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Triage applications in Turkey during the COVID-19 pandemic

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Abstract

The purpose of this paper is to describe the revisions made to the triage system in Turkey as a response to the COVID-19 pandemic. The fundamental aspects of a triage system are universal, and these will be explored. The COVID-19 pandemic exposed this system to new challenges worldwide, as will be told in the paper. Turkey adopted a national policy which requires further examination, which is the main subject we will cover. The present paper includes the triage system used in Turkey during the COVID-19 pandemic for performing pre-evaluation of all patients admitted to the emergency department of hospitals related to COVID-19 and for approaching different patient groups that have been diagnosed positive for COVID-19.

Keywords: COVID-19, triage, emergency department.

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1. Introduction

Triage is a system and according to this system the first evaluation of illness or injury/trauma findings of patients who apply to the emergency department is made and they are categorised according to their degree of urgency. When we consider a historical point of view, the first triage was applied in France between 1804 and 1814 during the reign of Emperor Napoleon Bonaparte [1]. The word triage has been derived from the French verb 'Trier' and means to select and distinguish. Triage was first used to distinguish the soldiers, who were at the point of death, from the soldiers, who were less seriously injured, on the battlefields. In this case, priority was given to the soldiers who were less seriously injured and would return to the battlefield, recovering more quickly [2]. The first triage was applied in the emergency department of Yale Newhaven Hospital in the United States (USA) in 1963 and Weirnermann et al. reported the first civilian triage practice in writing in 1964 [1].

Triage is still continued to be used in hospital emergency departments, catastrophic situations (mass accidents and bomb explosions) and the military. The Turkish equivalent of triage is 'prioritisation' [3]. The triage system was launched to be used in Turkey on October 16, 2009: Official Gazette Number 27378 [4]. In cases where the available resources all over the world are not sufficient depending on various reasons, the triage system shows change due to COVID-19 in our country [5]. On 31 December, the People's Republic of China warned the World Health Organisation about unusual cases of pneumonia caused by an unknown virus that is believed to have originated from a market in Wuhan [6]. When this disease first appeared in 2019, it was named the 2019 novel coronavirus, later it was officially named COVID-19 (WHO, 2020). During this epidemic, a serious problem has been experienced as some governments and healthcare systems showed weakness in terms of planning, preparation, organisation and leadership, and some problems have occurred such as insufficient stocking of necessary medical equipment, including protective equipment for nurses and other healthcare workers. All of these have undoubtedly contributed greatly to moral questions related to this global public health emergency case and issues such as human rights [7]. Apart from ethical issues, another problem was that this new respiratory disease managed to spread rapidly on a global scale since it easily infected other people and the symptoms of COVID-19 patients progressed slightly in some infected patients, and even these symptoms were too weak to detect [8].

Starting from March 10, 2020, when COVID-19 was first seen in Turkey, triage measures specific to COVID-19 started to be implemented and the patients in the triage system were evaluated in terms of COVID-19 risk and these patients were divided into low-, medium- and high-risk groups and directed to the related areas. This risk assessment is also important for early diagnosis and when the role of early initiation of treatment on the effectiveness of the treatment process is considered, the value of triage in this process will be better understood [9]–[11].

2. Application field types and systems of triage

The purpose of triage is to protect life, to prevent deaths and injuries that may occur in the future, to protect limited resources, to prevent unnecessary applications to hospitals, to facilitate the care of non-critical patients, to ensure staff's effectiveness, to alleviate the fears of patients caused by the regulation and speed of operation of the system, to relieve the patient flow and unit traffic and to determine the most appropriate time to wait until a doctor consults [2].

The most common field types and systems in triage defined in this way can be classified as the triage system in the battlefield (military triage), the disaster triage system, the on-scene triage system, triage in the hospitalisation and the triage system in the emergency departments [12]. Different triage systems have been established for the prevention and control of the COVID-19 pandemic. Although each of these types of triage has its own unique elements, all of them have some common features as well. In order to understand the revision implemented in the triage system in Turkey, it would be useful to talk about the systems in other countries [12].

2.1. Triage classification systems used in the world and in Turkey

The emergency department of every hospital, regardless of size, is obliged to practice emergency department triage. While the simple or double, triple, quadruple and quintuplet triage classification systems currently used in hospitals are listed in Table 1, the Emergency Nurses Association and the American College of Emergency Physicians suggested the use of the quintuplet classification system because it has higher validity and reliability [12].

A large number of triage systems have been developed in many countries in order to be used in emergency departments. Many countries in the world have revised and reflected to practice their triage protocols, which are currently in use and proven to be valid, in terms of their own country population and suitability. Manchester Triage System and Canadian Triage and Emergency System (CTAS) are patient complaint-based triage systems. For both triage categories, a flow chart towards each disease group has been created and appropriate triage categories have been determined. The CTAS were developed in the late 1990s by means of taking as a model the Australian Triage System (ATS). Unlike the CTAS, in the ATS the recommended patient evaluation times according to the triage category have been changed and triage criteria specific to the child age group have been defined. Contrary to other classification methods, in the Emergency Severity Index (ESI), the classification is not made by determining the patient complaint-based parameters, but classification is made by determining the parameters suitable for the needs and estimated needs of the patients. Classifications made using the ESI can be defined in a very short time [13].

The physical conditions of the emergency department, triage practices, the operation of the emergency department and how the services will be carried out in our country are explained within the scope of the 'Communique on the Practice Procedures and Principles of Emergency Department in the Health Facilities with Bed' published in 2009, and the data on the implementation of the emergency departments described in this communique show suitability with the three-stage triage system. In the communique of the Ministry of Health published in the Official Gazette, colour coding is used as follows: red (very urgent), yellow (urgent) and green (non-urgent) (TR Ministry of Health, 2009).

Table 1. Triage classification systems used in emergency units around the world [12]

Double emergency classifications	Triple emergency classifications	Quadruple emergency classifications	Quintuplet emergency classifications
Urgent	Very urgent	Life-threatening	Immediate care
Non-urgent	Urgent	Very urgent	Very urgent
	Non-urgent	Urgent	Urgent
		Non-urgent	Non-urgent
			Referral to Hospital

2.2. Approach to the probable/definite COVID-19 patient in the emergency department

Emergency departments come into prominence as the units which have the highest contact risk with infected people during the COVID-19 pandemic due to the fact that they provide service for a period of 24 hours. Emergency departments are important units, which constitute the first starting point of the diagnosis, evaluation and treatment of the infection and where processes such as admission of suspected/confirmed cases, triage, examination, inspection, evaluation, observation, consultation, treatment, hospitalisation (isolated service and intensive care), referral and exitus are implemented [14], [15].

The initial assessment of clinical symptoms in the emergency department is the cornerstone of triage and it aims to identify and isolate patients who are infected or under the risk of being infected, and to quickly improve the vital functions of critically ill patients by using a multidisciplinary approach.

It is important to restructure the organisation of the emergency department and triage in order to properly manage the treatment and care services of patients who will need to go to the other emergency medical intervention during the epidemic process [14], [15].

Stable patients suspected of COVID-19 should be applied triage transaction by pre-trained healthcare personnel in a pre-triage area located outside the emergency department or just at the entrance of the emergency department and then they should be taken to the area where they will receive medical care. Patients who come to the emergency department with fever and/or respiratory symptoms should wear a surgical mask in the triage area and they should be isolated from other patients in order to reduce the risk of infection [14]–[18].

It is important to separate the emergency department area (contaminated emergency department), where the care of patients with moderate and/or high risk or confirmed diagnosis will be made, from the emergency department area, where the care of COVID-19 patients with low risk will be made (clean emergency department) to both prevent the infection between patients and minimise the risk of infection to healthcare workers. The care of patients, who underwent the first triage procedure and who were evaluated to be COVID-19 with low risk, should be carried out in the area defined as the clean emergency department. The contaminated emergency department should be divided into three areas: contaminated area, potentially contaminated area and clean area. The clean area should be allocated as resting areas for emergency department workers. Instructions on the proper use of personal protective equipment and the rules to be followed in passing between areas should be posted in all areas and these instructions should be designed in such a way that all workers can easily see them [14]–[18].

2.3. Triage approach in the COVID-19 period in Turkey

The first evaluation of patients who apply to the emergency department can be carried out in different triage areas. In triage, patients have been evaluated in terms of the risk of COVID-19, and these patients have been divided into low-, medium- and high-risk groups and directed to the relevant areas. This risk assessment is important for early diagnosis and when the role of early initiation of treatment in terms of the effectiveness of the treatment process is considered, the value of triage in the process will be better understood. After the evaluation is made, as shown in Figure 1, according to a certain triage algorithm, patients who made an application are directed to the separate areas specified below [11], [15], [19], [20].

Tent and container triage areas have been set up at the emergency department entrances of hospitals and thus the patients in the low-risk category are directed to the relevant area in the emergency department. The pre-triage area can set up at the entrance of the emergency department as well as it can set up in the internal section of the emergency department and the patients are separated according to their answers given to the questions shown in Table 2, related to COVID-19. Patients who do not have any symptoms of COVID-19 risk according to any criteria but have other complaints are sent to the relevant unit in the emergency department along with other patients in the low-risk group in order to subject to a preliminary evaluation. Patients with low risk in the main triage area in the internal section of emergency department are referred to the yellow area [10], [19].

Table 2. 112 triage questions of command and control centres [10]

Do you have a cough?	Yes/No
Do you have difficulty in the breathing or any respiratory distress?	Yes/No
Do you have fever or a history of fever?	Yes/No
Have any of your relatives been hospitalised due to any respiratory disease in the last 14 days?	Yes/No
Have any of your relatives been diagnosed with COVID-19 in the last 14 days?	Yes/No

* All of these questions are asked and if the answer of minimum 2 questions is yes, it is considered as possible COVID-19. If the answer given to the first two questions is yes, N95/FFP2 mask and glasses/face protecting equipment, otherwise medical masks and glasses/face protecting equipment are sufficient. An Attendant is not taken for adult patients, but when it is absolutely necessary for paediatric patients, the attendant is admitted provided that he/she wears a surgical mask.

(Ministry of Health, 2020).

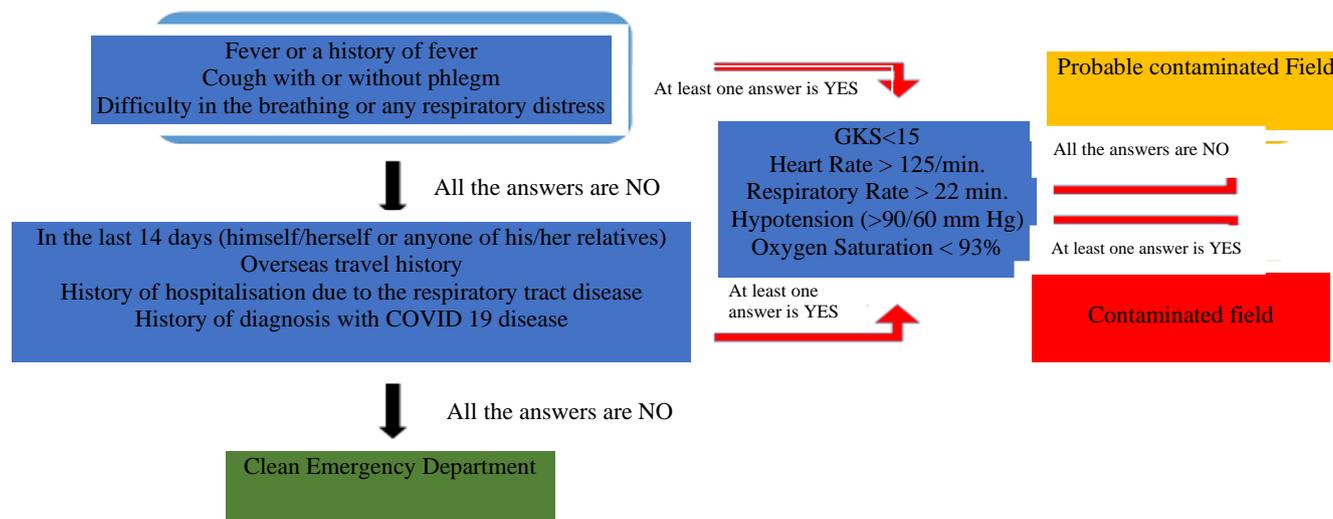


Figure 1. Triage algorithm in patients suspected of COVID-19 [11], [15], [19]

3. COVID-19 triage approach with a definite and probable diagnosis in outpatients: examples from Turkey and the world

In the system belonging to the pre-epidemic period in the Republic of Turkey, the quintuplet triage system with colour codes was widely used in the emergency department. This system aims to bring the physician and the patient together at the right place and at the right speed as required. Since the patient flow in emergency departments cannot be limited to as much as the areas where polyclinic service is provided, this situation shows that it is necessary to apply more than one triage area. It should be carried out routinely by taking into consideration standard precautions recommended by the Ministry of Health. Not only patients should be classified according to the colour code of the disease they have, but also they should be classified according to the data obtained after a complete triage process is applied, including patients' epidemiological information, clinical features and vital signs, which should be asked to COVID-19 patients during the current pandemic period (Figure 2) [19], [21], [22], [24].

Thus, the possible patient can be promptly directed to the relevant area and the patient, who is less likely to be infected or who has a mortal emergency medical condition, can quickly get the treatment that he/she needs. As a result of preliminary triage and body temperature measurements made in the triage areas deployed at the hospital entrances (outpatient clinic and emergency department) for outpatients, the patients who are likely to be sick are referred to the evaluation areas allocated for COVID with the least contact as soon as possible by evaluating the physical conditions of the hospital [22], [24].

	Do you have a fever or a history of fever?	Yes	No
	Do you have a cough?	Yes	No
	Do you suffer from shortness of breath, sore throat, headache, muscle aches, loss of taste and smell perception or diarrhoea?	Yes	No
If the answer given to any of the above questions is YES, the PATIENT WEARS A MASK and is directed to the area allocated for COVID-19.			

If the answer given to all of the above questions is NO, the following questions are asked to the patient.			
	Have you been abroad in the last 14 days?	Yes	No
	Have any of your household members come from abroad in the last 14 days?	Yes	No
	Have any of your relatives been hospitalised due to any respiratory disease in the last 14 days?	Yes	No
	Have any of your relatives been diagnosed with COVID-19 in the last 14 days?	Yes	No
If the answer given to any of the above questions is YES, the PATIENT WEARS A MASK as there is a risk of COVID-19 and the patient is directed to the area allocated for COVID-19.			

If the answer given to all of the above questions is NO, it is considered as low-risk patient for COVID-19 and the patient is directed to the relevant department to be evaluated in accordance with his/her complaint.

Figure 2. Possible COVID-19 case inquiry form for applications of outpatient (Ministry of Health, 2020) [19], [22]

Before the diagnosis and treatment interventions to be applied to these patients are made, it is not appropriate to request a consultation note or thoracic computed tomography indicating that COVID-19 disease is not available in all clinics and services with beds, especially in the emergency department. When it is considered that the PCR test can be negative in both asymptomatic carriers and patients, it is not possible to say certainly that a person is not infected with COVID-19. Therefore, it should be foreseen that everyone can infect other people with COVID-19, even if they are not sick. In line with the Personal Protective Equipment Recommendations of the Scientific Committee and COVID-19 Emergency Anaesthesia Management guidelines, personal protective equipment such as reinforced gowns, medical masks, goggles/face protecting equipment and gloves should be standard and used in accordance with the rules regarding precautions required in order to prevent the infection, all kinds of medical care, treatment and intervention should be administered for these patients with indications [11], [19], [22].

If a patient within the scope of red category makes an application, first the necessary isolation is provided by the COVID-19 guidance teams and then both guidance and first intervention process are applied simultaneously. For ambulance applications, as a result of the predetermined possible case inquiry algorithm, they should be delivered to both the pre-triage areas and the polyclinic clinic areas allocated for COVID-19, and the necessary isolation should be provided. The emergency department is responsible for directing the mild-stable patients presenting with COVID-19 to the pandemic polyclinic and initiating necessary procedures, as well as it is responsible for organising the mild-moderate patients to receive the necessary treatment or, if needed, hospitalisation in the service/intensive care unit. Also, standard emergency protocols requiring resuscitative procedures should be maintained. It

will be more accurate to separate these evaluations according to the application forms towards triage areas [17], [19], [22].

For example, in China, similar measures have been implemented and at West China Hospital, the emergency department has undertaken the mission of clinical admission, primary diagnosis and interim treatment for suspected COVID-19 cases. A well-functioning triage system is one of the ways to struggle with the increased workload. The use of online methods in the triage system provides some conveniences. First, the online clinic has been established to facilitate patient triage. Through a free online consultation, a preliminary decision regarding the urgency of treatment has been taken in the hospital and non-emergency patients have been advised to postpone their hospital appointments or to visit other non-pandemic hospitals and also patients with low suspicion were instructed to be treated at home by isolating themselves and high-suspicion patients have been invited to the fever clinic via the green code (channel). The online clinic has effectively eased the emergency department's workload and facilitated early detection of potential cases [6], [23].

Second, a distinction has been created between triage and emergency departments. The assigned healthcare personnel has made a preliminary examination and triage to categorise incoming patients as low suspicion, high suspect and other patients, and they have enabled the patients in the different categories to follow the specified routines for entering the emergency department and divided the in-emergency area into high-risk and low-risk zones. An independent fever clinic room and fever observation room and computerised tomography examination room have been allocated for suspicious cases in the hospital. Cases confirmed by qRT-PCR and/or computed tomography were transferred to the quarantine service, while other patients were sent back to other departments or home. The emergency department separation triage system has reduced the cross-infection by limiting the activity intervals of both patients and emergency medical personnel [6]. Again, in a study conducted in China, the epidemiological criteria specific to COVID-19 have been established and patients have been classified according to their relationship with Wuhan where the epidemic started – for example, whether they went to the region within 14 days or not [23]. According to the same study, first-level triage pre-assessment in the hospital was made at the entrance of the outpatient lobby and second-level self-assessment was made in the inflammatory disease area, and those with positive diagnoses were sent to another building within the same hospital complex.

Third, the need for the emergency department has the top priority. The hospital established a functional command system and also personal protective equipment and medical devices were provided preferably to the emergency department with implementation of the effective coordination mechanisms and triage, and in addition to these regions, personnel with high risk were equipped with standard personal protection and non-emergency appointments and operations were cancelled or postponed and assistant healthcare personnel were sent to the emergency department from other departments. These measures are concentrated on the healthcare personnel who need excessive protection [6], [23].

4. COVID-19 in the hospital and the Turkish triage system

According to the new triage practices in Turkey, the COVID-19 triage area should be established at the entrance section or outside separately from the existing triage area in the emergency department. As a result of the demographic inquiry, as shown in Figure 2, a distinction was made between infected and non-infected patients. Thanks to the restriction of the hospital entrance areas, the presence of a pre-triage area similar to the entrance other than the emergency department, even though the patient has applied in accordance with an appointment system, as a result of the preliminary evaluation made, the patient can be directed to the pandemic polyclinic. Appropriate areas should be created to ensure that patients, who apply to the hospital and the emergency department, wait due to the social distance rules [18], [22]. Personal protective equipment (mask, visor, apron etc.) should be provided for healthcare workers working in triage areas, and reminder visuals and announcements

should be placed showing their correct use. Hand and surface cleaning should be done by using hand disinfectant after each patient application, and the triage area should be ventilated as soon as possible. Equipment used on the patient should also be cleaned before the usage of next patient. The use of surgical masks is sufficient, except for procedures that require droplet isolation [18], [22]. On the other hand, the fact that this new respiratory disease has managed to spread rapidly on a global scale because it is easily infected and the symptoms of COVID-19 were mild even too weak to detect is another problem [24]. A nurse working in an emergency department in New York, where cases and deaths are increasing rapidly, has expressed his/her experiences strongly. This nurse stated that they were faced with difficult moral dilemmas such as deciding who will live and who will die (due to lack of ventilators etc.) beyond the difficulties that concern them such as working hours of 60 hours a week and mask wounds [7]. Nurses are frontline healthcare professionals who work in acute care hospitals, long-term care institutions, nursing homes, schools, community and government healthcare institutions. The multiple roles and functions undertaken by nurses have come to the forefront, especially during this COVID-19 pandemic [22], [24], [25], [26].

5. Patient management with pneumonia in Turkey

5.1. Mild–moderate progressive pneumonia triage approach

Patients who have symptoms such as fever, muscle/joint pains, cough and sore throat, whose respiratory rate is <30/minute, SpO₂ level >90% in room air and who have mild–moderate pneumonia findings based on chest X-ray or tomography are considered as mild–progressive pneumonia (patients without having severe pneumonia finding). Personnel in charge for triage takes respiratory tract sampling for PCR testing by means of using the recommended personal protective equipment (apron, N95 mask, goggles/face protecting equipment and gloves) in order to ensure protection against COVID-19 infection when the respiratory tract sampling is taken [11], [15], [19], [22].

A possible case that has been evaluated as mild pneumonia has the following criteria: patients who do not have poor prognostic criteria (the number of blood lymphocyte is 10x upper limit of normal value or ferritin >500 ng/ml or D-Dimer >1,000 ng/ml) in blood tests taken at admission, whose respiratory rate is <24/minutes, SpO₂ level is >93% in room air and who do not have bilateral diffuse (>50%) involvement in lung imaging can be sent back home or to the related isolation areas with the recommendation of isolation outside the hospital (the relevant isolation area is determined by the provincial/district health directorate when necessary). Antiviral treatment is started in line with the treatment algorithm presented in Table 3. The treatment started is given by the hospital pharmacy [11], [22].

Table 3. Treatment recommendations for positive COVID-19 cases with mild–moderate progressive pneumonia [19], [22]

Medicine's name	Daily dose, administration method	Duration of treatment (days)
Hydroxychloroquine 200 mg tablet	2 × 200 mg tablet, oral	5 days
AND/OR		
Favipiravir 200 mg tablet	2 × 1,600 mg loading, 2 × 600 mg maintenance	5 days

(Ministry of Health, 2020).

5.2. Severe pneumonia triage approach

As severe pneumonia findings and with the purpose of evaluating in terms of hospitalisation in the intensive care unit, an intensive care consultation is requested from patients who have symptoms such as fever, muscle/joint pains, cough, sore throat and nasal congestion, whose tachypnea is ≥ 30 /minute, SpO₂ level is below $>90\%$ in room air, who have poor prognostic criteria (the number of blood lymphocyte is 40 mg/l or ferritin >500 ng/ml or D-Dimer $>1,000$ ng/ml) in blood tests taken at admission and who have bilateral diffuse pneumonia findings according to the chest X-ray or tomography; the decision is made together with the responsible physician. The decision regarding the admission of the patients to the intensive care unit is also made together with the intensive care physician [11], [15], [22].

Personnel in charge performing triage take respiratory tract sample for PCR test by using recommended personal protective equipment (apron, N95 mask, goggles/face protecting equipment and gloves) to ensure protection from COVID-19 infection during respiratory tract sampling and the patient is isolated in accordance with standard contact and droplet isolation conditions. Antiviral treatment is started in line with the treatment algorithm presented in Table 4 [11], [15], [22].

Table 4. Treatment in probable/definite COVID-19 cases with severe pneumonia [19], [22]

Medicine's name	Daily dose, administration method	Duration of treatment (days)
Hydroxychloroquine 200 mg tablet	2 × 200 mg tablet, oral	5–10 days
AND/OR		
Favipiravir 200 mg tablet	2 × 1,600 mg loading, 2 × 600 mg maintenance	5–10 days
Treatment in cases whose clinical symptoms worsen or pneumonia symptoms progress while receiving hydroxychloroquine treatment.		
Favipiravir 200 mg tablet	2 × 1,600 mg loading, 2 × 600 mg maintenance	5–10 days

For the diagnosis and treatment of the patient who is thought to develop MAS in the service follow-up, see the relevant section.

(Ministry of Health, 2020).

6. Results

The triage system has a particular importance for the functioning of the health system. The COVID-19 pandemic has made it mandatory to update the triage systems in the world and in Turkey. These updates have been made taking into account the countries' healthcare systems and country-specific needs. The COVID-19 triage system in Turkey has been developed by benefitting from the experiences in China, but it has been adapted to the structure of the Turkish healthcare system, which has turned into a unique system.

7. Contribution to the field

With this study, the changes that Turkey made in the triage system during the COVID-19 pandemic have been explained and this system has been examined both before and after COVID-19 based on the country and also by comparing it with different systems in other countries, and thus a contribution has been made to the literature of emergency department nursing.

Authors' contribution

Aziz Aslanoglu (Abed Alazeez M. M. Almalahy) took charge of planning and writing this study. Prof. Dr. Mustafa Ayyildiz took charge of the design, editing and final control of this study.

Ethical statement

The authors declare that they complied with the research and publication ethics.

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