

ORIGINAL ARTICLE

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Being a medical pathology expert in the COVID-19 pandemic **Havva Erdem,**  **Muruvvet Akcay Celik***Ordu University Faculty of Medicine, Department of Pathology, Ordu, Turkey*

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**Abstract**

The aim of the study is to reveal the risk of COVID-19 among pathologists and to examine their views, concerns along with measures to be taken in dealing with COVID-19. The research was carried out in Turkey with online survey method, on 176 participants. According to the findings of the study, participants who served one-on-one to a COVID-19 patient was 47.16%. Number of participants assigned in the polyclinic and clinical processes of coronavirus patients; 63.6%. 24 participant (13.6%) stated that their frozen cases decreased. Substantially, there was a use of protective equipment (88.6%). Cytological specimens were seen to continue 93.7%. There was a competence of 88.6% in terms of protective equipment. It was determined that the anxiety levels of the participants did not change according to age groups, according to the hospital type, working pandemic outpatient clinic and gender variables ($p > 0.05$). As a result, medical pathologists actively continue their routine services during the pandemic process and also support their other colleagues by working actively in the COVID-19 outpatient clinic. As always, solidarity with our colleagues continues.

Keywords: COVID 19, pathologist, pathology laboratory, protection**Introduction**

A pandemic happens when a large number of communities have not developed immunity against the presence of a new virus. Pandemia; it means a large number of diseases and deaths. With the increase in global transportation and urbanization, the pandemic caused by a new virus can affect the whole world instantly. This has led to the deaths of millions of people, social tremors, and profound economic losses [1].

Four stages are observed during a pandemic. These; start, increase, peak, decrease periods. It is said that there may be a second wave after the decrease period [1].

In Wuhan, China, a set of cases of pneumonia the new 2019 coronavirus (2019-nCoV), caused by betacoronavirus, has been identified. On December 31, 2019 Chinese health officials came up with the notification of a set of acute respiratory diseases in people related to the Hunan Seafood and Animal Market in Wuhan city, Hubei Province, in the center of China. Then it started to spread rapidly in China and many other countries [2].

As of April 29, there were 3.089.013 cases, 217.551 deaths, 888.091 cases of improvement worldwide. As of now, coronavirus cases have been seen in 210 countries. In Turkey 117.589 total cases, 3.081 total number of death, 44040 total number of healed. Healthcare workers who become infected, 10-11% in the world and between 6.4-6.5% in Turkey [3].

The outbreak of COVID-19 worldwide has become a clinical threat to the general population and health professionals. However, information about this new virus is currently limited. In addition, insufficient personal protection of healthcare workers, long exposure to many infected patients (increased virus load), abnormal increase in workload and lack of personal protective equipment further increase the risk of infection for healthcare professionals [2,4].

Research has reported that these healthcare professionals are afraid of getting infected and infection to their families, friends and colleagues, they feel uncertainty and stigma, think of withdrawal or resignation, and experience high levels of stress, anxiety, and depression [5].

Despite all the psychological burden in this pandemic environment, both pathologists, technicians and other workers continue to work and do well.

Periodical algorithms and guidelines are published by the Ministry

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of Health of the Republic of Turkey on methods of working environment security and protection from COVID-19 [6,7].

In this context, depending on the circular issued by the Ministry and the attitude of surgeons, and since many of the hospitals were converted to pandemic hospitals, the number of cases decreased significantly.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is highly contagious and can be fatal, so pathologists and lab workers should be very careful while working on fresh tissues [8].

For the extraordinarily fast spread of pandemic and frequent changes in information about it, protection precautions come first because there is currently no vaccine against COVID-19.

The shift system is recommended as part of COVID-19 measures. In addition to protective equipment such as mask, goggles, apron and visor, disinfection is important as protection equipment.

In addition, cooperation and mutual tolerance are required with other colleagues during the pandemic period. Thus, tolerance can be shown against possible defects. It is important to address the fact that this outbreak will inevitably cause stress, fear and anxiety on pathologists, laboratory staff, and students.

Therefore, in this study the role of fighting with COVID-19 medical pathology specialists in Turkey, working conditions in a pandemic environment, attitudes towards pandemic and risk environments and in different environments was carried out to demonstrate that affect their anxiety levels of work outside their own department.

Material and Methods

Universe and Sample

The universe of the study consists of medical pathology expert working in different health institutions in Turkey. In the study, internet survey method was used in order to ensure the participation of employees by reaching all regions. 38 (21.5%) were male and 138 (78.4%) were female. 75 of them are 39 years old and under (42.6%), 68 were between the ages of 40 and 49 (38.6%), 31 were between the ages of 50 and 59 (17.6%), 3 were aged 60 and over (1.7%). 36 of them were 1-5 years (20.4%), 43 of them were 6-10 years (24.4%) experts, 38 of them were 11-15 years (21.5%), 23 of them were 16-20 years (13%), 36 of 21 were above (20.4%). 109 were ministry of health hospitals (61.9%), 59 (33.5%) were university hospitals, 5 were other (2%), 3 were private hospitals (1.7%). 6 (3.4%) were assistants (in the final period), 13 (7.3%) were associate professors, 26 (14.7%) were doctor lecturer 30 (17%) were professors, 101 (57.3%) were specialists. 138 (78.4%) were working in a pandemic hospital, 15 (8.5%) were in non-pandemic hospitals, 23 (13%) were not working in a pandemic hospital but in a hospital that had corona patients. 84 (47.7%) encountered COVID-19 cases, 92 (52.2%) did not encounter COVID-19 cases.

Data Collection Tool and Process

In the research, the COVID-19 Pandemic Medical Pathology Laboratory and Clinical Activities Scale were used as a data collection tool to reveal the contact status of the participants about COVID-19 and their work in pandemic hospitals, their working

conditions, and their views on fighting Covid 19 in general.

During the development of the scale, first of all, in-depth interviews with health professionals (in whatsapp groups), their views on working conditions and the general epidemic were identified. In the second stage, expressions forming the scale were created by the researchers (Table 1).

Beck anxiety scale was used to determine the level of anxiety [9].

The basal characteristics (age, gender, etc.) of the physicians were recorded and their answers were recorded by asking the beck anxiety scale questions.

Since face-to-face meeting is not possible due to the pandemic, the internet environment was used to collect data, and a survey was shared on pathology platforms across the country, and the medical pathologists reached were requested to fill in the questionnaire by clicking the attached link. The answers on the scale were as follows; never / never disagree, rarely / disagree, occasional / partially agree, mostly / agree, always / fully agree, no idea. As a result of the study, data was obtained from 176 medical pathology expert.

Statistical Analysis

SPSS v26 (IBM Inc., Chicago, IL, USA) were used to test the aims of the study. The analyzes were carried out within the 95% ($p = 0.05$) confidence interval. Descriptive statistical methods, Chi-square analysis and frequency analysis were used in the study.

Results

The medical pathologist serving the COVID-19 patient was 47.16% (83 people).

Within the scope of the pandemic, the distribution of physicians assigned in the outpatient and clinical processes of coronavirus patients; 112 people ((63.6%, rarely; 10, occasional; 15, mostly; 19, always; 68)) 152 (86.3%) experts stated that frozen cases decreased and 24 (13.6%) did not. Frozen reduction in 150 centers (85.2%) was attributed to the postponement of elective cases, it did not decrease in 12 centers (6.8%), but did not frozen in 14 centers (7.9%).

As the three most successful countries, 115 people voted for South Korea, 114 people for Germany, 81 people for China. Turkey (73 people found success) fourth, Singapore (31 people found success) was fifth. The most unsuccessful countries were Italy, 137 people, USA 136 people, Spain 102 people. England 44 people, France 19 people were 4th and 5th respectively.

COVID-19 test status; 32 people (18.18%) had the test and (1 person (0.5%) positive (contact with covid case)), 31 (17.6%) negative. 144 (81.8%) people did not get tested.

As seen in table-1 and gfigure-1; number 1: 62.5% (110 people) was answered as " always ". Number 2: 39.2% (69 people) was answered as " always "(answered the question the most). Number 3 and 4: The answer was the same as the previous vote. Number 5: 63% (111 people) was answered as " never ". Number 6: 71% (125 people) was answered as " always ". Number 7: (56.2%) 99 people gave the highest answer to the question. Number 8: 51.7% (91 people) was answered as " always ". Number 9: The question was never 28.9%

(51 people) and the answer was always equal and highest. Number 10: 52.8% (93 people) was answered as "always" (the most). Number 11 and 12: 60.7% (107 people) and 59% (104 people) were the most responsive, respectively. Number 13: 42.6% (75 people) was answered as "always". Number 14: 57.3% (101 people) was answered as "always" (highest answer). Number 15: 77.8% (137 people) was answered as "never". Number 16: 73.2% (129 people) was answered as "never" (the highest response). Number 17: 59.6% (105 people) was answered as "never" (the highest response). Number 18: 27.2% (48 people) was answered as "always" (the highest response), 26.7% (47 people) was answered as "never" (the highest response). Number 19: 32.9% (58 people) of the answers were "always" (the highest). Number 20: 58.5% (103 people) of the answers were "never" (the highest). Number 21: 40.9% (72 people) of the answers were "always". Number 22: 59% (104 people) of the answers were "always" (the most response). Number 23: 38.6% (68 people) of the answers were "always" (the highest) and 35.7% (63 people) of the answers were "never" (the highest) and. Number 24: 39.2% (69 people) of the answers were "always" (the highest) and 35.7% (63 people) of the answers were "mostly". Number 25: 36.3% (64 people) of the answers were "always" (the highest) and

36.3% (64 people) of the answers were "mostly".

The change in the anxiety level of the participants by age groups is given in Table 2. As a result of the chi-square test, it was determined that the anxiety levels of the participants did not change according to age groups ($p > 0.05$).

The change of the anxiety levels of the participants according to the answers to the question "When I look at the pandemic cases, I do not have the protective equipment shortage" is given in Table 3. The chi-square test was not found to be significant for the relationship between variables ($p > 0.05$).

The change in the anxiety levels of the participants according to hospital type, "Have you ever encountered COVID-19 patients?" "Did you examine a COVID-19 patient?", gender variables is given in Table 4. As a result of the chi-square test, it was observed that the anxiety levels of the participants did not change significantly according to the hospital type, "Have you ever encountered COVID-19 patients?" "Did you examine a COVID-19 patient?", gender variables ($p > 0.05$).

Table 1. COVID-19 Pandemic, Medical Pathology Laboratory and Clinical Activities Influence Scale

Number	
1	We continue to accept routine cases during the pandemic process
2	During the pandemic process, the number of cases has decreased drastically.
3	In the pandemic process, we ask whether the cases carry COVID-19 suspicion on the request sheet.
4	Our frozen practice continues in the pandemic process.
5	We postpone cases during the pandemic process
6	We accept cytological samples in the pandemic process.
7	I use a biosafety cabinet for cytological samples (add notes if there is no suitable option)
8	I use safety equipment in macroscopic sampling during my pandemic
9	I use a mask for microscopic evaluation during my pandemic.
10	During the pandemic, I disinfect the microscope and my work area in microscopic evaluation.
11	During the pandemic, I ventilate my workspace in microscopic evaluation.
12	During the pandemic, I ventilate my work area in macroscopic evaluation.
13	I don't have protective equipment shortage when looking at pandemic cases
14	I use the protective equipment correctly.
15	Have any injuries, such as incisions, happened in macroscopic sampling in your pandemic process?
16	Did you have problems with COVID-19 after the incision?
17	(Regarding 16) Was there any suspicion of COVID-19 in the sampled cases?
18	Do you attend academic meetings with telemedicine techniques and online systems in the pandemic process?
19	I am not making a specific assessment of COVID-19 when accepting cases during the pandemic process.
20	While accepting the cases in the pandemic process, if there is suspicion of COVID-19, I accept it according to whether the case is diagnostic or not.
21	I think that we have a positive solidarity with our colleagues during the pandemic process.
22	During the pandemic process, we cannot carry out our in-clinical scientific meeting/seminar programs.
23	In the pandemic process, I am assigned to the polyclinic and clinical processes of COVID-19 patients.
24	I think we are successful as a health system in the fight against pandemic.
25	I think we are successful as a country in fighting pandemic.

Table 2. Distribution of anxiety grade and age ranges

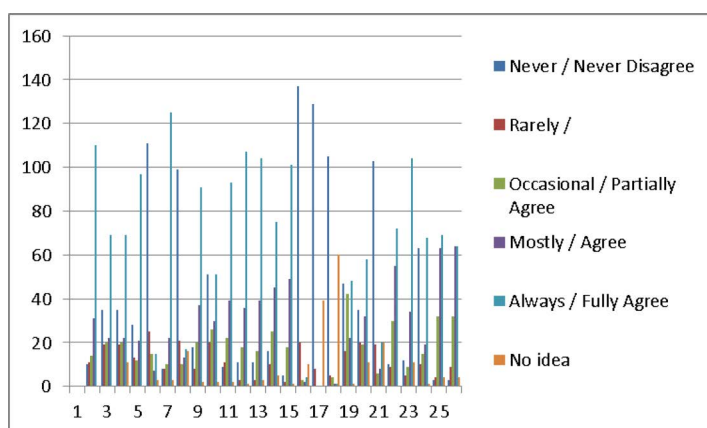
age	Degree of Anxiety						p
	0-1		2		3.4		
	n	%	n	%	n	%	
39 and below	39	47.0	22	44.0	13	30.2	0.228 (LR χ^2 =8.146)
Between 40-49	28	33.7	22	44.0	18	41.9	
Between 50-59	15	18.1	6	12.0	10	23.3	
60 and above	1	1.2	0	0.0	2	4.7	
Total	83		50		43		

Table 3. Relationship between anxiety degree and protective equipment

When I look at the pandemic cases, I do not have the protective equipment shortage	Degree of Anxiety			p
	0-1	2	3.4	
Never / Never Disagree	7(8.4)	5(10.0)	3(7.0)	0.717 (LR χ^2 =6.918)
Rarely / Disagree	1(1.2)	2(4.0)	3(7.0)	
Occasional / Partially Agree	10(12.0)	3(6.0)	7(16.3)	
Mostly / Agree	16(19.3)	13(26.0)	9(20.9)	
Always / Fully Agree	48(57.8)	26(52.0)	20(46.5)	
No idea	1(1.2)	1(2.0)	1(2.3)	

Table 4. Relationship between the degree of anxiety and the hospital studied, gender and encounter with COVID-19

	Degree of Anxiety	Anxiety degree			p
		0-1	2	3.4	
Type of hospital	In a pandemic hospital	65(47.1%)	41(29.7%)	32(23.2%)	0.776 (LR χ^2 =1.872)
	Hospitals that accept corona patients,	10(43.5%)	5(21.7%)	8(34.8%)	
	no corona cases	8(53.3%)	4(26.7%)	3(20.0%)	
Have you ever encountered COVID-19 patients?	yes	44(52.4%)	25(29.8%)	15(17.9%)	0.144 (χ^2 =3.876)
	no	39(42.4%)	25(27.2%)	28(30.4%)	
Did you examine a COVID-19 patient?	yes	42(50.6%)	26(31.3%)	15(18.1%)	0.177 (χ^2 =3.465)
	no	41(44.1%)	24(25.8%)	28(30.1%)	
Gender	man	16(42.1%)	8(21.1%)	14(36.8%)	0.120 (χ^2 =4.241)
	woman	67(48.6)	42(30.4)	29(21.0)	

**Figure 1.** Distribution of the responses of the participants to the Clinical Activities Impact Scale

Discussion

The attitude of the authorities brings success in the pandemic process. The attitude of the countries in the pandemic process and the patient density are followed by the world through the media. Both the equipment adequacy and the capacity of the hospitals became one of the most important parameters here. Countries that took precautions previously in particular were more successful in this process. The satisfaction of the health worker is important for the health system. If the system is good enough, it will be so good in the tussle. In the survey results, it is seen that there is a general satisfaction. (always; 39.77%, mostly; 35.80%, occasional; 18.18%, rarely; 2.27%). The attitude of the units and local administrations studied here are also the parameters affecting the satisfaction.

In this process, the World Health Organization periodically updated the guides and tried to reach all health workers in terms of both

prevention methods and treatment (World health organization whatsapp). Communication networks were created. New developments were announced to the world quickly. As a result, each specialty in the COVID-19 pandemic has begun managing its division against the crisis.

During the COVID-19 pandemic period, biopsies and resections sent for pathology assessment were reduced. However, emergency cases, especially tumor cases, continued. According to the results of our survey, 62.5% routine case acceptance was continued. However, it was stated that the number of cases decreased significantly (39.2%). The reason for this is that many hospitals in our country have been converted to pandemic hospitals and postponed to reduce the risk of transmission of elective cases depending on the guidelines.

When taking fresh samples, pathologists should be particularly informed about the condition of COVID-19. In this regard, pathologists want COVID-19 status to be indicated on the request paper (always; 39.20%). Because especially in positive cases, it should be more cautious. Care should be taken in both sampling, preparation and microscopic evaluation. Since protective equipment is not easy to use, especially positive cases must be reported [6,7].

Difficulties with the use of protective equipment are expressed on many platforms. Even for a few hours, difficulties in basic needs such as eating, going to the toilet and other problems have been reported both in social media and in publications [10].

According to the results of the questionnaire, there was no general change in the acceptance of the incoming material (we accept cytological samples (always); 71.02%, we continue to accept routine cases (always; 62.50%, mostly; 17.61%). There was no significant delay in the conclusion of the cases. However, it is in close contact with our colleagues and it is necessary to request a case to be sent when only necessary [6,7].

The ratio of the formalin in the container in which the cases to be sent in the formalin are placed should be ensured and should be sent in the double container, if possible. The importance of this situation has been determined in the guidelines [6,7].

According to the answers to the questions about frozen in our survey, it was stated that the frozen practice continues, however the number of cases decreased (always; 74.43%). Cytological materials continued to be accepted. The usage rate could not be evaluated clearly since the question of whether there is a biosafety cabinet or not (not in the survey questions). Compliance with safety equipment was high, especially in macroscopic sampling, the use of protective equipment, and compliance with ventilation disinfection rules. There was no problem with protective equipment. Participation in online training programs increased during the pandemic period attending seminars (all and nothing) at the same rates may possibly be related to the unit and academic position he / she worked in.

In the diagnosis and treatment phase of COVID-19 positive cases, medical pathologists were found to be assigned to a large extent (63.6%) with varying frequency. The difference in frequency may be related to the center studied, patient density, number of staff and different business planning of the local authority. One of the important factors is whether the hospital studied is a university hospital, a hospital affiliated to the ministry of health, or a private

hospital. As the majority of the ministry of health hospitals serve as a pandemic hospital, it is likely to be more deployed.

From the outset regarding the pandemic functioning, manuals and algorithms have been constantly updated by the authorities and periodic needs have been determined. The staff was asked to work in shifts against possible quarantine situations. In our survey, the health system was found to be largely successful (72.6%).

In the guide published by the World Health Organization, recommendations regarding the use of COVID-19 positive samples, the definition of transportation conditions and how to deliver the samples are specified in detail [6]. Since it is not known whether patients without COVID-19 assessment are asymptomatic, it will be more reliable to treat each case with caution and it will make the health worker feel safe.

As mentioned earlier, it has been suggested that cytological samples should be prepared and frozen assessment should be reduced unless mandatory. It has been reported that cytopathological changes in cytological samples contain nonspecific findings related to pulmonary damage for COVID-19 [11].

In our opinion, in terms of being very infectious, if there is no different diagnostic requirement, the evaluation requests should be minimized. If it is not urgent, it should be postponed. Again, a biosafety cabinet (level 2) is recommended in the manual (6,7). In the units without a biosafety cabinet may pose a risk for droplet and aerosol formation and contamination [6,7].

Examination of fresh tissue with frozen process which is performed by freezing, if absolutely necessary, it should be requested.[6,7]If frozen assessment is mandatory, technical and medical personnel should take action by wearing protective equipment [6,7]. Laboratory workers and pathologists should wear appropriate protective equipment such as goggles, medical mask, lab coat with sleeves and specific gowns, gloves [6,7].

In 2019-nCoV cases, it should be prudent because it can form aerosols in the cryostat.[12] Darnell et al. stated that formalin and glutaraldehyde inactivate SARS-CoV depending on temperature and time. They reported that formalin at 37 ° C or room temperature significantly reduced the infectivity of the virus on the first day, while glutaraldehyde inactivated SARS-CoV after 1-2 days of incubation [6,7].

It is the most used fixative formalin in the routine. Since the biopsies are small, they allow sampling on the same day, but it may be more appropriate to postpone them a day later in terms of their protective measures.

Duan et al. found that of several coronaviruses for 90 minutes at 56 ° C, 60 minutes at 67 ° C, and 30 minutes at 75 ° C. was not contagious after exposure to heat [14].

As with other coronaviruses such as SARS and MERS, Kampf et al. stated that COVID-19 can remain on inanimate surfaces such as metal, glass or plastic for up to 9 days. However, it can be effectively inactivated by standing for 1 minute with surface disinfection procedures containing 62-71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite [15].

Duan et al stated that viral load is reduced with ultraviolet light in the culture medium [14].

In macroscopic evaluation, knife incisions are injuries experienced in routine. Such injuries may be important in terms of transmission in macroscopic sampling during your pandemic process. 29 people (16.4%) stated that they were injured at varying frequency. Afterwards, when asked whether they had problems with COVID-19, 13 people (7%) stated that they had problems at different frequencies. These two situations may be related to each other or they may be two independent situations. Nevertheless, utmost attention should be paid to measures during the pandemic process, which has many unknowns.

In all processes, healthcare personnel also have a fear of serious infection. They may develop behavioral responses due to fear of infection. It is known that psychological factors play a vital role in a person's success. Public health strategies used in the treatment of epidemics are important. Health anxiety is important in influencing the success or failure of each of the strategies implemented [16].

People with high health anxiety in viral outbreaks can develop incompatible safety behaviors. These can be included excessive handwashing, social withdrawal, and panic attacks. In order to avoid all these behaviors, public health recommendations and guidelines recommended by the authority should be followed in the management of epidemics. In pandemics, those with high health anxiety may have extreme points that may have negative consequences for the individual and society. For example, unnecessary stockings can be made (eg hand sanitizer, medicines, protective masks, foods). Low health anxiety can also have negative effects on health behavior or result with neglect. In this period, the attitude of decision makers is very important in directing the society [16].

While uncertainty was more intense in the first months of the pandemic, this situation has eased at the moment. Guidelines and algorithms, and an increase in the number of healing patients give hope to society.

When we look at anxiety levels in our survey, it was seen that the level of anxiety was significantly low. The reason for this may be the reduction of the pandemic table, as we mentioned above. When we examine the table again, it was seen that anxiety was lower in the people who examined a COVID-19 patient. This may be because they have seen the controllability of the disease. The higher rate in women may also be related to the emotional differences of the female male gender or due to the excess of women in the sample ($p=0.228$).

Conclusion

As a result, medical pathologists continue to do their part in the pandemic process by either continuing their routine services or working actively in the COVID-19 outpatient clinic. No contamination was detected in our routine, as there was no shortage of protective equipment supply and elective cases were delayed. According to our colleagues at the front line of medical pathologists, the risk of infection was low. The biosafety cabinet is especially necessary for the safe preparation of infectious materials. As always, positive solidarity with our colleagues continues in the pandemic process.

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Conflict of interests

The authors declare that they have no competing interests.

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Ethical approval

This study was approved by Ordu University Clinical Research Ethics Committee with decision number 2020/73.

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