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The impact of the COVID-19 pandemic on diving routines and diving hygiene

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Abstract

Purpose: The COVID-19 pandemic led to a significant reduction in diving activities in Turkey. While knowledge about the virus increased and specific safety measures were adopted to encourage a return to diving, it seems that recovery of the pre-pandemic levels will take time. The purpose of this study was to identify changes in divers' routines and perceptions of hygiene compared to the pre-pandemic period.
Method: A 20-question survey, designed to assess demographic data, diving routines, and hygiene perceptions, was electronically sent to four diving schools, inviting participation from their members.
Findings: A total of 46 divers participated in the survey. Most participants were experienced divers in the middle-aged group who had been diving regularly for a long period. A significant increase in hygiene awareness was observed post-pandemic. However, many participants reported shortcomings in the implementation of safety measures and expressed a lack of sufficient motivation to return to diving.
Conclusion: This study, though based on a limited sample, revealed the impact of the pandemic on the diving population in Turkey. It highlighted the need for efforts to restore diving operations to pre-pandemic levels of activity. These results also confirmed that diving hygiene is a crucial component of diving safety.

Keywords: COVID-19, diving hygiene, diving safety

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COVID-19 pandemisinin dalış rutinleri ve dalış hijyeni üzerindeki etkisi

Özet

Amaç: A COVID-19 pandemisi, Türkiye'deki dalış aktivitelerinde önemli bir azalmalara yol açmıştır. Virüs hakkındaki bilginin artması ve dalışa dönüşü teşvik etmek için spesifik güvenlik önlemlerinin benimsenmesine rağmen, pandemi öncesi seviyelere ulaşmanın zaman alacağı görülmektedir. Bu çalışmanın amacı, dalgıçların rutinlerinde ve hijyen algılarında pandemi öncesine kıyasla meydana gelen değişiklikleri belirlemektir.
Metod: Demografik veriler, dalış rutinleri ve hijyen algılarını değerlendirmek amacıyla hazırlanan 20 soruluk bir anket, dört dalış okuluna elektronik olarak gönderilmiş ve üyelerinin katılımı davet edilmiştir.
Bulgular: Ankete toplamda 46 dalgıç katılmıştır. Katılımcıların çoğunluğu, uzun süredir düzenli olarak dalış yapan orta yaş grubundaki deneyimli dalgıçlardır. Pandemi sonrası dönemde hijyen farkındalığında önemli bir artış gözlemlenmiştir. Ancak, birçok katılımcı güvenlik önlemlerinin uygulanmasında eksiklikler bildirmiş ve dalışa geri dönmek için yeterli motivasyon bulamadıklarını ifade etmiştir.
Sonuç: Sınırlı bir örneklem temelinde yapılan bu çalışma, pandeminin Türkiye'deki dalış popülasyonu üzerindeki etkisini ortaya koymuştur. Dalış operasyonlarının pandemi öncesi aktivite seviyelerine döndürülmesi için çabalara

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ihtiyaç duyulduğunu vurgulamıştır. Ayrıca, dalış hijyeninin dalış güvenliğinin önemli bir bileşeni olduğu bir kez daha teyit edilmiştir.

Anahtar kelimeler: Covid-19, dalış hijyeni, dalış güvenliği

1. Introduction

The novel coronavirus was first identified on January 13, 2020, in Wuhan, the capital of Hubei province, following studies on a group of patients who developed respiratory symptoms (fever, cough, shortness of breath) at the end of December. The virus was initially detected in individuals who had visited a seafood and live animal market in the region [1]. Through human-to-human transmission, it subsequently spread within Wuhan, to other cities in Hubei province, other regions of China, and the rest of the world [2]. The first cases related to the virus were announced in Turkey in March 2020, restrictive measures were implemented across various sectors upon the recommendation of the Ministry of Health.

The COVID-19 pandemic caused unprecedented disruptions to travel and all scuba diving activities worldwide. During this period, all recreational diving activities were suspended following recommendations from ECHM (European Committee for Hyperbaric Medicine) and EUBS (European Underwater and Baromedical Society). Meanwhile, professional diving activities were recommended to proceed only after a careful risk assessment and based on the urgency of the diving operation. In general, all sports activities were advised to be halted during the COVID-19 pandemic, except for those conducted alone, in pairs, or in very small groups, provided that sufficient physical distance was maintained between participants and sports equipment was not shared [3].

Maintaining the recommended minimum distance of one meter during recreational diving (as per the World Health Organization's COVID-19 prevention guidelines) is virtually impossible. Similarly, guaranteeing that breathing equipment would not be shared, such as in emergencies underwater, is challenging. The use of rental equipment during diving was also considered a risk factor for virus transmission.

In COVID-19, the virus is transmitted through respiratory droplets produced by sneezing or coughing, contact with contaminated surfaces, or close contact with an infected person. The incubation period of the virus ranges from two to 14 days [4]. One study found the average incubation period to be 5.1 days, with 97.5% of patients developing symptoms within 11.5 days [5].

Governments, global experts, and numerous institutions are closely monitoring the spread and virulence of this new virus and providing recommendations to all countries on measures to protect public health and prevent its spread. In this context, this study aims to address the following questions: "What are the key safety and hygiene tips for those engaging in recreational travel and scuba diving during and after the COVID-19 pandemic?" and "How can divers strengthen their connection to and interest in the underwater world as they did in the pre-pandemic period?" The purpose of this study is to identify the differences in divers' routines and perceptions of hygiene compared to the pre-pandemic period.

2. Materials and methods

For the study, a survey was prepared to evaluate the demographics, diving routines, and hygiene perceptions of divers during this period. The study was conducted using a 20-question survey that could be completed electronically between May 5 and July 5, 2021. The prepared survey was sent to divers electronically, inviting their participation. The responses collected from the divers were subsequently evaluated and analyzed cross-sectionally.

The survey questions covered topics such as prior diving experience, certification levels, total number of dives, frequency of diving before and after the pandemic, histories of COVID-19 transmission and illness following dives, shared use of diving equipment during dives, and diving routines during the pandemic period. A total of 46 divers participated in the study. Participation was voluntary. Additionally, relevant current literature was reviewed.

Ethics Committee Approval Sultan 2nd Abdulhamid Han Training and Research Hospital Medical Ethics Board (date and number: 13.01.2025, e-54230385-619-265369370). All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

3. Results

Among the 46 divers included in the study, 30 (65%) were male, and 16 (35%) were female. The age distribution of the participants was as follows: 3 divers (6.7%) were aged 18-30, 16 divers (35.6%) were aged 30-40, 20 divers (44.4%) were aged 40-50, and 6 divers (13.3%) were aged 50-60.

Only one diver (2.17%) held a PADI (Professional Association of Diving Instructors) certification, while the remaining 45 divers (97.83%) were CMAS (Confédération Mondiale des Activités Subaquatiques) certified. Regarding certification levels, 42 participants (91.3%) were recreational divers, and 4 (8.7%) were diving instructors. A total of 38

divers (82%) reported actively diving at least 10 times per year since they began diving. Three divers (6.5%) had been diving for less than one year, 18 divers (39.1%) had been diving for 1-5 years, and 25 divers (54.3%) had been diving for more than five years.

Diving records showed that 7 divers (15.2%) had completed 0-20 dives, 13 divers (28.3%) had completed 20-50 dives, 8 divers (17.4%) had completed 50-100 dives, and 18 divers (39.1%) had completed over 100 dives.

During this period, 23 divers reported contact with a COVID-19 patient, and 14 divers (30.4%) contracted COVID-19. Only one diver (2.1%) was diagnosed with COVID-19 within 14 days following a dive during the pandemic.

Before the COVID-19 pandemic, 22 divers (47.8%) shared diving equipment with their dive partners. However, after the pandemic began, only 5 divers (10.8%) continued sharing equipment. When asked about sharing the second stage of the regulator with a dive buddy for any reason during pre-pandemic dives, 16 divers (34.7%) responded affirmatively. Post-pandemic, no divers reported such shared usage. Regarding underwater air-sharing (buddy breathing) training during the pandemic, only 6 out of 27 divers (22.2%) received this practice. No dive accidents, such as decompression sickness or arterial gas embolism, were reported during dives conducted during the COVID-19 pandemic. However, two novice divers experienced sinus barotrauma during their dives.

When asked if their diving habits changed during the pandemic compared to pre-pandemic times, 25 divers (54.3%) reported changes. Twenty-four divers (52%) stated that their diving frequency decreased, while 5 divers noted changes in their preferred diving locations. Forty-one divers (89%) found the measures taken by dive schools or clubs during the pandemic adequate, while 5 divers (11%) found them insufficient. The inadequacies mentioned included insufficient personal equipment availability during boat dives, shared use of dive gear for those without personal equipment, hygiene issues in communal areas on boats, and challenges in adhering to mask and distancing rules onboard.

4. Conclusions and discussion

As with the rest of the world, the COVID-19 pandemic has significantly impacted recreational diving activities in Turkey. Additionally, travel safety during transportation to dive locations has become a critical issue. Intercity and international travel have contributed to the spread of the disease. In Turkey, travel restrictions during this period have led to a marked decrease in the number of recreational diving activities. The Turkish Underwater Sports Federation (TSSF) provided recommendations on measures that diving centers should take during the pandemic and suggested temporarily restricting diving activities.

While learning SCUBA diving and participating in certification programs during this period could permanently change individuals' perceptions of the underwater world, the necessity of additional safety measures to minimize the risk of infection transmission during the COVID-19 pandemic became evident. Considering the transmission routes of the disease, adhering to social distancing and hygiene rules during training sessions should be a primary focus.

TSSF recommended that air-sharing (buddy breathing) skills not be practiced during courses held in the pandemic period. However, we observed that 6 out of 27 divers (22.2%) who received training during the pandemic practiced this skill. It should be noted that the federation's advice to use an alternate air source for air-sharing training, where the diver providing air gives their alternate air source (octopus) to the requesting diver, can minimize the risk of virus transmission [6].

COVID-19 has a more severe impact on older individuals, particularly those over 65 years of age [7]. Approximately 80% of the participants in our study were divers aged 30-50, an age group better able to tolerate the disease in case of exposure. Among the divers included in the study, 14 (31.1%) contracted COVID-19 independent of diving activities, while only one diver (2.1%) was diagnosed with COVID-19 within 14 days following a dive. Despite the challenges of consistently applying mask and distancing rules during boat-based dives, the low disease rate observed in our study suggests that taking the necessary precautions significantly reduces the risk of transmission during dives.

As TSSF is a CMAS-affiliated organization, all divers in the study except for one were CMAS certified, as expected. Only one PADI-certified diver participated in the study.

A total of 38 divers (82.6%) reported diving at least eight times across two separate occasions in a diving season. Most participants were active divers, with 25 (54.3%) being experienced divers with over five years of diving history. The experience level of most divers may have contributed to the absence of diving accidents during the pandemic period. Only two divers reported sinus barotrauma, potentially linked to upper respiratory infections.

Although limited in scope, our study revealed the pandemic's impact on the diver population in Turkey. It highlighted the necessity of preparations to enable diving operations to resume at pre-pandemic levels of intensity. This finding also demonstrated that diving hygiene is a critical component of diving safety. The study found that the perception of hygiene increased significantly after the pandemic.

The COVID-19 pandemic has heightened global awareness regarding biological contamination and the transmission of pathogens in aquatic environments. This increased vigilance has had implications for diving hygiene, particularly concerning shared equipment and water quality management. Lessons from invasive aquatic species research highlight the potential role of human activities in pathogen dissemination, as observed in the case

of *Pseudorasbora parva*, which acts as a carrier of the deadly *Sphaerothecum destruens*, endangering native fish biodiversity [8]. Similarly, in diving, inadequate hygiene measures may contribute to the spread of microbial contaminants, underscoring the need for stringent decontamination protocols to mitigate health risks in diving operations.

As knowledge about the disease grows, adopting specific measures and encouraging a return to diving are ongoing efforts. However, it is expected to take time to recover the losses experienced during the pandemic. A reduction in the virus's spread within the country and worldwide, along with effective vaccination policies, will help recreational diving activities in Turkey return to pre-pandemic levels. Despite its limited scope, our study has shown the pandemic's impact on the diver population in Turkey. In conclusion, it confirmed that diving hygiene is an essential element of diving safety.

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References

[1] Liu, Y. C., Kuo, R. L., & Shih, S. R. (2020). COVID-19: The first documented coronavirus pandemic in history. *Biomedical Journal*, 43(4), 328-333. doi.org/10.1016/j.bj.2020.04.007

[2] Turkish Ministry of Health. (2020). The novel coronavirus (COVID-19). Retrieved July 10, 2021, from https://covid19bilgi.saglik.gov.tr/tr/

[3] *European Underwater and Baromedical Society (EUBS) & European Committee for Hyperbaric Medicine (ECHM).* (2020). Position on diving and COVID-19 (26th March 2020). Retrieved July 17, 2021, from http://www.echm.org/documents/English-EUBS-ECHM-position-on-diving-and-COVID-19-26th-March-2020.pdf

[4] *European Centre for Disease Prevention and Control (ECDC).* (2020). Factsheet for health professionals on coronaviruses. Retrieved July 19, 2021, from https://www.ecdc.europa.eu/en/factsheet-health-professionals-coronaviruses

[5] Lauer, S. A., Grantz, K. H., Bi, Q., Jones, F. K., Zheng, Q., Meredith, H. R., Azman, A. S., Reich, N. G., & Lessler, J. (2020). The incubation period of coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: Estimation and application. *Annals of Internal Medicine*, 172(9), 577-582. doi.org/10.7326/M20-0504

[6] Guru Dive. (2021). TSSF dalış merkezlerinin COVID-19 salgınına karşı alması gereken önlemler. Retrieved July 18, 2021, from https://www.gurudive.com/bilgi-bankasi/tssf-dalis-merkezlerinin-covid-19-salginina-karsi-almasi-gereken-onlemler-410.html

[7] *Altın, Z. Covid-19 pandemisinde yaşlılar. (2020). Tepecik Eğitim ve Araştırma Hastanesi Dergisi, 30 (2), 49-57.*

[8] *Saç, G., Gaygusuz, Ö., & Ertürk, A. (2020). Invasive fish threat in Manyas Lake (Turkey). Biological Diversity and Conservation, 13(2), 115-120. https://doi.org/10.46309/biodicon.2020.733667*