beslenme parametresinin tek başına etkili olamayacağı gösterildi (29). İlk modifiye Braden ölçeğindeki her bir alt ölçek puanlama ögesinin tanımlayıcı analizi, deri tipi ve boy için vücut yapısının en belirgin öngörücü faktörler olduğunu, beslenmenin ise BY gelişimini öngörmek için en az belirgin faktör olduğunu göstermiştir. Modifiye Braden ölçeği, BY önlenmesinde klinik etkinliği artırmak için %100 duyarlı ve spesifik olmadığından, Çin'deki akut bakım merkezlerinde BY gelişimini tahmin etmek için hemşirelik gözlemiyle birlikte kullanılmasını tavsiye etmektedir. Bununla birlikte PBK ve bakımevleri gibi BY gelişme riski yüksek olan merkezlerde risk analizi yaygınlaştırılmalıdır. BY önleme ile ilgili Ranzani

Tablo 6. Norton BY skalası, duyarlılık, özgüllük, prevelans ve pozitif negatif olasılık oranları

Norton BY değerlendirme sonuçları		
İstatistik	Yüzde (%)	%95 GA
Duyarlılık	48,88*	%42,75-55,04
Özgüllük	83,16*	%78,41-87,24
Pozitif olasılık oranı	3,29	%2,19-3,85*
Negatif olasılık oranı	0,61	%0,54-0,70
Hastalık yaygınlığı	47,43	%43,25-51,64
BY: Basınç yarası, GA: güven aralığı *Eşik Norton skorunun BY varlığına ilişkin duyarlılığı %48,9, özgüllüğü %83,16 hesaplandı		

ve ark.'nın (26) geliştirdiği ölçekler ya da modifiye Braden ölçeği ile ilgili yeni çalışmalara ihtiyaç duyulmaktadır. Norton ya da Braden ölçekleri özgüllükleri yüksek ve kullanımı kolay uygulamalardır. Oysaki yapılan bir araştırmada bakım evleri ve evde sağlık hizmeti veren kuruluşlarda, yalnızca %21 oranında Braden ölçeği veya Norton gibi onaylanmış bir ölçek kullandığı görülürken evde sağlık kurumlarının sadece %18'inin bir BY önleme protokolünde önerilen önlemleri aldığı belirtilmiştir (30). PBK başta olmak üzere hareket kısıtlılığı olan hastalarda BY oluşumunu engellemek için geliştirilmiş ölçeklerin kullanılmasının yaygınlaştırılması gerekmektedir.

Araştırma tek merkezde yapılmıştır. PBK'ye kabul edilen hastaların BY ve BY skalaları retrospektif olarak incelenmiştir. Diğer BY ölçekleri de kendi içinde incelenebilir. Braden BY ölçeğinde beslenme subjektif olarak değerlendirilmektedir. Beslenme ile ilgili albumin/prealbumin düzeyleri, sarkopeni varlığı ile BY açılma oranları arasında bağlantı olup olmadığına bakılabilir.

Sonuç

PBK'de özellikle yoğun bakımlardan kabul edilen hastalarda BY görülme sıklığı fazladır. Braden BY ölçeğinin spesifite ve sensitivitesi Norton BY ölçeğinden daha yüksek bulunmuştur. Norton ve Braden BY skorlarına göre risk altında olan olguların yaklaşık yarısına ulaşan oranda önceden açılmış BY mevcuttu. Her iki skora ölçeğinin mevcut BY

varlığı açısından sensitivitesi düşük bulundu. Diğer yandan, spesifite değerleri kabul edilebilir bulundu. Beslenme, hareket kabiliyetleri ve sürtünme, deri nem oranı hastaların inkontinans durumları kontrol edilmeli, BY riskini azaltacak şekilde bakımları verilmelidir. BY oluşmadan önlenmeli, BY risk değerlendirmesi Norton ve Braden gibi ölçekler PBK'de rutin olarak yapılmalıdır.

Teşekkür: Bu makalenin hazırlanmasına olan katkılarından dolayı palyatif bakım kliniklerinde çalışan sağlık hizmeti sunucularına teşekkür ederiz.

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HSV and SARS-CoV-2 Encephalitis “Or to Take Arms Against a Sea of Troubles (W. Shakespeare)”

HSV ve SARS-CoV-2 Ensefaliti “Veya Bir Deniz Dolusu Sıkıntıya Karşı Silahları Kuşanmak (W. Shakespeare)”

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ABSTRACT Published data suggest that encephalitis is one of the most fatal neurologic manifestations of coronavirus disease-2019 (COVID-19) involving both adult and pediatric patients. Herpes simplex virus (HSV) encephalitis is one of the most common causes of sporadic encephalitis. There have been cases of systemic and pulmonary reactivation of HSV due to immune dysregulation following COVID-19 infection. An 88-year-old woman diagnosed with Alzheimers disease was admitted to the intensive care unit (ICU) with fever and general condition disorder. On admission, the patient with fever and neck stiffness was found to be positive for HSV DNA in the cerebrospinal fluid (CSF) sample studied with lumbar puncture (LP) and positive for COVID polymerase chain reaction (PCR) in the nasopharyngeal swab sample taken together. While the COVID PCR test was positive in the CSF sample studied with LP performed on the 9th day of intensive care hospitalization, HSV DNA was found to be negative in the patient whose acyclovir treatment was continued. The COVID PCR test was also positive in the nasopharyngeal swab sample taken at the same time. Cardiac arrest occurred after sudden desaturation, and the patient was resuscitated for 6 min on the 11th day of ICU admission. Left frontotemporal epileptic activity in bedside electroencephalography was evaluated in favor of focal disorganization. In addition to frontotemporal lobe involvement, which is common in HSV and COVID-19 encephalitis, we want to report the coexistence of these two viruses. We believe that this case report should help professionals remind co-infections of HSV and severe acute respiratory syndrome coronavirus-2 to cure the morbidity appropriately.

Keywords: HSV encephalitis, COVID-19, CSF PCR, COVID-19 encephalitis

ÖZ Yayınlanan veriler, ensefalitin, hem yetişkin hem de pediatrik hastaları kapsayan, koronavirüs hastalığı-2019'un (COVID-19) en ölümcül nörolojik belirtilerinden biri olduğunu öne sürmektedir. Herpes simpleks virüs (HSV) ensefaliti, sporadik ensefalitin en yaygın nedenlerinden biridir. COVID-19 enfeksiyonunu takiben immün düzensizlik nedeniyle HSV'nin sistemik ve pulmoner reaktivasyonunu bildiren olgular olmuştur. Alzheimer tanısı alan 88 yaşındaki kadın, ateş ve genel durum bozukluğu şikayetiyle yoğun bakım ünitesine (YBÜ) kabul edildi. Başvuru sırasında ateşi ve ense sertliği olan hastanın lomber ponksiyon ile çalışılan beyin omurilik sıvı (BOS) örneğinde HSV DNA pozitifliği, birlikte alınan nazofaringeal sürüntü örneğinde ise COVID polimeraz zincirleme reaksiyonu (PZR) pozitifliği belirlendi. Yoğun bakıma yatışının 9. gününde yapılan lomber ponksiyon (LP) ile çalışılan BOS örneğinde COVID PZR testi pozitif çıkarken, asiklovir tedavisine devam edilen hastanın HSV DNA'sı negatif olduğu belirlendi. Aynı anda alınan nazofaringeal sürüntü örneğinde de COVID PZR testi pozitif çıktı. YBÜ'ye yatışının 11. gününde ani desatürasyon sonrası kardiyak arrest gelişen ve 6 dakika süreyle kardiyopulmoner resüsitasyon uygulanan hasta resüsitasyona yanıt verdi. Yatak başı elektroensefalografide sol frontotemporal epileptik aktivite ve fokal dezorganizasyon lehine değerlendirildi. HSV ve COVID-19 ensefalitinde frontotemporal lob tutulumunun yaygın olmasının yanı sıra bu iki virüsün bir arada varlığını da bildirmek istiyoruz. Bu olgu raporunun, profesyonellerin HSV ve şiddetli akut solunum sendromu koronavirüs-2'nin birlikte enfeksiyonlarını, morbiditeyi uygun şekilde tedavi etmek için hatırlatmalarına yardımcı olacağını düşünüyoruz.

Anahtar Kelimeler: HSV ensefaliti, COVID-19, BOS PZR, COVID-19 ensefaliti

Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which emerged in Wuhan, China in December 2019, infected 767,518,723 people and killed 6.947.192 (1). Although most coronavirus disease-2019 (COVID-19) patients present with fever, cough, respiratory distress-shortness of breath, many published studies have demonstrated the neuroinvasive potential and neurological involvement of the virus. While discussions on the mechanism of central nervous system invasion continue, two hypotheses have been focused on; direct viral invasion; indirect damage by inflammatory and autoimmune pathways (2,3). It has also been argued that the neuroinvasive potential of SARS-CoV-2 may be one of the causes of respiratory failure (4).

The first case of encephalitis secondary to SARS-CoV-2 is a patient with aseptic encephalitis who was admitted to China in February 2020 with symptoms of headache, fatigue, and fever, and SARS-CoV-2 RNA was detected in the cerebrospinal fluid (CSF) of the study (5).

In this case report, we aimed to present a patient with herpes simplex virus (HSV) encephalitis and a positive COVID polymerase chain reaction (PCR) taken from a nasopharyngeal sample, and a patient with a positive COVID PCR in the CSF studied in the intensive care unit (ICU).

Case Report

An 88-year-old female patient with no known chronic disease other than Alzheimer's, who could be mobile with home support, had a history of general condition disorder and decreased oral intake that started approximately one week before her admission to the hospital. Two days before admission to the hospital, fever and wheezing were added to the patient's symptoms.

On admission to the emergency department, her Glasgow coma scale (GCS) was E4M5V3. Her fever was 38 degrees, tachypneic, and O₂-free peripheral oxygen saturation was 86-90. When her conscious state was evaluated, she was disorientated and uncooperative. On physical examination, lung sounds were deep and coarse, but no pathological sound was heard. In the neurological examination, nuchal rigidity, kerning and brudzinski were positive; the light reflex of the patient was taken and no lateralizing signs were detected. Electrocardiogram was in atrial fibrillation rhythm.

No signs of intracerebral hemorrhage or an appearance compatible with the mass were observed in the brain computed tomography (CT). Appearances consistent with chronic ischemia were detected in the periventricular white matter and diffusion magnetic resonance imaging (MRI) did not detect pathological diffusion restriction. On the thorax CT examination, sequela parenchymal changes and mosaic pattern were observed in both lungs.

A lumbar puncture was performed in the patient who did not have acute pathology in the brain CT. No microorganism was observed in the direct microscopic examination without dye and gram staining studied from the CSF sample, and pathogenic bacteria didn't grow in the CSF culture. In the meningitis/encephalitis panel studied, HSV-1 was positive. The patient was given 600 mg acyclovir treatment considering infectious diseases.

The COVID PCR test, which was studied from the concurrent nasopharyngeal sample, was also positive, patient given first dose of favipiravir.

The patient, who had GCS E2M4V1 in the follow-ups and could not protect the airway, was intubated and connected to a mechanical ventilator. The patient was transferred to the anesthesiology and reanimation ICU. Acyclovir treatment for HSV-1 encephalitis was continued in the patient who was transferred to the ICU, and molnupiravir treatment was started for COVID PCR positivity. It was also added to the 3rd generation cephalosporin treatment.

The patient, who was extubated on the 7th day of the intensive care follow-up and weaned off the mechanical ventilator, underwent a lumbar puncture again on the 10th day of the intensive care hospitalization, and the viral panel studied from CSF was negative. COVID PCR, which was studied from CSF, was positive (Figure 1).

On the 11th day of her hospitalization in the ICU, the patient was intubated and connected to a mechanical ventilator due to the development of sudden breathing and cardiac arrest while the patient was being followed up in the nasal cannula. When the patient's hemodynamics was stable, brain CT was performed with the suspicion of cerebellar herniation.

A suspicious involvement area was observed in the right temporoparietal region in the CT scan (Figure 2). Antiepileptic treatment was started for the patient who had refractory seizures in the follow-up; slow wave activity and occasional sharp wave activity were observed in the left anterior frontotemporal region in bedside electroencephalography. It was found to be significant in terms of left frontotemporal

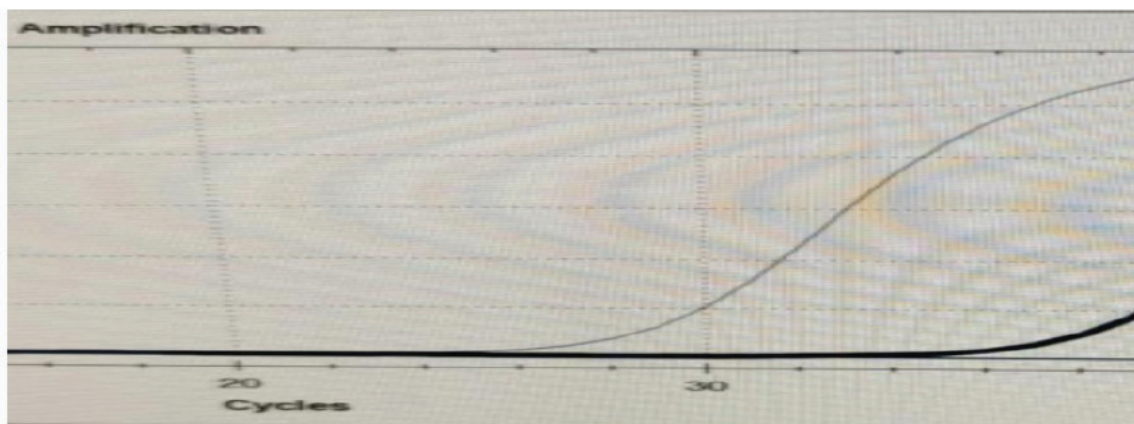


Figure 1. COVID PCR diagram from CSF
 COVID PCR: Coronavirus disease polymerase chain reaction, CSF: cerebrospinal fluid



Figure 2. Suspected temporoparietal involvement area in brain CT
 CT: Computed tomography

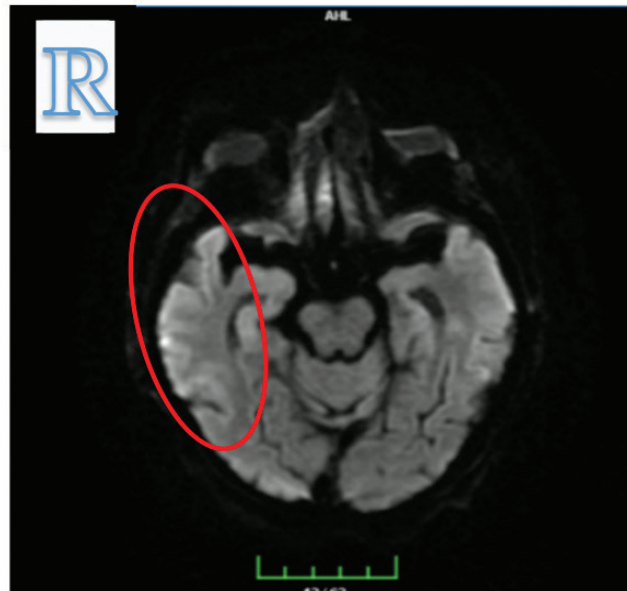


Figure 3. Right temporal edematous appearance

epileptic activity and focal organization disorder. Diffusion MRI taken on the 23rd day of ICU hospitalization showed an edematous appearance in the right temporal region, consistent with HSV encephalitis (Figure 3).

In the febrile period and in the tracheal aspirate culture taken at regular intervals, *Klebsiella pneumonia* and *Pseudomonas aeruginosa*; antibiotherapy was strengthened in the patient who had *Candida glabrata* growth in blood cultures. COVID PCR tests on the samples taken from the patient with deep tracheal aspirate were positive.

Prone position was tried in the patient with acute respiratory distress syndrome appearance on lung X-ray (Figure 4) and desaturated despite high mechanical ventilator pressure supports.

The patient, whose secondary bacterial infections were added to COVID pneumonia, died on the 40th day of intensive flow follow-up.

The consent of the patient’s family has been obtained for the presentation of the case.

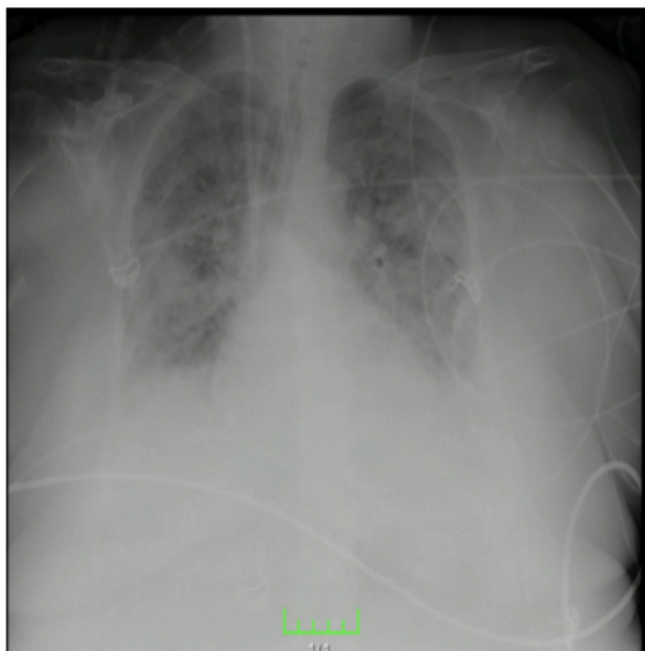


Figure 4. ARDS view
ARDS: Acute respiratory distress syndrome

Discussion

In the literature, temporary immunosuppression has been identified in patients due to systemic inflammatory response caused by COVID infection, lymphopenia or steroid or IL-6 receptor antagonists used in the treatment (6). Studies reporting the respiratory system and systemic reactivation of HSV due to immunosuppression are available in the literature and a case has also been reported in the literature

(7,8). Due to the symptoms of encephalitis did not improve despite seronegativity of CSF for HSV under appropriate HSV treatment we concluded that covid and HSV are both the causes of encephalitis initially.

While there may be HSV reactivation due to immune dysregulation in COVID patients, it is necessary to consider isolated COVID central involvement.

Since its clinical diagnosis is easier with both imaging methods and laboratory examinations, and the treatment options are more known, HSV encephalitis is a more common and treatable encephalitis agent than COVID encephalitis.

With no consensus on its treatment, COVID encephalitis has a more widespread involvement and its pathogenesis has not yet been fully enlightened.

More studies are needed to enlighten COVID encephalitis.

Ethics

Informed Consent: The consent of the patient's family has been obtained for the presentation of the case.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: R.A., Concept: R.A., E.K., Design: R.A., Data Collection and/or Processing: R.A., Analysis and/or Interpretation: R.A., E.K., B.Y., Literature Search: R.A., E.K., Writing: R.A., E.K.

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