Covid-19 Pandemisinde Klinisyenlerin Biyokimya Laboratuvarına Bakışı

The View of Clinicians to the Biochemistry Laboratory in the Covid-19 Pandemic

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ÖZET

Amaç: COVID-19 pandemisi ile birlikte klinisyenlerin laboratuvar profesyonellerinden beklentileri ve istenen test miktarları önemli ölçüde artmıştır. Pandemi ile ön saflarda mücadele eden laboratuvar ekibinin iş akışını uzman klinisyen hekimler yeterince anlamamakta ve iletişimde sorunlar yaşanmaktadır. Çalışmada klinisyenlerin laboratuvara ve laboratuvarın işleyişine ne ölçüde hakim oldukları sorgulanmıştır.

Gereç ve Yöntem: Araştırma anket yoluyla gerçekleştirilmiş olup Türkiye genelinde çeşitli devlet, eğitim ve araştırma ve üniversite hastanelerinden 85 uzman klinisyen hekimin Google Formlar'daki formu doldurarak katıldığı 18 sorudan oluşmaktadır. Sonuçlar yüzde olarak değerlendirildi.

Bulgular: Genel olarak klinisyenlerin tıbbi laboratuvarların analitik süreçlerine ve kalite özelliklerine hakim olmadıkları, akılcı test isteminde bulunmadıkları ve laboratuvar ile aralarında iletişim kopukluğu olduğu belirlendi. Biyokimyacıların çalışmalarını hafife alsalar da tıp doktoru olan biyokimyacılarla çalışmayı tercih ettikleri belirtildi.

Sonuç: Biyokimya ve diğer tıbbi laboratuvarların işleyişinin klinisyenler tarafından anlaşılması, analitik süreçleri hızlandıracak, tıbbi hataları azaltacak ve karşılıklı iletişimi kolaylaştıracaktır.

Anahtar Kelimeler: klinik laboratuvar hizmetleri; tıbbi laboratuvar personeli; covıd-19; klinisyenler

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ABSTRACT

Aim: With the COVID-19 pandemic, clinicians' expectations from laboratory professionals and the desired test volumes have increased significantly. The specialist physicians do not sufficiently understand the laboratory team's workflow struggling with the pandemic at the forefront, and there are problems in communication. In the study, the extent to which clinicians understand the lab's labor and the extent to which they have mastered the laboratory functioning were questioned.

Materials and Methods: The research was carried out through a survey, and 85 specialist physicians from various state, training and research, and university hospitals across Turkey participated by filling out the form on Google Forms contains 18 questions. Answers were evaluated in percentages.

Results: In general, it was determined that the clinicians did not have a command of analytical processes and quality specifications of medical laboratories, did not make reasonable test requests, and there was a communication gap between them and the laboratory. They stated that although they underestimate biochemists' work, they prefer to work with biochemists who are medical doctors.

Conclusions: Understanding the workings of biochemistry and other medical laboratories by clinicians will speed up analytical processes, reduce medical errors and facilitate mutual communication.

Key words: clinical laboratory services; medical laboratory personnel; covid-19; clinicians

INTRODUCTION

Since the COVID-19 pandemic started in late 2019, clinicians' laboratory expectations have increased enormously. Clinical laboratories have succumbed to a variety of challenges, as do various organizations and industries worldwide. Laboratory professionals and employees work at an intense pace to understand the mechanisms underlying the pandemic and contribute to diagnosis and treatment under a large test load (1). The major challenges in the microbiology site are, collecting the suitable respiratory tract specimen at the right time from the right anatomic site is necessary for an immediate and accurate molecular diagnosis of COVID-19, polymerase chain reaction (PCR) analyzes that give reliable results and problems in material supply (2). In biochemistry laboratories, a serious challenge is providing service to many infection patients, some of whom are severely ill due to insufficient working areas, technical capacity problems, and human resource difficulties (3). Measurements of inflammation biomarkers, heart and muscle damage, liver and kidney function, and coagulation are significantly increased in both severe and fatal COVID-19 patients (4). Complete blood count (CBC), d-dimer, ferritin, fibrinogen, cardiac troponin I (cTnI), lactate dehydrogenase (LDH), and c-reactive protein (CRP) tests, especially in tertiary care hospitals, are used in almost all individuals are requested (5). Since respiratory distress occurs in intensive care patients, blood gas analysis, procalcitonin, and broad biochemistry profile are frequently analyzed.

A study stated that the communication between the clinicians and the laboratory team was interrupted, and hospital managers should take responsibility for increasing the service quality and not leave the scientific methodology (6). The 2015 Institute of Medicine report, Improving Diagnosis in Health Care, highlighted diagnostic errors cause patient damage and that development in the diagnostic process requires cooperation between physicians and laboratory professionals (7). Also, it has been stated that laboratory specialists have the opportunity to become more effective in the diagnostic process by providing support as if they are one of the clinicians, beyond just providing test results (8). Fortunately, when talking about Turkey's circumstances before the pandemic, our experiences as laboratory professionals say that most clinicians were stated that biochemists did not work under an equal workload and made less effort. In the fight against COVID-19 infection, which has spread worldwide, even the fact that

biochemists come to the field to diagnose and treat patients together with clinicians does not seem to change this idea. Therefore, in Turkey, biochemistry professionals indicate that clinicians do not know enough about the working conditions and rough quality procedures of biochemistry and other medical laboratories. Based on this idea, we conducted a questionnaire study in order to determine the missing points in terms of both communication and education by taking the opinions of clinicians about the functioning of medical laboratories. Survey creating questions that generated the most distress among clinicians and laboratory staff in Turkey were discussed.

MATERIALS AND METHODS

Subjects

The research was carried out through a survey with informed consent between November 2020 and January 2021, and 85 specialist physicians from various state, training and research, and university hospitals across Turkey participated by filling out the form on Google Forms (Google Inc, California, USA). Since the study was not performed on biological samples or through medical records, the hospital board or ethics committee's approval was not required.

Methods

The survey consisted of 18 questions about sampling, transfer, sample preparation and analysis, possible laboratory errors, and understanding the laboratory workflow starting from the preanalytical phase, including the analytical and post-analytical phase. Considering the first 11 questions, that answers can be selected as "yes" or "no", six were about the preanalytical phase, and four were about test requests, as shown in Table 1. There were five questions about the analytical and post-analytical phase. Besides, seven questions were prepared as two answer options consisting of one sentence in order for the clinicians to provide more detailed information about the study, as shown in Table 2. Physicians who participated in the survey were not asked about their specialty information, as it was thought to cause problems between clinicians and laboratory physicians. Questions were based on the clinical biochemistry laboratory working system and the general laboratory functioning.

Table 1. Survey questions prepared to answer as "yes" or "no" and the number of answers.
Tablo 1. "Evet" veya "Hayır" şeklinde yanıtlanacak anket soruları ve cevap sayıları.

	YES	NO
Are you present when a blood sample is taken from the patients?	11	74
Do you have information about blood sampling procedures?	19	66
Do you think the blood collection staff perform sampling according to guidelines?	32	53
Do you think the identity information of the patients was verified before blood sample was taken?	21	64
Do you handle the laboratory test requests yourself?	13	72
If you do not fulfill the audit requests yourself, do you think that the assistant make unnecessary requests?	68	17
Do delayed or incomplete test results cause you to react?	81	4
Do you call the laboratory to complete a few tests that you care about in case of sample rejection?	37	48
Do you have enough information about correct test order, sample collection, transportation, preparation and test run times?	14	71
Would you react when test results are failed due to device malfunction or material supply problem?	73	12
Do you think the test results should arrive on time and without an excuse?	82	3

Table 2. Survey questions prepared to answer as prepared sentences and the number of answers. Q; Question, A; Answer.
Tablo 2. Hazır cümleler olarak cevaplanmak üzere hazırlanan anket soruları ve cevap sayıları.

Q	Do you perform your test requests according to differential diagnosis or in general?			
A	Differential diagnosis	31	General	54
Q	Do you request laboratory tests individually or collectively via prepared forms?			
A	Individually	23	Collectively	62
Q	What do you think about sampling blood from emergency room patients or inpatients with a syringe?			
A	No problem	47	Error factor, impracticable	38
Q	What do you think about the sample rejections for various reasons?			
A	Fewer can be made	39	Essential for reliable results	46
Q	What do you think about laboratory quality management and periodic inspections?			
A	No idea	57	I am aware and appreciated	28
Q	What do you think about clinical biochemistry specialists?			
A	Their job requires less effort	42	As precious as clinicians	43
Q	What do you think about clinical biochemists who are medical doctors or not?			
A	Prefer MD Clinical Biochemist	77	It does not matter	8

Ethical Committe

This study was approved by Amasya University ethics committee on April 8, 2021.

Statistics

The survey results were evaluated with percentage data from Microsoft Excel software (Microsoft Inc, Washington, USA).

RESULTS

The answers showed that 87.1% of clinicians are not present with the patient during the blood collection, and 77.6% do not have information about the blood draw. 62.4% stated that the blood draw is not done according to the guidelines, and 75.3% did not believe that the patients' identity is confirmed before the blood draw. 84.7% of the clinicians confirmed that they do not fulfill the test requests themselves, and 80% indicated that their assistants make unnecessary test requests. Specialist physicians stated that they would react to the laboratory team at a rate of 95.3% in delayed or incomplete test results that the laboratory can intervene, and at a rate of 85.9% when the tests they want cannot be performed which the laboratory is not directly involved, such as power failure, plumbing problems device failure or material supply problem. Interestingly, 43.5% of the participants claimed that they wanted the tests to be concluded, which they thought were important for their patients, even if samples were rejected. When the awareness rate of a correct test order, sample collection, transportation, preparation, and test run times, which includes all laboratory processes, was investigated, 83.5% of the clinicians stated that they did not master the process; 96.5% stated that when the test request was made, they wanted the results to reach their hands on-time and without an excuse. 63.5% of the participants stated that they made their test requests in general, not specifically for diagnosis. Besides, 72.9% stated that they made test requests collectively through the hospital information system template rather than requesting tests one by one. While 55.3% of clinicians did not consider taking blood with a syringe in emergency services or inpatients as a problem, 45.9% claimed that sample rejection was made more than necessary. 67.1% of the participants claimed that they

were unaware of the quality controls of medical laboratories, also 49.4% stated that medical biochemists work less. Finally, specialist physicians argued that 90.6% of medical biochemists should be medical doctors. The percentage of the answers given to the first 11 questions of the survey are shown in Figure 1.

DISCUSSION

Clinicians do not have to be present with their patients when taking blood samples, but they are expected to be familiar with blood sampling procedures. For the clinical laboratory, errors occurring in the preanalytical phase of the test include a high incidence of non-compliance with blood collection procedures and can account for 75% of total laboratory errors (9). Blood sampling errors can have detrimental effects on patient care, resulting in a waste of resources, improper diagnosis and treatment, increased length of hospital stay and reduced hospital quality. Although specialist physicians are not expected to have comprehensive knowledge of this subject, it is essential to have an idea of possible errors. In this pandemic period, where intense laboratory tests are required from COVID-19 patients, unexpected results can be better evaluated when the sources of blood draw error are known (10). Clinicians do not believe that blood sampling staff work based on guidelines, which can be explained by certified phlebotomists' insufficiency due to the increasing need for staff during the pandemic process (11). The belief that the patient's identity whose blood will be drawn is confirmed is also low, but our experience says the opposite. Even dormant but conscious patients must be identified definitely, and must not rely upon patient file or record tags (12). However, in small healthcare facilities far from urban centers and lacking medical biochemists, this faulty application may perform.

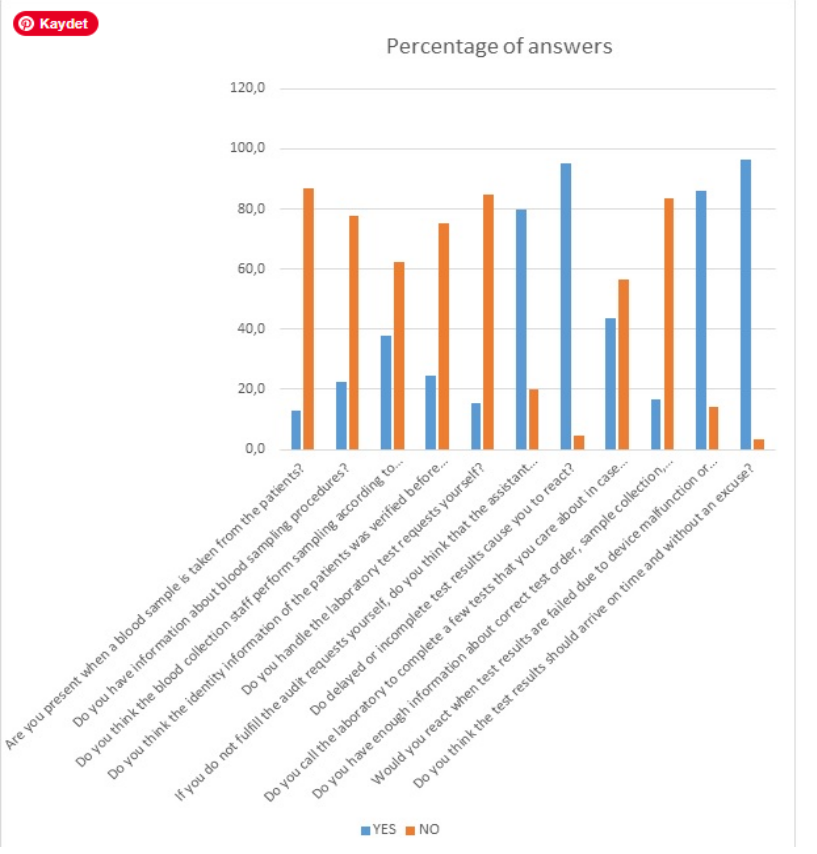

Figure 1. Percentage of the answers given to the first 11 questions of the survey.
Şekil 1. Anketin ilk 11 sorusuna verilen yanıtların yüzdeleri.

According to our survey results, clinicians often admitted that assistant staff made test requests, not themselves and that staff made unnecessary requests when they did not deal with the test request. Besides, the study results showed that the rate of specialist physicians performing diagnostic test requests was low. The fact that someone other than the clinician makes the test requests in the first place endangers the security of the patient's information, even if the clinician instructs them. While almost 70% of the decisions to be taken regarding the patient's medical processes depend on the laboratory test results, the uncontrolled execution of the test requests and the general test request rather than the disease specificity is not an explanation (13).

According to the study results, clinicians stated that they were not satisfied with sample rejection at a rate of almost half and that less sample rejection could be made. They also stated that a few tests they find valuable for their patients should be studied even from rejected samples. These data have made us think that clinicians do not have enough information about sample rejection and even believe that sample rejection is done by laboratory initiative, not by sample quality. Also, 55% of the clinicians claimed that it would not be a problem when asked about blood collection from a syringe, which is the main factor of hemolysis, especially in the emergency service and inpatients. The IFCC Working Group on laboratory errors and patient safety stated that sample rejection is a requirement in terms of quality, even though it extends the time to result of the tests (14).

According to our study data, clinicians claimed up to 95% that if there is a delay in test results, they will react and when they request the test, the results should be ahead of them on time and without any excuse. Thanks to advances in analytical techniques and instrumentation, errors in the finalization of tests have been reduced by a factor of 10 in the last decades. However, the preanalytical errors such as identification errors and sample problems mentioned above are much more vulnerable in the turn-around-time (TAT) (15). Also, no matter how justified their demands may seem, the quality procedures that the laboratory must apply to provide reliable results may take time for several analytes or devices (16). One of the clinicians' expectations could be that their knowledge about rational test requests, sample collection, transport, preparation, and test study periods was insufficient to realize how laboratory operations perform. Most clinicians advocated that the results should be reported promptly, despite factors such as supply problems, electrical failure, and plumbing problems that are not in the laboratory team's hands. Since there is a global supply explosion in ferritin, d-dimer, fibrinogen, troponin, complete blood count (CBC), and c-reactive protein (CRP) tests, which are highly desired, especially during the pandemic period, it is comprehensible that the manufacturing companies will not be able to provide timely and complete supply to all countries and all laboratories.

At the point of laboratory quality management and regular inspection of clinical laboratories, specialist physicians mostly stated that they have no idea. In laboratory medicine, process analysis, the recording/documentation of all procedures and operations according to quality standards, especially the ISO 15189: 2007, which points explicitly out medical laboratories, are crucial tools for alteration and development onto daily clinical practice (17). Clinicians should appreciate the effort of laboratory staff dealing with such intensive quality regulations for reliable results. Despite this, a considerable proportion of the specialist physicians (49.4%) claimed that biochemists did not make much effort and worked under much more comfortable conditions. This could be due to less communication between the laboratory and the clinician and the clinicians' lack of knowledge about medical laboratories, which are closed environments.

Finally, more than 90% of clinicians made it clear that medical biochemists should be medical doctors. As far as we know from our

own experience, specialist physicians trust biochemistry specialists who, like themselves, have received medical faculty education, know how to examine patients, have an idea about diseases according to specific specialties, interpret the result according to the treatment applied, and even serve as a consultant to the clinician. Considering that all physicians examine patients, diagnose and treat patients regardless of their specialty, in the fight against COVID-19, it is understandable that this demand is not unfounded.

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