Journal of The Cardiovascular Thoracic Anaesthesia and Intensive Care Society

GKDA Derg 2022;28(1):42-49
DOI: 10.14744/GKDAD.2021.27676

Research Article / Araştırma

Awareness of Anesthesiology Practices in the Coronavirus Disease 2019 Pandemic and Coronavirus Disease 2019 Normalization Period

COVID-19 Pandemisi ve COVID-19 Normalleşme Döneminde Anesteziyoloji Uygulamaları Farkındalığı

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ABSTRACT

Objectives: On March 11, 2020, the World Health Organization declared the new coronavirus disease 2019 (COVID-19) as a global epidemic. This study aims to assess anesthesiology and reanimation physicians' knowledge of the anesthesiology practices published by the Turkish Republic Ministry of Health during pandemic period, their awareness in Turkey.

Methods: This descriptive cross-sectional study included 2834 anesthesiologist physicians who are members of Turkish Society of Anesthesiology and Reanimation. Data were collected online over 8 weeks using a questionnaire form by SurveyMonkey (San Mateo, CA) website after national and local ethics committee approval.

Results: The study included 332 physicians (research associates and specialist physicians). Eighteen participants were excluded from the study since they merely gave their consent and did not respond to the questions. It was determined that participants' level of awareness about the possibilities of protection during the pandemic period was high, a low level of awareness about preparation for the operating room and case management, and a high level of understanding about the normalization period.

Conclusion: Anesthesiology and reanimation physicians had a moderate understanding and awareness of COVID-19 perioperative management. Physicians were observed to have inadequate knowledge of algorithms for personal protective equipment, equipment disinfection protocol, and general anesthesia. In this era of easier access to the current information, it is critical to maintaining the highest level of knowledge and awareness among anesthesiology and reanimation physicians who manage the COVID-19 pandemic, to ensure the continuity of training to transfer them to team members, and to carry out procedures following the recommendations.

Keywords: Anesthesia, coronavirus disease 2019, coronavirus, pandemic, personal protective equipment, questionnaire

ÖZ

Amaç: Dünya Sağlık Örgütü 11 Mart 2020 tarihinde, yeni koronavirüsü (COVID-19) küresel bir salgın olarak ilan etti. Bu çalışma, anesteziyoloji ve reanimasyon hekimlerinin pandemi döneminde Türkiye Cumhuriyeti Sağlık Bakanlığı tarafından yayınlanan anesteziyoloji uygulamalarına ilişkin bilgilerini, Türkiye'deki farkındalıklarını değerlendirmeyi amaçlamaktadır.

Yöntem: Tanımlayıcı kesitsel tipteki bu çalışmaya, Türk Anesteziyoloji ve Reanimasyon Derneği üyesi 2834 anestezi uzmanı hekim dahil edilmiştir. Veriler, ulusal ve yerel etik kurul onayından sonra SurveyMonkey (San Mateo, CA) web sitesi tarafından hazırlanan bir anket formu kullanılarak sekiz hafta boyunca çevrimiçi olarak toplanmıştır.

Bulgular: Çalışmaya 332 hekim (araştırma görevlileri ve uzman hekimler) dahil edilmiştir. 18 katılımcı sadece onam verdiği ve soruları yanıtlamadığı için çalışmadan çıkarıldı. Katılımcıların pandemi döneminde korunma olanaklarına ilişkin farkındalık düzeylerinin yüksek, ameliyathaneye hazırlık ve vaka yönetimine ilişkin farkındalık düzeylerinin düşük, normalleşme sürecini anlama düzeylerinin yüksek olduğu belirlendi.

Sonuç: Anesteziyoloji ve reanimasyon doktorları, COVID-19 perioperatif yönetimi konusunda orta düzeyde bir anlayışa ve farkındalığa sahipti. Hekimlerin kişisel koruyucu ekipman (KKE), ekipman dezenfeksiyon protokolü ve genel anestezi için algoritmalar konusunda yetersiz bilgiye sahip oldukları gözlemlendi. Güncel bilgilere erişimin daha kolay olduğu günümüzde, COVID-19 pandemisini yöneten anesteziyoloji ve reanimasyon hekimleri arasında bilgi ve farkındalığın en üst düzeyde tutulması, eğitimlerin sürekliliğinin sağlanması, ekip üyelerine aktarılması ve taşınması kritik önem taşımaktadır.

Anahtar sözcükler: Anestezi, anket, COVID-19, kişisel koruyucu ekipman, koronavirüs, pandemi

Please cite this article as "İlyas Y, Akdoğan A, Şenel AC. Awareness of Anesthesiology Practices in the Coronavirus Disease 2019 Pandemic and Coronavirus Disease 2019 Normalization Period. GKDA Derg. 2022;28(1):42-49".

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Submitted Date: September 05, 2021 **Accepted Date:** November 11, 2021 **Available Online Date:** January 18, 2022

Introduction

The World Health Organization (WHO) first reported cases of pneumonia in the city of Wuhan in China, where the agent was not detected in humans, and the agent was later identified as the novel coronavirus (2019-nCoV). The 2019-nCoV was recognized as being coronavirus disease 2019 (COVID-19) and because of its close resemblance to severe acute respiratory syndrome coronavirus (SARS-CoV), the virus was called SARS-CoV-2. After cases of COVID-19 were found in 113 countries outside of China, the WHO proclaimed the COVID-19 global epidemic (pandemic) on March 11, 2020. The first case was determined on March 11 in Turkey, and the first death occurred on March 17.[1]

Due to their work environment, all health care workers are exposed to high risks during the pandemic period. Anesthesiologists are among the health care workers most at risk due to critical patient follow-up or perioperative airway interventions (mostly general and regional anesthesia, aspiration, etc.). Therefore, health personnel should be protected appropriately.[2-4] The use of personal protective equipment (PPE) is one of the most important preventive measures to reduce the risk of transmission of infection. Turkish Republic Ministry of Health has standardized the PPE donning-doffing algorithms that should be used by anesthesiologists in the operating room.[5] Due to the pandemic's quickly changing course, it's important to remember that in asymptomatic cases, full protection measures should be implemented while performing operations with a high risk of aerosolization.

Given the multisystemic nature of COVID-19 infection, anesthesiologic and surgical interventions may affect the course of the disease adversely. It is known that the mortality rate in patients who underwent surgery in the early phases of the pandemic approaches 20-50% as a result of insufficient pre-operative examinations.[6] Precautions should be made to decrease the danger of transmission, given the high mortality rates.[6] Pre-operative evaluation is becoming more important in anesthesiology outpatient clinics, and anesthesiologists have key roles in perioperative treatment.

This study aimed to assess anesthesiology and reanimation physicians' knowledge of the guidelines and algorithms published by the Turkish Republic Ministry of Health and the Turkish Society of Anesthesiology and Reanimation regarding the COVID-19 pandemic and patient management during the normalization phase according to their professional experience and working years.

Methods

For our research, approval was obtained from the Turkish Republic Scientific Research Platform of the Ministry of Health (Decision No. 2020-06-11T15_41_12 Dated 16/06/2020), General Directorate of Health Services, and the Scientific Researches Local Ethics Committee of Karadeniz Technical University Faculty of Medicine (Decision No. 24237859-483, Protocol Number 2020/193 dated 24/07/2020).

Our research was planned as a cross-sectional and descriptive study. To ensure that the research reaches enough participants and does not violate the hygiene requirements during the pandemic, a questionnaire was developed using the SurveyMonkey (SurveyMonkey, San Mateo, CA) website.

The questionnaire was distributed through the Web to 2834 physicians who are members of the Turkish Society of Anesthesiology and Reanimation. The data collection process has been adjusted to prevent the same person from participating in the survey more than once. The survey's objective was described in the e-mail addressed to participants. At the end of the 7th week, data collection was completed. The questionnaire consisted of 49 questions that were written following recommendations issued by the Turkish Society of Anesthesiology and Reanimation and the Turkish Republic Ministry of Health, General Directorate of Public Health, COVID-19 Guidelines, and Turkish Society of Anesthesiology and Reanimation.

Parts of the questionnaire;

- Part 1: Questions about demographic data
- Part 2: Questions about COVID-19 symptoms, modes of transmission, symptoms to watch out for in the pre-operative period, and precautions to take in case of transmission
- Part 3: Questions about the use of PPE and infection control measures during the pandemic COVID-19
- Part 4: Questions about operation room preparation and anesthesia practice during the pandemic COVID-19
- Part 5: Questions about device use, infection control measures, and preoperative screening tests during the COVID -19 normalization phase
- Part 6: It was developed in the form of questions for the participants to evaluate the COVID-19-related guidelines and algorithms published by the Turkish Society of Anesthesiology and Reanimation and the Turkish Republic Ministry of Health.

The accuracy rates of the responses given to the questions in other sections were calculated in addition to the distribution of demographic data. The number and proportions of participants who correctly answered at least 65% of the multiple response survey questions were calculated. Accuracy rates of participants with work experience of fewer than 5 years and more than 5 years were compared.

Awareness scores were calculated to determine participants' awareness of Part 3, Part 4, and Part 5. Each correct

answer was scored as 1 point, and each incorrect answer was scored as 0. Participants with an overall awareness score of <50% were classified as low, and participants with a score of 50% or more were classified as high.

Furthermore, the total awareness scores of these three parts were computed to determine the participants' overall awareness level. Each correct answer was scored as 1 point, and each incorrect answer was scored as 0. The total score range was between 0 and 30. Participants scoring 0-10 were considered low, those scoring 11-20 were considered medium, and those scoring 21-30 were considered high. Age groups, gender, professional experience, academic title, and provinces were used to compare awareness levels.

In the concluding part of our survey, participants were asked to share their thoughts on the provided local guides and information.

Statistical Analysis

The Statistical Package for the Social Sciences for Windows (SPSS Inc., Chicago, IL, USA) version 23.0 package application was used to analyze the data collected from the answers to the questionnaire's questions. The Chi-square test was applied to compare categorical variables according to groups. For categorical data, the findings were reported as frequency (n) and percentage (%). The statistical alpha significance level was accepted as $p<0.05$ in all tests.

Results

The questionnaire was completed by 332 anesthesiology and reanimation physicians. Eighteen subjects who participated in the questionnaire were removed from the study because they did not answer the questions after consent. The average completion duration of the survey was 14 min, and the percentage of respondents who answered all of the questionnaire questions was 56%. A total of 314 questionnaires were evaluated.

Table 1 shows an analysis of academic degree, experience, and institute of the participants.

When asked about general information on COVID-19 infection, the participants said that "fever (99.3%)" was the most prevalent symptom and "droplet transmission (96.2%)" was the most common mode of transmission. The four precursor questions (fever, cough, contact history, and shortness of breath) that must be asked during the clinical examination in the pre-operative period were correctly answered by 98.6% of the participants. About 83.3% of participants reported that they were medical support staff who had a COVID-19 infection at their institution, and 77.8% reported that they had a colleague who had a COVID-19 infection at their facility.

Table 1. Academic degree, experience, and institute of the participants

Characteristics	n	%
Length of work experience (years)		
<2	58	18.5
2-5	96	30.6
5-10	85	27.1
10-20	57	18.2
>20	18	5.7
Academic title		
Research associates	151	48.1
Specialist physicians	135	43
Teaching staff	28	8.9
Instution of work		
University hospital	147	46.8
State hospital	137	43.6
Private hospital	30	9.6

The optimal duration of hand disinfection to be performed before and after patient contact was answered correctly by 70.8% of the participants. It was found that the rate of correct answers (61.4%) was significantly lower among participants with <5 years of work experience than among those with 5 or more years of work experience ($p=0.001$). It was found that 13.4% of the participants answered correctly the order of donning the PPE and 13.8% of the participants answered correctly the order of taking it off. The correct answer to the question prepared to question the recommendations about the long-term usage of N95/FFP2 masks was given by 81.8% of the participants. It was found that the rate of correct answers (88.2%) was significantly higher among participants with <5 years of work experience than among those with 5 or more years of work experience ($p=0.008$). During the pre-operative examination, it was found that 42.5% of the participants answered correctly to the question about diagnostic approaches that may be employed for screening and the validity of wrong propositions. When participants were compared according to their work experience, no significant difference was found ($p>0.05$). It was found that 22.3% of the participants gave the correct answer (chlorine tablet and 1/10 diluted sodium hypochlorite) to the question asking about disinfectants to be used when cleaning surfaces contaminated with patient secretions during the normalization phase COVID-19. When participants were compared according to their work experience, no significant difference was found ($p>0.05$) (Table 2).

It was found that 82.2% of the participants indicated the correct option, neuraxial anesthesia, to the question where no N95/FFP2 respirator masks should be used during the pandemic period COVID-19 and induction of general an-

Table 2. Rates of correct answers of the participants to the questions where the level of awareness

Questions about the awareness levels of the participants	5 years > n (%)	≥5 years n (%)	Total n (%)	p
1. In patients with suspected or infected COVID 19, what level of personal protective equipment should operating room personnel use during surgical intervention and procedures with the risk of aerosolization (n=253)?	109 (85.8)	113 (89.7)	222 (87.7)	0.350
2. The optimal duration of hand disinfection, which should be performed before and after patient contact, should be at least how many seconds ? (n=253)	78 (61.4)	101 (80.2)	179 (70.8)	0.001*
3. Number the order of donning Personal Protective Equipment (PPE) from beginning to end (n=253).	20 (15.7)	14 (11.1)	34 (13.4)	0.280
4. Number the order of doffing the Personal Protective Equipment (PPE) from beginning to end (n=253).	14 (11)	21 (16.7)	35 (13.8)	0.194
5. In which application is it not necessary for the person performing the task to use an N95/FFP2 or equivalent mask (n=253)?	107 (84.3)	101 (80.2)	208 (82.2)	0.395
6. Which is true about the long-term use of N95/FFP2 or equivalent mask (n=253) ?	112 (88.2)	95 (75.4)	207 (81.8)	0.008*
7. Which one(s) of the following should not be considered when preparing the operating room (n=196) ?	67 (65.7)	53 (56.4)	120 (61.2)	0.182
8. Which of the following is not one of the items that the person(s) who will come into contact with the patient must be aware of (n=196)?	88 (86.3)	76 (80.9)	164 (83.7)	0.305
9. Which of the following is not one of the things that should be done during airway management (n=196)?	33 (32.4)	30 (31.9)	63 (32.1)	0.948
10. Which of the following procedures should not be considered when performing endotracheal intubation (n=196)?	38 (37.3)	39 (41.5)	77 (39.3)	0.544
11. Which of the following is not recommended during extubation (n=196)?	20 (19.6)	13 (13.8)	33 (16.8)	0.280
12. For at least how long should the laryngoscopy blade be kept in the appropriate disinfectant (n=196)?	26 (25.5)	26 (27.7)	52 (26.5)	0.731
13. For disinfection of the videolaryngoscope, 70% ethyl alcohol and/or a rapid surface disinfectant is sufficient (n=196)	69 (67.6)	64 (68.1)	133 (67.9)	0.948
14. Which of the preparatory steps regarding the use of regional anesthesia during the COVID-19 pandemic is false (n=196)?	57 (55.9)	45 (47.9)	102 (52)	0.262
15. Which of the following is not part of the personal protective equipment that must be used during regional anesthesia applications in COVID -19 suspected, positive, or suspiciously positive patients (n=196)?	36 (35.3)	27 (28.7)	63 (32.1)	0.325
16. During the active viremia period, an epidural blood patch can be used to treat post-dural puncture headache (PDPH) (n=196).	43 (42.2)	25 (26.6)	68 (34.7)	0.022*
17. Which of the following statements about cardiopulmonary resuscitation in COVID-19 patients or suspected COVID-19 cases is false (n=196)?	73 (71.6)	74 (78.7)	147 (75)	0.248
18. It is not one of the procedures that patients should be evaluated for before surgery (n=188).	39 (39)	41 (46.5)	80 (42.5)	0.326
19. Cleaning the operating room should be done according to pandemic conditions in the current COVID-19 normalization process (n=188).	93 (93.9)	85 (95.5)	178 (94.7)	0.633
20. During the COVID-19 normalization period, which disinfectant should be used to clean surfaces contaminated with patient secretions (n=188)?	21 (21.2)	21 (23.6)	42 (22.3)	0.695
21. During which procedure during the COVID -19 normalization period is the person performing the procedure not required to use N95/FFP2 or equivalent masks (n=188)?	86 (86.9)	66 (74.2)	152 (80.9)	0.001*
22. For consecutive cases, what is the minimum number of minutes that should be waited between two cases after disinfecting the operating room as recommended (n=188)?	21 (21.2)	15 (16.9)	36 (19.1)	0.448

χ^2: Chi-square test statistic; *: $p<0.05$.

esthesia was the second most common option at 37.2%. When participants were compared according to their work experience, no significant difference was found (p>0.05). During the normalization period, it was discovered that 80.9% of the participants correctly answered neuraxial anesthesia to the question about procedures in which N95/FFP2 respirator masks should not be used, which is the correct option. It was found that the rate of correct answers (86.9%) was significantly higher in participants with <5 years of work experience than in those with 5 or more years of work experience (p=0.001) (Table 3).

It was found that participants' awareness level of protection options during the pandemic period was high (67.6%), the awareness level of operating room preparation and case management was low (69.9%), and the awareness level of the normalization period was high (67%). In general, it was found that the awareness level of the participants was at a medium level (64.4%). There was no significant difference in awareness levels when age, gender, work experience, academic titles, institutions, and provinces were examined (p>0.05) (Table 4).

Discussion

COVID-19 has emerged as a global health problem affecting all sectors. Health care workers who are on the front lines of the fight against the epidemic are at higher risk of becoming infected. Therefore, given the rapidly changing nature of pandemics and the frequency with which in-

Table 3. Operations that should not use N95/FFP2 masks

Operations	During the COVID-19 pandemic period			During the COVID-19 normalization period		
	5 years > n (%)	≥5 years n (%)	p n (%)	5 years > n (%)	≥5 years n (%)	p n (%)
Entubation	14 (11)	18 (14.3)	0.122	5 (5.1)	9 (10.1)	0.362
Bronchoscopy	14 (11)	17 (13.5)	0.196	5 (5.1)	9 (10.1)	0.414
Cricothyroidotomy	13 (10.2)	16 (12.7)	0.181	4 (4)	9 (10.1)	0.381
General anesthesia induction	48 (37.8)	46 (36.5)	0.569	36 (36.4)	37 (41.6)	0.491
Gastrointestinal system endoscopy	25 (19.7)	25 (19.8)	0.688	16 (16.2)	15 (16.9)	0.241
Transesophageal echocardiography	17 (13.4)	28 (22.2)	0.621	7 (7.1)[a]	21 (23.6)[b]	0.342
Neuroaxial anesthesia	107(84.3)	101 (80.2)	0.534	86 (86.9)[a]	66 (74.2)[b]	0.001*
Tracheostomy	13 (10.2)	16 (12.7)	0.481	3 (3)	8 (9)	0.096
Extubation	13 (10.2)	17 (13.5)	0.516	3 (3)	7 (7.9)	0.088

*: P<0.05; [a, b]: No difference in years of experience, each with the same letter in the situation.

Tablo 4. Comparison of valuation proposals according to professional experience period

Characteristics	5 years > n (%)	≥5 years n (%)"	p
The awareness level of the protection methods (n=253)			
Low	38 (29.9)	44 (34.9)	0.396
High	89 (70.1)	82 (65.1)	0.425
The awareness level of the preparation of the operating room for anesthesiology applications and case management (n=196)			
Low	71 (69.6)	66 (70.2)	0.927
High	31 (30.4)	28 (29.8)	0.664
The awareness level of the protection methods during the normalization period (n=188)			
Low	33 (33.3)	29 (32.6)	0.913
High	66 (66.7)	60 (67.4)	0.122
The participants' level of awareness			
Low	32 (25.2)	39 (31)	0.519
Moderate	84 (66.1)	79 (62.7)	0.221
High	11 (8.7)	8 (6.3)	0.144

P>0.05.

formation changes, it is important to inform health-care professionals using updated guidelines. Concerning the transmission risk of a COVID-19 infection, it is well known that anesthesiology and reanimation physicians are in the high-risk group. Physicians must have sufficient knowledge and equipment when performing applications that create aerosolization in the operating room environment and are likely to be contaminated, and which are classified as high-risk operations in terms of anesthesiology and reanimation. In our study, we aimed to examine anesthesiologists' and reanimation physicians' knowledge and awareness of anesthesiology practices and case management during the pandemic and normalization phases to help reduce and control the risk of infectious disease spread during the COVID-19 pandemic.

Not only in intensive care units but also operating rooms, anesthesiology, and reanimation physicians might encounter suspected or positive COVID-19 cases. Such cases increase the risk of transmission, as well as post-operative morbidity and mortality. In the early phases of the pandemic, it was reported that the post-operative mortality rate reached 20-50% as a result of ineffective pre-operative assessments.[7] For this reason, efforts should be made to reduce the potential risk of surgical transmission by effective patient education by the anesthetists in the pre-operative period. Patients should be questioned about the COVID-19 clinic and included in the screening programs within the scope of the suggested protocol during their pre-operative evaluation in the anesthesiology outpatient clinic.

During the pre-operative examination, the frequency of COVID-19 symptoms, particularly "fever, cough, shortness of breath, and contact history," should be thoroughly questioned. In addition to clinical evaluation, there are recommendations for the use of microbiologic and radiologic diagnostic methods (reverse transcriptase-polymerase chain reaction (RT-PCR) test and thorax computed tomography (CT) in the pre-operative period to detect COVID-19 infection.[6,7] False-negative rates of PCR tests vary. One review found that the false-negative rate ranged from 1.8% to 58%.[8] Examination of our results showed that 46.1% of participants were aware of the recommendations regarding RT-PCR testing and thorax CT inquiries in the pre-operative period. Because of the false-negative rated asymptomatic cases, and patients who were outside of the algorithm in terms of screening methods, we believe the participants avoided the usual pre-operative RT-PCR test request.

In terms of effective use of PPEs and decreasing the risk of transmission, anesthesiology and reanimation physicians must understand the procedures that cause aerosolization. During anesthesiology practices, it is advised that a minimum number of employees be present in the operating room and that all staffs in the room wear 3rd level PPE.[9-12] Furthermore, because neuraxial anesthesia procedures are not among the aerosol-generating procedures, wearing N95/FFP2 masks are not advised.[13] At the same time, the use of 3rd level PPE is strongly recommended during the transition to unpredictable general anesthesia after neural anesthesia.[13] We believe that over 80% of the study participants followed the recommendations and were aware of the PPE that should be used in the operating room for suspected/confirmed COVID-19 cases.

Turkish Republic Ministry of Health developed and published PPE donning and doffing algorithms.[5] Proper use of PPE is important to prevent infectious diseases. Kwon et al.[14] discovered that 50% of health care workers behaved outside the algorithm in donning and 100% in doffing PPE in a study that analyzed the application levels of proposed algorithms in donning and doffing PPE. In a similar study, Baran determined that 12.7% of anesthesiology physicians deviated from the protocol during PPE donning and 18.5% during PPE doffing.[15] When examining the results of our study, it was detected that 13.4% of participants correctly applied the algorithms for donning the PPE and 13.8% correctly applied the algorithms for doffing the PPE, similar to other studies. The data obtained revealed that non-algorithm practices were widespread during donning and doffing PPE. This is because 52.5% of our study participants followed the national standards released by the Turkish Republic Ministry of Health, and 48.1% followed the TARD standards.

Due to transportation and equipment shortages, long-term usage of PPEs has become increasingly important in health centers, particularly during pandemics. To this end, the participants' awareness of the recommendations published by the Turkish Republic Ministry of Health on the "Long-term Use of N95/FFP2 Masks in the pandemic COVID-19" was evaluated.[16] It was discovered that 81.8% of the participants correctly answered the question with multiple responses. It was assumed that participants were aware of the long-term use of N95/FFP2 masks.

For anesthesiology physicians whose primary work area is the operating room environment, it is important to consider the current literature as a part of infection control measures. To decrease the risk of contamination and transmission, there are suggestions for general anesthesia applications to be carried out during the pandemic period, both in terms of preparation and general anesthesia applications.[11,12,17] We found that 83.7% of the participants in our study were aware of these suggestions. Only 32.1% of the participants knew that the auscultation step should not be performed when confirming the position of the endotra-

cheal tube after intubation during the pandemic period, and 70.4% of them knew that topicalization of the airway should be avoided during awake intubation. The correct response to the prepared question to evaluate the suggestions for the endotracheal intubation procedure and the preparation of the endotracheal tube was given by 39.3% of the participants. It can be evaluated that anesthesiology physicians have a high awareness of the preparation of the operating room and staff during the administration of general anesthesia. However, when the results of general anesthetic induction and endotracheal intubation in probable or confirmed COVID-19 patients were analyzed, it was discovered that physicians had a low level of knowledge. We can consider this circumstance as the professional habits of anesthesiology physicians during routine procedures such as airway management.

If ventilation is needed in the early post-operative period after extubation, it is recommended that it be done with at least two individuals and that low flow and low pressures be provided using the two-hand mask ventilation method (especially in obese patients, placing the mask on the face completely, holding the mask in the "VE" position using both hands).[11] It was determined that 16.8% of the participants answered the question on the topic correctly, while 42.8% stated that extubation under deep anesthesia was wrong. This situation can be considered extubation under deep anesthesia because of the increased risk of aerosolization due to long-term mask ventilation.

Because of the risk of respiratory system involvement, thrombosis, and aerosolization in COVID-19 infection, general anesthesia is considered a high-risk method. As a result, regional anesthetic procedures are frequently recommended to get the benefits of its systemic effects while minimizing the risk of aerosols.[18] To achieve the desired oxygen saturation during regional anesthetic administrations, it is recommended to avoid nasal cannula application and provide minimum flow mask oxygen support.[19] Furthermore, in cases where the possibility of conversion to intraoperative general anesthesia is high, it is recommended that the general anesthetic procedure be preferred first.[17] In our study, 52% of participants were aware that they should not use a nasal cannula for oxygenation in the first place while evaluating the preparatory process for regional anesthetic applications during the COVID-19 pandemic period. However, 27% of participants believed that beginning with general anesthesia was not more suitable in patients with a high likelihood of converting to intraoperative general anesthesia.

When the awareness levels generated by the correct answers given by the participants in our study were evaluated, it was discovered that the awareness level of the protection methods for the use of PPE during the pandemic period was high, the awareness level of the preparation of the operating room for anesthesiology applications and the awareness level of case management were low, while the awareness level of the protection methods was high during the normalization period. When all parts of the study were analyzed, it was found that the participants' level of awareness was moderate, with no significant differences by age, gender, work experience, or academic title.

Our study has some limitations. First, because the survey covers a wide range of topics and takes a long time to complete, individuals may have answered questions fast and incorrectly on a subject they were aware of. Second, given the number of anesthesiology and reanimation physicians in our country, the low percentage of survey participation can be viewed as a limitation. The reason may be that anesthesiology physicians have a busy schedule in the current period.

Conclusion

According to the findings, anesthesiology and reanimation physicians have a moderate knowledge and awareness of COVID-19 perioperative management. However, physicians' current knowledge of COVID-19 has proven inadequate in practice, including algorithms for donning and doffing PPE, equipment disinfection protocol, and general anesthesia procedures (especially during endotracheal intubation). In this era of easier access to up-to-date information, we believe that anesthesiology and reanimation physicians who live and manage every moment of the pandemic should maintain the highest level of knowledge and awareness, the continuity of training to be transferred to team members, and procedures to be carried out following the recommendations.

Disclosures

Ethics Committee Approval: The study was approved by The Karadeniz Technical University Rectorate KTU Faculty of Medicine Scientific Research Ethics Committee (Date: 24/07/2020, No: 24237859-483).

Informed Consent: Written informed consent was obtained from all patients.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study has received no financial support.

Authorship Contributions: Concept – Y.İ., A.A., A.C.Ş.; Design – Y.İ., A.A., A.C.Ş.; Supervision – Y.İ., A.A., A.C.Ş.; Fundings – Y.İ., A.A., A.C.Ş.; Materials – Y.İ., A.A., A.C.Ş.; Data collection &/or processing – Y.İ., A.A., A.C.Ş.; Analysis and/or interpretation – Y.İ., A.A., A.C.Ş.; Literature search – Y.İ., A.A., A.C.Ş.; Writing – A.A.; Critical review – Y.İ., A.A., A.C.Ş.

Etik Kurul Onayı: Çalışma Karadeniz Teknik Üniversitesi Rektörlüğü KTÜ Tıp Fakültesi Bilimsel Araştırmalar Etik Kurulu tarafından onaylandı (Tarih: 24/07/2020, Numara: 24237859-483).

Hasta Onamı: Hastalardan yazılı onam alınmıştır.

Hakem değerlendirmesi: Dışarıdan hakemli.

Çıkar Çatışması: Çıkar çatışması bulunmamaktadır.

Finansal Destek: Yazarlar bu çalışmanın herhangi bir finansal destek almadığını beyan etmişlerdir.

Yazarlık Katkıları: Fikir – Y.İ., A.A., A.C.Ş.; Tasarım – Y.İ., A.A., A.C.Ş.; Denetmeler – Y.İ., A.A., A.C.Ş.; Kaynaklar – Y.İ., A.A., A.C.Ş.; Malzemeler – Y.İ., A.A., A.C.Ş.; Veri Toplanması ve/veya İşlemesi – Y.İ., A.A., A.C.Ş.; Analiz ve/veya Yorum – Y.İ., A.A., A.C.Ş.; Literatür Taraması – Y.İ., A.A., A.C.Ş.; Yazıyı Yazan – A.A.; Eleştirel İnceleme – Y.İ., A.A., A.C.Ş.

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