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SOCIAL PSYCHOLOGICAL AND DIAGNOSTIC APPROACH OF T

HE MEDICAL LABORATORY AS PART OF A MULTIDISCIPLINARY TEAM FOR THE

TREATMENT OF PATIENTS WITH SARS-COV-2

abstract

on

dissertation work for the award of the educational and scientific degree "Doctor"

Professional direction: 7.4 Public health

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Scientific supervisors:

Associate Professor Emilia Georgieva, Ph.D.

Assoc. Dr. Tsvetelina Turpomanova, d.m.

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The dissertation contains 160 pages, including 16 tables, 52 figures and 3 appendices. 152 literary sources are cited, of which 66 are in Cyrillic and 86 are in Latin. The dissertation was discussed and proposed for defense to the departmental council of the Department of Health Care at the Sliven Branch of the University of Varna on 29.11.2023.

Scientific jury:

Assoc. Silvia Ivanova Filkova, d.o.z. - chairman
Prof. Galina Stamova Chaneva, d.m. – a reviewer
Associate Professor Silvia Ivanova Filkova, PhD - reviewer
Assoc. Prof. Pavlina Penkova Teneva, Dr.
Associate Professor Kristina Petrova Zaharieva, Ph.D.
Assoc. Anna Petrova Georgieva, PhD.

The public defense of the thesis will take place on ……. 2024 from 13.00 online via Webex.
The defense materials are available in the Scientific Department of the MU - Varna and are published on the website of the MU - Varna.
Note: In the abstract, the numbers of the figures and tables do not correspond to their numbers in the dissertation work.

CONTENTS

ABBREVIATIONS USED

In Cyrillic

BAPZG – Bulgarian Association of Healthcare Professionals

DKC - Diagnostic-consultative center

COVID-Coronavirus disease

MBAL – General hospital for active treatment

MDL – Medical Diagnostic Laboratory

MU - Medical University

MK – Medical complex

SBALPFZ – Specialized hospital for active treatment of pneumophthiasis diseases

WHO - World Health Organization

UMBAL – University General Hospital for Active Treatment

In Latin

HADS – Hospital anxiety and depression scale

MBI – Maslach burnout inventory

SARS-COV-2 - Severe acute respiratory syndrome coronavirus 2

I. INTRODUCTION

Medical professions have undeniable social significance - each with its competence and specifics, together form the multidisciplinary team. Any work related to the organization and provision of health care contributes to the well-being of the individual and society as a whole.

Medical staff relationships raise many significant issues in medical practice that must include not only professional competence but also effective professional communication and interaction. Good professional communication in medical practice is achieved through strict compliance with established rules of medical ethics. Adherence to both universal and health professional-specific rules of communication. Creating an atmosphere of trust, support and empathy in the process of working with the medical staff from the various units in the hospital and outpatient environment.

The purpose of the present dissertation is to investigate and analyze the need for a specific socio-psychological and diagnostic approach of the medical laboratory technician as part of a multidisciplinary team for the treatment of patients with SARS-COV-2. An essential element in the work of the medical specialist (including the medical laboratory technician) is the ability to communicate with colleagues and all members of the team, in addition to communicating with patients. In fact, without effective communication and trust, the efforts of the medical professional will not have the necessary effect, because in the interactive process important information is exchanged, relationships of mutual understanding, trust and partnership are built, which respectively affects the quality of the work.

The dissertation work has the task of researching and analyzing the level of stress, worry and anxiety and other psycho-emotional manifestations in patients who have recovered from Covid, as well as in the medical teams working with them.

The dissertation examines: the role of the medical laboratory technician as a medical specialist - as part of a multidisciplinary team working in a risky environment - a new, infectious, highly contagious disease caused by an unknown agent, with an unclear course, treatment and prognosis. Investigates the need for a specific psychological approach to patients suffering from Covid. The socio-psychological and emotional state of healthcare workers during a pandemic, as well as that of patients, is assessed. As a result of the study, a technique was proposed for dealing with the manifested psycho-emotional disorders.

An in-depth study was carried out regarding the need to increase the competences of medical laboratory workers for the disease Covid - causative agent, clinical picture, specific clinical and laboratory indicators and prevention with the introduction of an additional topic in the training of medical laboratory students and conducting courses as postgraduate training for working laboratory workers . Obtaining up-to-date knowledge and skills is important and useful and puts the medical laboratory technician on an equal footing with the entire multidisciplinary team working with Covid patients and useful to patients.

II. RESEARCH METHODOLOGY AND METHODS

1. Purpose, tasks, working hypotheses

1.1. Purpose:

To investigate the need for a socio-psychological and diagnostic approach of the medical laboratory technician as part of a multidisciplinary team for the diagnosis and treatment of patients with Sars-Cov-2.

1.2. Tasks:

To achieve this goal, we set ourselves the following **tasks:**

1.2.1. To study and analyze the literature and legislation on the researched problem.

1.2.2. To identify factors influencing the mental health of patients with Sars-Cov-2 and healthcare professionals working with these patients.

1.2.3. To conduct a survey of medical laboratory technicians and other medical professionals to establish the role of the laboratory technician as part of an interdisciplinary team for the diagnosis and treatment of patients with Sars-Cov-2.

1.2.4. To prepare a clinical laboratory constellation for Covid patients.

1.2.5. To prepare strategies, approaches and preventive measures to reduce and deal with occupational stress.

1.3. Working hypotheses.

In the process of the work, the working hypotheses were built:

1.3.1. Patients with Sars-Cov-2 have increased psychological vulnerability due to reactive and endogenous effects related to the infection.

1.3.2. Laboratory tests are frequent in the course of diagnosis and treatment of the disease, a specific socio-psychological approach by medical laboratory technicians would contribute to reducing the tension and anxiety of patients.

1.3.3. Optimal impact of the disease is expected when working in a multidisciplinary team, with the medical laboratory assistant being an integral part of it.

2. Organization, time and place of the dissertation study

2.1. Time to conduct the study - the initiation of the study will begin after obtaining permission from the Research Ethics Committee. Conducting the surveys, interviews, data processing and analysis will take place in 2023. Upon completion of the survey, a final report with summarized results is planned.

2.2. The subject of the study is to investigate the impact of Sars-Cov-2 on the mental health of patients and medical staff, as well as the need for a specific approach by the medical laboratory technician as part of the multidisciplinary team.

2.3. Object of the study:

- ***Medical laboratory technicians*** - carrying out laboratory tests on patients with Sars-Cov-2 in the city of Stara Zagora;
- ***Doctors and nurses*** - working with hospitalized and outpatient patients with Sars-Cov-2 in Stara Zagora;
- ***Patients*** – re-infected with Sars-Cov-2 in outpatients

The scope of the survey is 200 respondents, divided into three groups:

First group - medical laboratory technicians practicing the profession in the city of Stara Zagora (n=50);

Second group - doctors and nurses practicing in the city of Stara Zagora (n=50);

The third group – patients who have recovered from Sars-Cov-2 in outpatient settings or in a hospital setting (n=100).

2.4. Research bodies

In its main part, the research was carried out personally by the doctoral student in order to achieve greater accuracy. The study was conducted in several stages, and the tools, place and period of implementation were determined, presented in a table.

III. OWN STUDIES

1. Results of own research and discussion

Our study included 200 respondents, divided into three groups - medical laboratory technicians (25.00%, n=50), medical professionals (doctors and nurses) (25.00%, n=50) and patients (50.00 %, n=100) (Fig. 1).

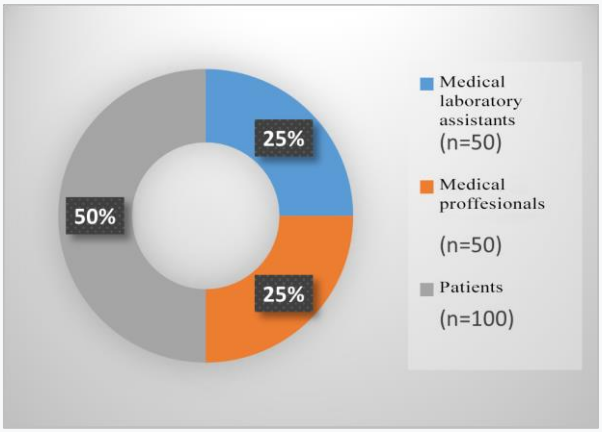


***Figure 1**. Distribution of survey respondents*

1.1. Analysis of survey data among medical laboratory workers

We have included 50 medical laboratory technicians in our study. The gender distribution shows a higher relative proportion (90.00%, n=45) of female respondents compared to male respondents (10.00%, n=5).

Statistical analysis shows that the null hypothesis can be rejected and we conclude that there is a statistically significant difference in the relative shares of respondents of both sexes ($\chi 2=32,000$, $p<0.05$). This is explained by the fact that more women than men are employed in the field of the clinical laboratory.

The mean age of the surveyed medical laboratory workers was 40.66 (SD±10.536) years with a minimum age of 21 years and a maximum of 65 years.

The majority of surveyed medical laboratory technicians work in a hospital clinical laboratory (66.00%, n=33), and a smaller number practice their profession in a medical diagnostic laboratory outside the structure of a hospital treatment facility (34.00%, n= 17).

The difference in the relative shares is statistically significant ($\chi 2=5.120$, $p<0.05$), which means that in our survey, the relative share of medical laboratory assistants who work in a hospital environment significantly prevails over the relative share of medical laboratory assistants who practice their profession in outpatient laboratory.

Just over 2/3 (70.00%, n=35) of respondents in the medical laboratory technician group answered affirmatively when asked if they had experienced any form of worry about their frontline work during

the Covid pandemic, and no worry at all had just under 1/3 of the surveyed participants in our study (30.00%, n=15) (Fig.2).

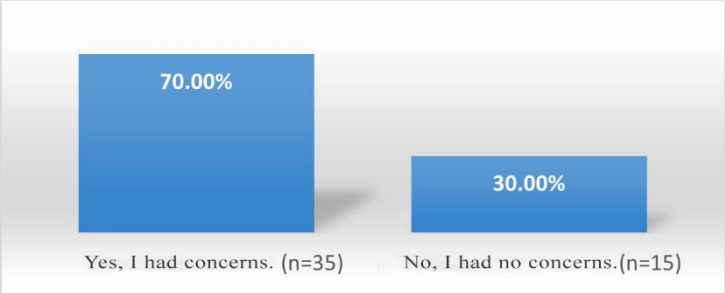


Figure 2. *Concerns about frontline work during the pandemic*

A statistically significant difference ($\chi 2=8.000$, $p<0.05$) was found regarding concerns about working on the front line in a pandemic, which was explained by the uncertainty that the pandemic caused at the beginning, as well as the lack of sufficient information about the occupational risk of exposure of the pathogen that causes Covid.

The majority of respondents (62.00%, n=31) reported contracting the coronavirus while performing their duties, while 38.00% (n=19) did not contract the virus that causes Covid.

The difference in the relative shares of persons who were infected and recovered from Covid during the performance of their official duties and those who were not is statistically insignificant ($\chi 2=8.000$, $p>0.05$), which means that the occupational exposure in the group of medical laboratory workers is not a determinant of infection with Covid. Probably, in the group of respondents who said that they did not get infected during the performance of their professional duties, there are persons who got infected, but when answering the question in the survey, they considered that infection was not a result of occupational exposure, but with socio-domestic character, i.e. in a social, family or friendly environment.

For the purposes of this dissertation, we set out to establish the presence of concerns about the personal risk of being infected with Covid, as well as the concerns related to infecting relatives of the respondents.

Regarding worries about the personal risk of contracting Covid, the majority of respondents said they were moderately worried (42.00%, n=21), followed by those who worried a little or a lot, which were the same relative shares (26.00%, n=13) in the medical laboratory respondent group. The smallest relative share (6.00%, n=3) has those who report that they have not experienced any form of worry related to the personal risk of contracting Covid ($\chi 2=13.040$, $p<0.05$) (Fig .3).

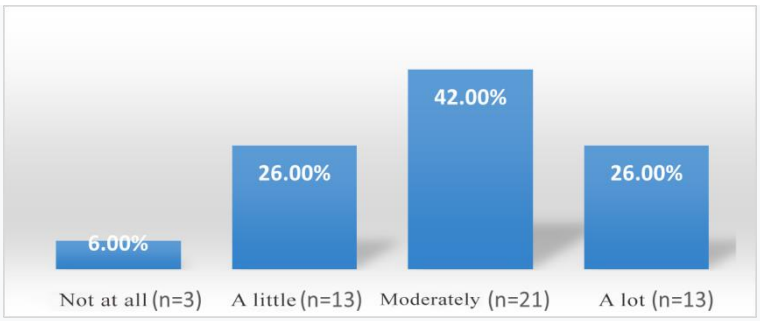


***Figure 3**. Concerns related to personal risk of contracting Covid*

A little over half of the surveyed respondents (56.00%, n=28) shared that they felt very strongly worried about the possibility that someone from their close environment, including family and friends to get infected with Covid, and about 1/3 of the participants in our study were moderately worried (36.00%, n=18). Statistically insignificant was the relative proportion of respondents who had no concern (2.00%, n=1) or were concerned to a degree defined as low (6.00%, n=3) about the possibility that any of their loved ones to be infected with Covid during the development of the pandemic on a national scale, which practically means that it is every second of the respondents (Fig. 4).

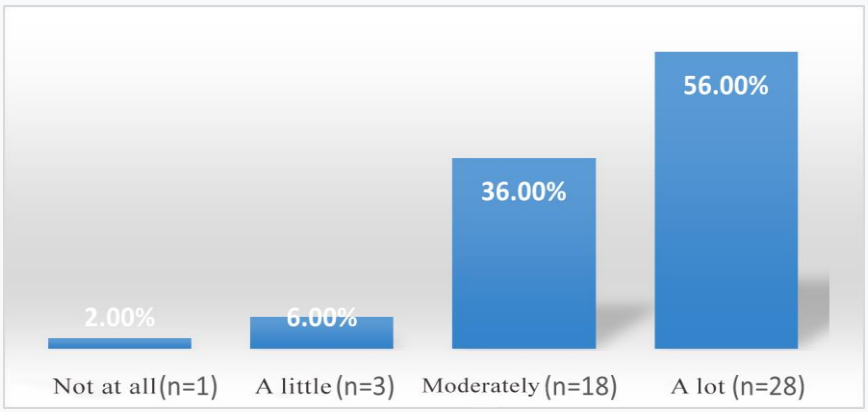


***Figure 4**. Concerns related to the risk of infecting close people*

The Covid pandemic has affected every sphere of human activity, affecting not only the social and economic spheres of life, but also the emotional world of each one of us in one way or another. For the purposes of this dissertation, it was interesting to find out to what extent medical laboratory workers experienced different experiential feelings caused by the pandemic caused by Covid.

Respondents were given the opportunity to rate the degree to which they felt in relation to seven experiences – **1) feeling stressed, 2) level of overload, 3) feeling nervous, 4) feeling insecure, 5) feeling depression and depressive symptomatology, 6) perception of social support and 7) feeling of social isolation** in the context of the Covid pandemic on a national and global scale.

The analysis of the data collected from our survey shows a wide variety of the experiences of medical laboratory workers during the pandemic, which, however, does not allow us to make a general conclusion about exactly how the laboratory workers experienced the pandemic emotionally and mentally, but it gives us the opportunity to orient ourselves in general situations related to the mental perception of the pandemic and its consequences.

The data collected during our survey shows that during the pandemic the surveyed medical laboratory workers experienced stress to varying degrees without being able to identify a specific degree that characterizes the feeling of stress in the group of respondents at the level of the general population ($\chi 2$= 2.800, $p>0.05$) and on the basis of which we can make a general conclusion about the extent to which medical laboratory workers experienced stress in the course of the developing pandemic. Moderate levels of stress were experienced by 34.00% (n=17), very high levels of stress were reported by just over 1/4 of the respondents (26.00%, n=13), and 18 .00% (n=9) of the surveyed medical laboratory specialists. The lowest is the relative share of respondents who did not experience stress in any form (18.00%, n=9).

Regarding the level of overload, overload was found in all surveyed medical laboratory workers, and this level was assessed as moderate by slightly more than half of the respondents (52.00%, n=26), and 34.00% self-identified as very busy (n=17) of them. 22.00% (n=11) and 4.00% (n=2) have little or no workload compared to the period before the Covid pandemic. The data convincingly indicate that in the group of medical laboratory workers, every third had a very high workload, and every second had a moderate workload ($\chi 2$=44.400, $p<0.05$).

A feeling of nervousness was found in 82.00% (n=41) of all medical laboratory workers surveyed, and in the remaining 18.00% (n=9) they did not find the presence of nervousness as a result of the developing Covid pandemic. Of all the respondents, about half of them were a little nervous (52.00%, n=26), moderately - 1/5 of the surveyed participants (20.00%, n=10), and very nervous 10.00% (n =5) from the respondents ($\chi 2$=20.560, $p<0.05$). The statistical analysis of the collected data regarding the feeling of nervousness shows that each medical laboratory worker showed nervousness to a different degree and the feelings she created were convincingly part of the experiences that the respondents experienced during the Covid pandemic.

Regarding the feeling of uncertainty, the trend is that it was felt to a small degree by 36.00% (n=18) and to a moderate degree by just over ¼ of the respondents (28.00%, n=14). A very high level of uncertainty during the Covid pandemic was reported by a statistically insignificant proportion of respondents (6.00%, n=3). The relative share of respondents who did not experience uncertainty related to the pandemic and its consequences is high (30.00%, n=15) ($\chi 2$=10.320, $p<0.05$).

It was of interest to us to determine the level of subjective assessment of the presence of depression and/or depressive symptoms caused by the development of the Covid pandemic in the group of medical laboratory workers. The absence of any depression and/or depressive symptomatology was reported by 66.00% (n=33) of the surveyed medical laboratory workers, and

about 1/4 of our respondents (24.00%, n= 12). A total of 10.00% (n=5) of the interviewed medical laboratory workers experienced depression and/or depressive symptoms to a moderate or very small degree ($\chi2=49.680$, $p<0.05$). The data show the presence of depression and/or depressive symptomatology, but to a degree that cannot be used to infer its significant prevalence in the group of medical laboratory workers during the Covid pandemic. It is likely that the surveyed medical laboratory workers managed to find a mechanism to deal with the prerequisites that would lead to the development of depression and/or depressive symptoms.

Just under half of medical laboratory workers reported that they did not feel social support during the Covid pandemic (44.00%, n=22); 1/4 of the respondents felt socially supported to a small extent (26.00%, n=13). Moderate social support was reported by 1/5 of the participants in our study (20.00%, n=10), and only 10.00% (n=5) of them felt such support to a very strong degree ($\chi2=12.240$, $p<0.05$).

Regarding social isolation, it was found that medical laboratory assistants either did not feel socially isolated (30.00%, n=15) or experienced social isolation to a very low degree (30.00%, n=15) at baseline. stage of the development of the Covid pandemic on a national scale. 28.00% (n=14) were moderately socially isolated, and 12.00% (n=6) of all respondents felt a very strong degree of social isolation. The relative shares in the different degrees of feeling of social isolation are statistically insignificant ($\chi2=4.560$, $p>0.05$), which means that we cannot make a general conclusion about the extent to which medical laboratory workers from our survey felt social isolation , caused by the Covid pandemic (Table 1).

Table 1. Degree of experiential feelings during the Covid pandemic

A feeling	Not at all		A little		Moderately		A lot		χ^2	p-value
	N	%	N	%	N	%	N	%		
Stressed out	9	18,00%	11	22,00%	17	34,00%	13	26,00%	2,800	p=0,423
Overloaded	2	4,00%	5	10,00%	26	52,00%	17	34,00%	44,440	p<0,05
Nervous	9	18,00%	26	52,00%	10	20,00%	5	10,00%	20,560	p<0,05
Insecure	15	30,00%	18	36,00%	14	28,00%	3	6,00%	10,320	p<0,05
Depressed	33	66,00%	12	24,00%	3	6,00%	2	4,00%	49,680	p<0,05
Socially supported	22	44,00%	13	26,00%	10	20,00%	5	10,00%	12,240	p<0,05
Socially isolated	15	30,00%	15	30,00%	14	28,00%	6	12,00%	4,560	p=0,207

The data show that despite the workload of the medical laboratory workers, the level of stress and tension, most of them managed to recover their strength with a relatively good sleep duration - between 6 and 8 hours ($\chi2=28.168$, $p<0.05$).

Taking into account the specifics of the medical laboratory technician's work and the fact that these medical specialists rarely have direct contact with patients, it is not surprising that the majority of medical laboratory technicians (40.00%, n=20) who took part in the survey In our study, they did

not have to personally inform a patient about a positive result of a Covid test, and this was a routine practice for 1/4 of the participants in our survey (24.00%, n=12). Between 1 and 2 times a week this occurred for 14.00% (n=7) of our respondents, and slightly more frequently on a weekly basis (between 3 and 5 times) this occurred for 22.00% (n=11) of the survey respondents (Fig. 5).

***Figure 5**. Frequency of informing patients of a positive Covid test result*

The difference in the relative shares of medical laboratory assistants who reported results to patients and those for whom this was not an obligation was statistically insignificant ($\chi 2=7.120$, $p>0.05$). This means that informing patients about the result of a virological test was not a task assigned to laboratory technicians by default, but an organizational decision depending on the workplace and the type of medical facility in which the respondents work. This could also be explained by the fact that either the results were available to the patient online through the information portal of the respective medical facility or were communicated by the attending physician who ordered the respective test.

All survey respondents who had to report a positive patient result of a Covid test (n= 30) had witnessed one or another patient reaction to reporting the result. Respondents were most likely to witness a reaction expressing fear (70.00%, n=21) and least likely (10.00%, n=3) to be indifference on the patient's part in understanding of a positive test result for establishing an infection with Covid. Among the other reactions identified in patients by medical laboratory technicians in our study were anxiety and tension (86.87%, n=26), despair (50.00%, n=13). A response of helplessness was detected in 40.00% (n=12) of the respondents from the group of medical laboratory assistants (Fig. 6).

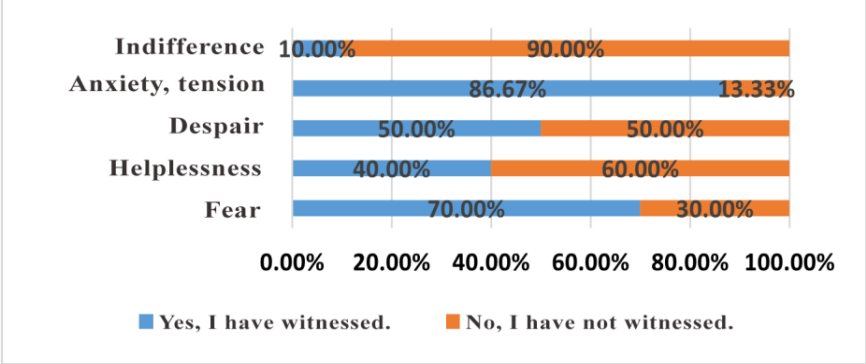


***Figure 6**. Evidence of one or another patient reaction to reporting the Covid result*

For the purposes of this dissertation, we set out to find out what were the actions taken by medical laboratory technicians in determining the relevant reaction/emotion on the part of the patient when understanding the positive result of a Covid test.

As a countermeasure to the manifested reaction, 86.67% (n=26) of the respondents took a certain action, and 13.33% (n=4) of the medical laboratory workers did nothing ($\chi 2=42.650$, $p<0.05$) (Fig 7).

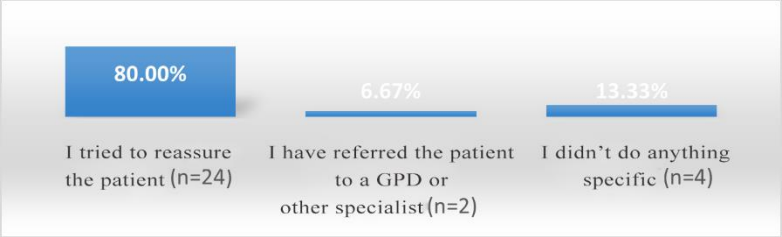


***Figure 7.** Actions by the healthcare professional in response to a displayed reaction/emotion from the patient*

These data indicate that any medical laboratory worker who had to inform a patient of a positive result and witnessed a particular behavioral response on the part of the patient took action to minimize that response so that the patient could acquire security and peace of mind. The highest relative share was found by the respondents who shared that what they did was either reassure the patient (80.00%, n=24) or refer the patient to the general practitioner or other specialist (6.67%, n= 2) ($p<0.05$).

According to a large part (64.00%, n=32) of the surveyed medical laboratory workers, the treatment of patients with Covid should be carried out by a multidisciplinary team with specialists from different medical specialties. 16.00% (n=8) of the respondents were of the opposite opinion, and 1/5 of the respondents (20.00%, n=10) had no opinion on this issue (Fig. 8).

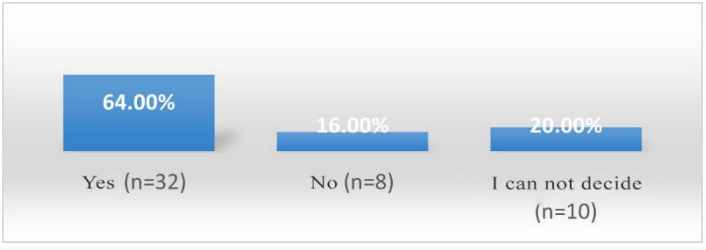


***Figure 8**. Need for a multidisciplinary team in the treatment of patients with Covid*

The presence of a large number of positive answers to the question related to the need for the treatment of patients with Covid to be carried out in a multidisciplinary team confirms the hypothesis

that for medical laboratory workers multidisciplinary teams are the best solution in the treatment of patients with established Covid in need of treatment in a hospital setting ($\chi 2=42.640$, $p<0.05$). In this way, complex treatment would be provided according to the profile of each of the complications accompanying the development of the coronavirus infection in each specific patient, as well as of the concomitant chronic diseases that worsen during the course of the disease.

In the context of multidisciplinary teams, the tendency that the relative share (14.00%, n=7) of medical laboratory workers who, during the Covid pandemic, worked together only with their colleagues from the same specialty, can be considered positive. i.e. other medical laboratory workers. The remaining 86.00% (n=43) worked in one form or another together with other persons involved in the treatment of patients with Covid - doctors, nurses and orderlies ($\chi 2=16.240$, $p<0.05$), which shows as from on the one hand, the role of the laboratory technician in the multidisciplinary team, as well as confirmation and validation of his role in this team by other medical specialists. A good impression is made by the fact that nearly half (46.00%, n=23) of the respondents worked with all stakeholders in the treatment process – doctors, nurses and orderlies, and the second most frequent (30.00%, n=15)) is the group of medical laboratory technicians who worked in a team with laboratory technicians and physicians (Fig. 9).

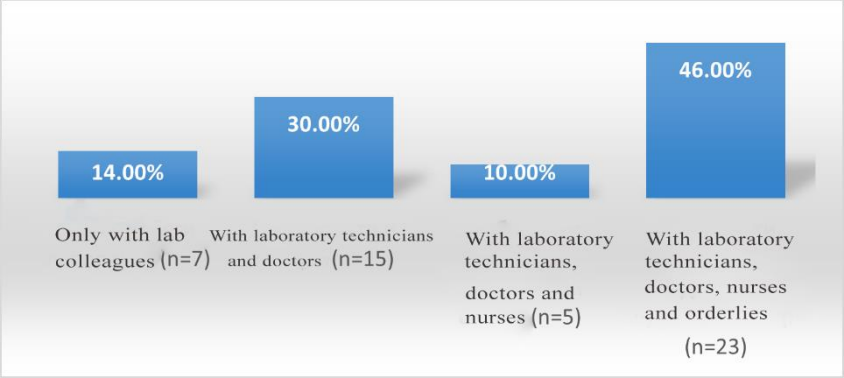
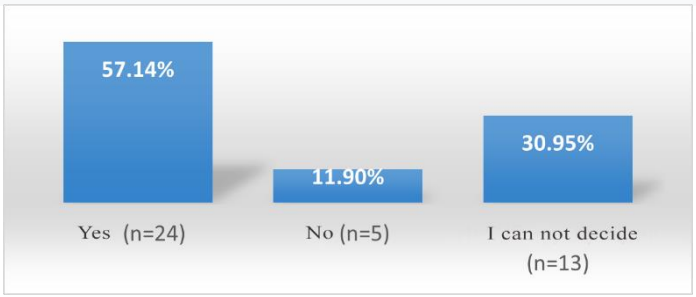


Figure 9. *Working in a multidisciplinary team during the Covid pandemic*

The data show that the medical laboratory technicians are accepted by the other participants in the therapeutic process as full members of the team with their duties and responsibilities, having a role and relation to the treatment of patients with Covid already in the first phase of establishing the condition, namely the diagnosis based on in which a decision will be made about the therapeutic approach in each specific case. Medical laboratory assistants are not support staff, but specialists with proven expertise, knowledge and skills who are an essential participant in the treatment-diagnostic algorithm of every hospitalized patient, not only in the context of the Covid pandemic.

In the subgroup of respondents who worked in a multidisciplinary team (n=42), the relative share (57.14%, n=24) of medical laboratory assistants who shared in the survey that they had a clearly

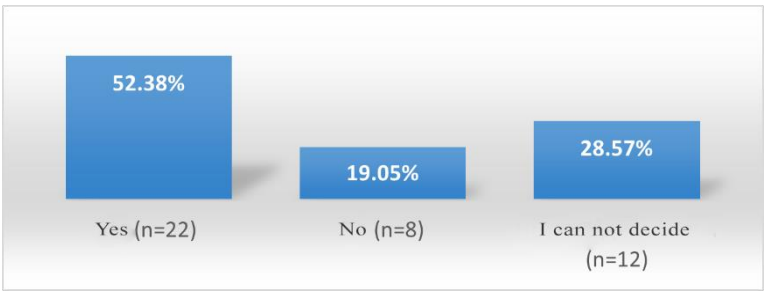
defined role in the multidisciplinary team was statistically significant , of which they were a part, and those who did not have a specific role or could not judge represent respectively 11.90% (n=5) and 30.95% (n=13) ($\chi 2$=13,000, p<0.05) (Fig. 10).



*The distribution of responses is given only for the group of respondents who indicated that they were part of a multidisciplinary team (n=42).

***Figure 10**. A clearly defined role in the multidisciplinary team*

More than half of the medical laboratory assistants (52.38%, n=22) who participated in a multidisciplinary team (n=42) felt equal with other members of the team, while nearly 1/5 of them did not feel equal (19, 05%, n=8). 28.57% of the respondents (n=12) could not give a concrete answer to this question ($\chi 2$=7.429, p<0.05) (Fig. 11).



*The distribution of responses is given only for the group of respondents who indicated that they were part of a multidisciplinary team (n=42).

***Figure 11.** Sense of equal participation in the multidisciplinary team**

Data related to the feeling of equality in the multidisciplinary team by the respondents confirm the role of the medical laboratory assistant in the construction and functioning of the multidisciplinary teams for the treatment of patients with Covid as their full members with their competences, skills and duties that contribute to the quality of diagnostic - the therapeutic process, in the center of which are patients with coronavirus infection.

In the subgroup of respondents who indicated that the treatment of patients with Covid should be carried out by a multidisciplinary team (n=32), the proportion of respondents who believe that the

multidisciplinary team should include a psychologist is relatively high. This opinion is shared by 65.63% (n=21) of the surveyed medical laboratory workers. The inclusion of a psychologist is considered unnecessary by 6.25% (n=2) of the respondents, and nine of them (28.13%) cannot assess the need for the participation of a psychologist in the multidisciplinary team treating patients with Covid ($\chi 2$= 13,563, $p<0.05$) (Fig. 12)

* The distribution of answers is given only to the group of respondents who indicated that the treatment of patients with Covid should be carried out in a multidisciplinary team (n=32).

***Figure 12**. Need to include a psychologist in the multidisciplinary team**

The analysis of the data shows that the medical laboratory workers take into account the fact that Covid is a disease that significantly affects the emotional world of the affected patients, this requires the intervention of a specialist to provide support and help the patient overcome his fears and worries, which in turn country will lead to his active participation in the healing process and the achievement of the ultimate goal, namely recovery and discharge.

The data in the study show that the medical laboratory technician is an indispensable part of the multidisciplinary team needed to work with patients sick with Covid. He has the necessary qualifications, knowledge and responsibilities, ability to work in a team.

The other members of the medical teams (doctors, nurses, paramedics) also accept the place and role of the med. laboratory assistant in the team to fight Covid in the name of patients and good medical practice.

Patients usually have shorter, episodic contacts with the medical laboratory technician, but he also has a place in the multidisciplinary medical team, according to them.

The mental health of medical workers was threatened during the Covid pandemic, in relation to the unknown at the beginning, concern for the health of loved ones, patients and for their own health, overload in the workplace. All this affects emotional stability, sleep, worries about the future.

Despite the good qualification and preparation for work in a state of emergency such as "Pandemic", health workers, including medical laboratory assistants, need to conduct additional training, seminars, trainings to deal with stress at work, to communicate with team colleagues , as well as for communicating with patients with highly expressed anxieties.

It is necessary to add more scientific information regarding the laboratory indicators of patients with Covid, and for this purpose it has been developed and recommended to be included in the training of students Medical laboratory technicians - Covid constellation in the clinical laboratory.

1.2. Analysis of survey data among medical professionals

The second group of respondents in our survey included 50 medical professionals - doctors (42.00%, n=21) and nurses (58.00%, n=29) who worked on the front line during the pandemic. Covid.

The analysis of the data shows that in terms of gender in the survey, a higher relative share (80.00%, n=40) of female persons has compared to the relative share (20.00%, n=20) of persons from male gender.

The mean age of respondents in the medical professional group was 47.00 years (SD±12.957) with a minimum age of 25 years and a maximum age of 72 years.

The distribution of respondents according to the type of medical facility in which they work shows great diversity. Medical specialists who work in six types of medical facilities where patients with Covid are encountered are covered (Table 2).

Table 2. Distribution of respondents by type of medical facility where they work

№	Type of medical facility	Total		Doctors		Nurse	
		N	%*	N	%**	N	%**
1.	Diagnostic advisory cetre (DAC)	11	22,00%	3	14,29%	8	27,59%
2.	Multiprfile hospital for active treatment (MHAT)	19	38,00%	9	42,86%	10	34,48%
3.	Medical diagnostic laboratory (MDL)	3	6,00%	1	4,76%	2	6,90%
4.	Medical complex (MC)	5	10,00%	3	14,29%	2	6,90%
5.	University multiprofile hospital for active treatment (UMHAT)	10	20,00%	5	23,81%	5	17,24%
6.	Specialized hospital for active treatment of pneumophthiasis diseases (SHATPD)	**2**	4,00%	0	-	2	6,90%
	TOTAL	**50**	**100,00%**	**21**	**100,00%**	**29**	**100,00%**

** The percentage ratio is expressed as a percentage of the total number of respondents who took part in the survey (n=50).*

*** The percentage ratio is expressed as a percentage of the total number of nurses (n=29) or doctors who took part in the survey (n=21).*

The variety of medical specialists who work in different medical facilities who took part in our survey allows us to conclude that the results we have analyzed provide a comprehensive assessment of the opinion of medical specialists working in medical facilities of different sizes, profiles, scope of activities, workload and patient flow.

What unites all these types of medical facilities is that they treat patients with coronavirus infection or pass patients to establish their virological status through diagnostics, preceding possible future treatment.

Just over half of the respondents (56.00%, n=28) to our survey said they did not feel anxious about their frontline work during the Covid pandemic, and 44.00% (n=22) responded negative to this question.

No statistically significant difference ($\chi 2=0.720$, $p>0.05$) was found regarding concerns about front-line work in pandemic conditions, which is explained by the fact that despite the new situation and the hitherto unknown disease, medical professionals remain calm in critical situations. driven by their professionalism and desire to be of service to their patients. In addition, the medical profession has always been accompanied by dangerous and critical situations, which have contributed to the fact that the Covid pandemic is accepted more lightly and with the professionalism characteristic of all medical professions.

The analysis of the results from our survey shows equal relative proportions (50.00%, n=25) among respondents in the group of medical specialists who have been infected with Covid while performing their duties and those who have not been infected during the course of their professional duties ($p>0.05$). In the group of doctors (n=21), a lower relative proportion (38.10%, n=8) of respondents have had Covid compared to the relative proportion (61.90%, n=13) of those who have not been infected while performing their duties ($\chi 2=1.190$, $p>0.05$).

Respectively, in the group of nurses, the relative proportion of specialists who have had Covid (58.62%, n=17) is higher than the proportion of those who have not been infected with Covid while performing their duties (41.38%, n=12), with these differences in relative proportions for both groups being statistically insignificant ($\chi 2=0.862$, $p>0.05$) (Fig 13).

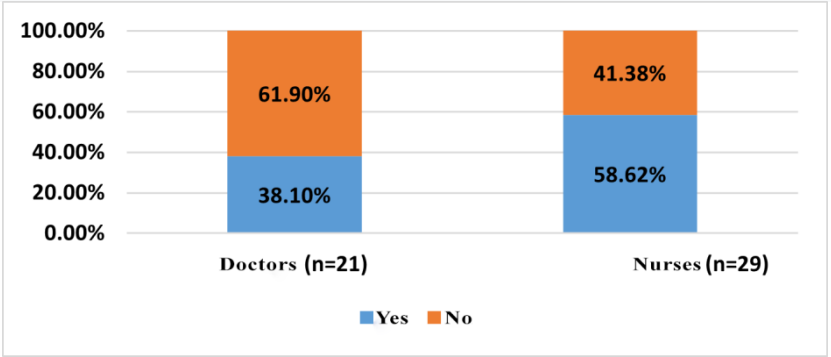


***Figure 13**. Covid Infection in Subgroups of Doctors and Nurses*

Regarding concerns about personal risk of Covid infection, almost all surveyed medical specialists have expressed concerns to a small extent (46.00%, n=23) or to a moderate extent (48.00%, n=24), while those who have expressed no concerns at all (2.00%, n=1) or have experienced strong concern (4.00%, n=2) represent a statistically insignificant proportion of the group of medical specialists. The data indicate that each of the surveyed respondents has experienced concern to some degree during the Covid pandemic on a national and global scale ($\chi 2=38.000$, $p<0.05$) (Fig. 14).

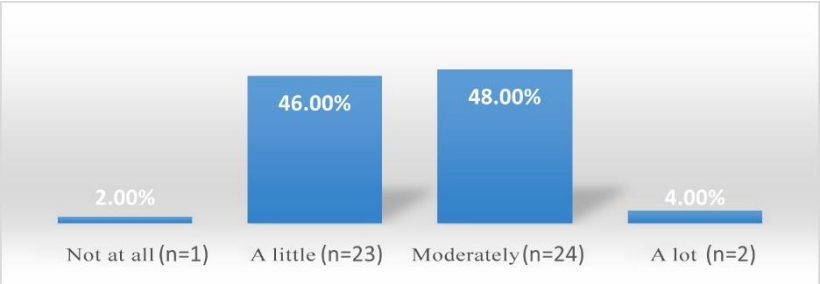


***Figure 14**. Concerns about personal risk of contracting the coronavirus*

All respondents shared that they were to a certain extent worried about the possibility that someone from their close environment, including family and friends to be infected with Covid, and the differences in the relative shares are statistically insignificant ($\chi 2=0.160$, $p>0.05$). Moderate concern was experienced by 36.00% (n=18) of the surveyed medical professionals, and concern defined as little was experienced by 32.00% (n=16) of the respondents, with the same relative proportion (32.00%, n=16) have, and the individuals answered that they were extremely worried about the possibility that one of their relatives might get infected with Covid (Fig. 15).

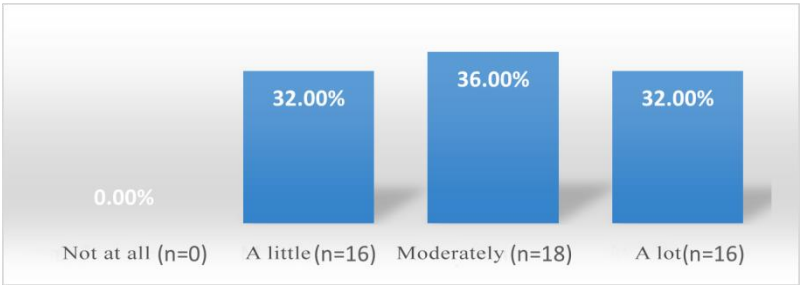


***Figure 15**. Concerns related to the risk of infecting close people*

Half of the respondents (50.00%, n=25) in our survey reported that their average sleep duration during the Covid pandemic was between 6 and 8 hours per night, and 38.00% (n=19) of they provide information on sleep duration of less than 6 hours. The majority of the surveyed respondents had relatively good sleep duration ($\chi 2=30.960$, $p<0.05$), which undoubtedly helped them to recover after

the difficult and tiring working days, as well as to relieve the tension accompanying the performance of their duties obligations.

In addition to the duration of sleep, we also aimed to determine the subjective assessment of the sleep quality of the respondents in our survey, and for this purpose, the participants were asked through a survey question to rate to what extent they thought their sleep during the pandemic was full-fledged. It found that for just over 1/4 of the healthcare professionals surveyed (26.00%, n=13), their sleep quality was not good at all compared to their sleep before the start of the pandemic;

full sleep to a small extent was found in 38.00% (n=19) of the respondents, moderately full sleep was for 34.00% (n=17) of the respondents and very full for one of the surveyed participants. The duration of sleep we found overlaps to a small extent with its quality, assessed by the respondents in our study ($\chi 2=15.600$, $p<0.05$) (Fig. 16).

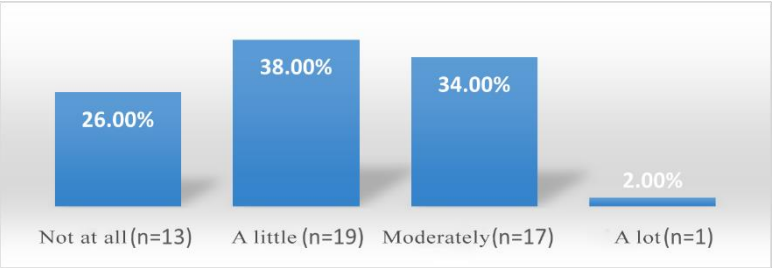


***Figure 16**. Assessment of sleep quality during the Covid pandemic*

Regardless of the duration of sleep during the Covid pandemic, respondents rate their sleep as insufficient due to the tension during the performance of their duties, the high workload resulting from the exponentially increasing number of hospitalized patients at the peaks of the pandemic, and the need to make decisions in a new and previously unknown situation, the outcome of which is decisive for the life and well-being of the patient and their close ones.

Respondents were given the opportunity to rate the extent to which they felt about seven experiences – **1) feeling stressed, 2) level of overload, 3) feeling nervous, 4) experiencing uncertainty, 5) feeling depressed and exhibiting depressive symptoms, 6) perception of social support, and 7) feeling socially isolated** in the context of the Covid pandemic on a national and global scale.

The data collected during our survey shows that during the pandemic, surveyed medical specialists experienced stress to varying degrees without being able to identify a specific degree that characterizes the feeling of stress in the group of respondents at the general population level ($\chi 2=5.800$, $p=0.110$). Based on this, we cannot make a general conclusion about the extent to which medical specialists experienced stress during the evolving pandemic. Moderate levels of stress were experienced by 28.00% (n=14), very high levels of stress were reported by just over 1/4 of the respondents (16.00%, n=8), and a small degree of stress was experienced by 38.00% (n=19) of the surveyed medical

specialists. The lowest relative proportion is of respondents who did not experience stress in any form (18.00%, n=9).

Regarding the level of overload, it was found that all surveyed medical specialists experienced some level of overload, with this level being assessed as moderate by slightly more than half of the respondents (42.00%, n=21), and as very heavy by only 38.00% (n=19) of them. Comparatively, 14.00% (n=7) reported a low level of overload or none at all compared to the pre-Covid period, with 6.00% (n=3) falling into each category, respectively. The data convincingly indicate that in the group of medical specialists, one-third experienced very heavy overload, while one-half experienced moderate overload ($\chi 2=34.240$, $p<0.05$).

A strong sense of nervousness was reported by 8.00% (n=4) of all surveyed medical specialists, while the remaining 28.00% (n=14) did not experience nervousness as a result of the evolving Covid pandemic. Of all respondents, a small number were nervous (28.00%, n=14), while a moderate number were nervous (26.00%, n=13) ($\chi 2=18.620$, $p<0.05$). The statistical analysis of the collected data regarding the feeling of nervousness shows that every medical specialist manifested nervousness to varying degrees, and the sensations it created were convincingly part of the experiences that respondents felt during the Covid pandemic.

Regarding the feeling of uncertainty, the trend is that it was felt to a small extent by 42.00% (n=21), and to a moderate extent by slightly over 1/4 of the respondents (16.00%, n=8). A statistically insignificant proportion of respondents (6.00%, n=3) reported a very high level of uncertainty during the Covid pandemic. A high relative proportion of respondents, 36.00% (n=18), did not experience uncertainty related to the pandemic and its consequences ($\chi 2=9.180$, $p<0.05$).

We were interested in determining the level of subjective assessment of the presence of depression and/or depressive symptoms stemming from the development of the Covid pandemic in the group of medical specialists. About 50.00% (n=25) of surveyed medical specialists reported the absence of any depression and/or depressive symptoms, while approximately one-third of our respondents (34.00%, n=17) reported experiencing mild depression. In a moderate or very small degree, depression and/or depressive symptoms were experienced by a total of 12.00% (n=6) of the surveyed medical specialists ($\chi 2=51.130$, $p<0.05$). The data indicate the presence of depression and/or depressive symptoms, but to a degree that does not allow for a conclusion to be drawn regarding its significant prevalence in the group of medical specialists during the Covid pandemic.

Slightly less than half of the medical specialists reported that they did not feel socially supported during the Covid pandemic (32.00%, n=16); about one-fourth of the respondents (30.00%, n=15) felt supported to a small extent. Moderate social support was reported by one-fifth of the participants in our study (28.00%, n=14), while only 10.00% (n=5) of them felt strongly supported ($\chi 2=10.890$, $p<0.05$).

Regarding social isolation, it was found that medical specialists either did not feel socially isolated (34.00%, n=17) or experienced social isolation to a very small extent (30.00%, n=15) in the initial

stage of the Covid pandemic on a national scale. Moderately socially isolated were 20.00% (n=10), while 14.00% (n=7) of all respondents felt very socially isolated. The relative proportions in the different degrees of experiencing social isolation are statistically insignificant ($\chi 2=4.250$, $p=0.203$), meaning that we cannot make a general conclusion about the extent to which medical specialists from our survey felt socially isolated due to the Covid pandemic (Table 3).

***Table 3**. Degree of experiential feelings during the Covid pandemic*

A feeling	Not at all		A little		Moderately		A lot		χ^2	p-value
	N	%	N	%	N	%	N	%		
Stressed out	9	18,00%	19	38,00%	14	28,00%	8	16,00%	5,800	p=0,110
Overloaded	3	6,00%	7	14,00%	21	42,00%	19	38,00%	34,240	p<0,05
Nervous	14	28,00%	19	38,00%	13	26,00%	4	8,00%	18,620	p<0,05
Insecure	18	36,00%	21	42,00%	8	16,00%	3	6,00%	9,180	p<0,05
Depressed	25	50,00%	17	34,00%	6	12,00%	1	2,00%	51,130	p<0,05
Socially supported	16	32,00%	15	30,00%	14	28,00%	5	10,00%	10,890	p<0,05
Socially isolated	17	34,00%	15	30,00%	10	20,00%	7	14,00%	4,250	p=0,203

In our study, each respondent has had to report a positive result from a virological test to a patient at one time or another during the Covid pandemic, with varying intensity for individual respondents. The data show that for slightly over half of them (52.00%, n=26), this has been a daily occurrence; between 3 and 5 times a week, this has occurred for 22.00% (n=11) of medical specialists, while with a frequency of 1-2 times a week, positive results have been reported by just over 1/4 of the surveyed participants (26.00%, n=13). Upon analyzing the collected data, no respondents were found who did not have to inform a patient about a positive result from a Covid test ($\chi 2=7.960$, $p<0.05$) (Fig. 17).

***Figure 17**. Frequency of Informing Patients about Positive Covid Test Results*

All respondents in our study have witnessed one reaction or another from the patient when informing them of a positive Covid test result. Most commonly, respondents witnessed a reaction expressing concern and tension from the patient (74.00%, n=37), while to the least extent (2.00%, n=1), they observed indifference from the patient upon understanding a positive test result for Covid infection, or helplessness (16.00%, n=8). Fear reaction has been detected in patients by 62.00% (n=31) of the respondents from the group of medical specialists (Fig. 18).

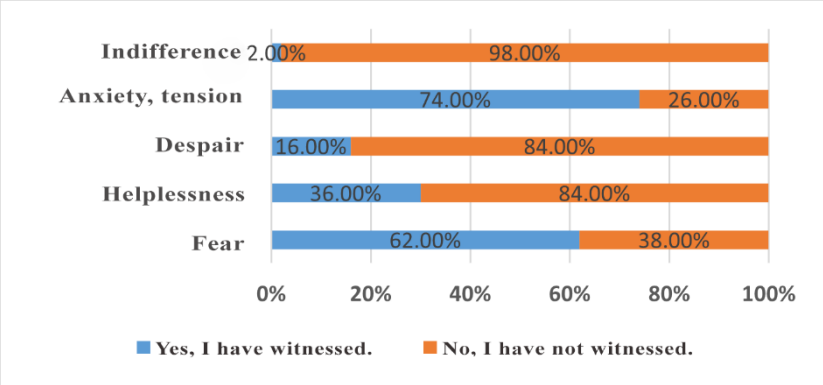


Figure 18. *Observed responses of healthcare professionals to patients upon understanding a positive Covid test result*

As a response to the exhibited reaction, 94.00% (n=47) of the respondents have taken defined actions, while 6.00% (n=3) of the medical specialists haven't taken any specific action ($\chi 2=53.560$, $p<0.05$). These data indicate that every medical specialist who has had to inform a patient of a positive result and witnessed a certain behavioral reaction from the patient has taken action to minimize this reaction, enabling the patient to gain assurance and tranquility. In the group of respondents who took action (n=47), the highest relative proportion consists of those who shared that what they did was either to reassure the patient (87.23%, n=41), or to seek assistance from another specialist (12.77%, n=6), who could consult the patient and if necessary apply a brief intervention to cope with the negative emotion stemming from understanding the positive result of the Covid infection test ($p<0.05$) (Fig. 19).

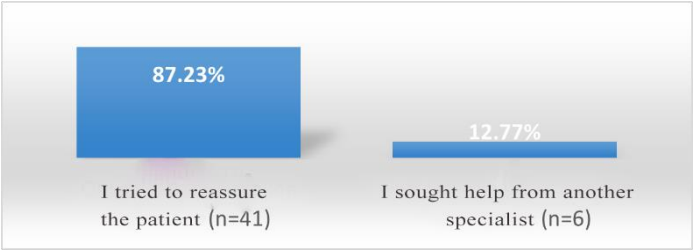


Figure 19. *Actions by the medical professional in response to a displayed reaction/emotion from the patient*

The fact that the medical specialist delivering the positive Covid test result is the first specialist the patient encounters after understanding the result of their test means it is of utmost importance for the medical specialist delivering the positive result to have the ability to recognize basic patient reactions and to possess the tools to facilitate the patient's processing of the reaction by providing information, giving hope, and reassurance. Undoubtedly, this would contribute to the patient more easily accepting the information about being a carrier of the virus. It is important for the patient to be supported, to have the opportunity to ask questions, and to be informed about what lies ahead in the next stages of the diagnostic-therapeutic algorithm.

Respondents are nearly unanimous that the treatment of Covid patients should be carried out by a multidisciplinary team involving specialists from various medical fields. A categorical agreement on this matter is shared by 86.00% (n=43) of the surveyed medical specialists, while those who cannot assess (10.00%, n=5) or express a contrary opinion (4.00%, n=2) are insignificant in number and have no statistical impact on the overall conclusion that the treatment of Covid patients should be multidisciplinary ($\chi 2=62.680$, $p<0.05$) (Fig. 20).

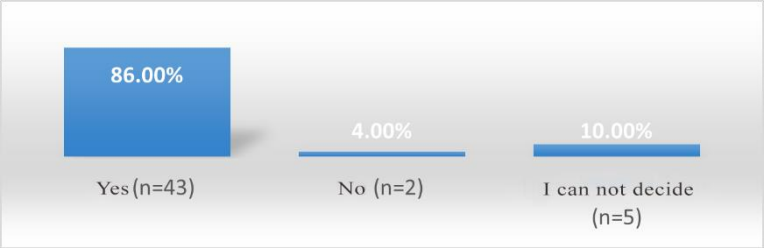


Figure 20. *Need for a multidisciplinary team in the treatment of patients with Covid*

The presence of a large number of positive responses to the question regarding the necessity of treating Covid patients within a multidisciplinary team confirms the hypothesis that medical specialists view Covid as a systemic disease affecting various systems and organs simultaneously, requiring targeted treatment for each of the symptoms exhibited by the patient with coronavirus infection in order to quickly control the condition and reduce the damage it causes. By providing comprehensive treatment, undoubtedly, patient survival rates will increase, as well as the quality of the treatment process in both hospital and non-hospital settings.

As a positive aspect within the group of medical specialists, it can be noted that all respondents, with the exception of one, have worked in teams with other colleagues from different specialties. From the analysis of the respondents' answers who participated in the survey, it is found that nearly 3/4 of them (74.00%, n=37) have worked in teams with all stakeholders involved in the treatment process - medical laboratory technicians, doctors, nurses, and orderlies, while in smaller teams consisting mainly of a technician, doctor, and nurse, 18.00% (n=9) of the surveyed individuals have worked; only

6.00% (n=3) of the surveyed medical specialists have collaborated solely with medical laboratory technicians and doctors ($\chi 2=68.000$, $p<0.05$) (Fig. 21).

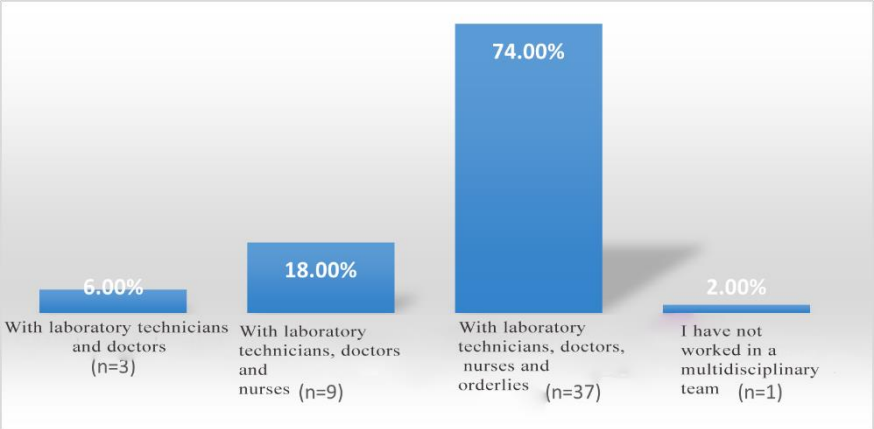


Figure 21. *Working in a multidisciplinary team*

For us, it was important to explore the opinions of medical specialists regarding the role of the medical laboratory technician in a multidisciplinary team caring for COVID patients. For this purpose, an open-ended question was included in our survey, to which respondents provided various answers. For a large part of them, the medical laboratory technician plays a key role in the multidisciplinary team with their logistical-organizational role in diagnostics, contributing to the faster diagnosis of the patient's condition and, consequently, the initiation of therapy. A significant number of medical specialists emphasize that the medical laboratory technician should have equal rights, opportunities, and responsibilities in the formation of the multidisciplinary team, and their expertise gained through work experience could be directed not only towards medical-laboratory research but also towards providing moral support to doctors and patients, as well as explaining to the patient the information related to the specific diagnostic test prescribed, etc. All surveyed specialists show respect for the work of the medical laboratory technician in their comments and express their gratitude for the effective joint work between the technician, doctor, nurse, and sanitary worker, considering teamwork as an opportunity to achieve higher therapeutic results for patients.

Given that COVID is a new disease that, in addition to affecting the body, also manifests with stress, anxiety, and often with depression and depressive symptoms or suicidal thoughts, i.e., it affects the cognitive-behavioral sphere as well as the physical illness of the body, a question related to assessing the opinion of the respondents on the necessity in the multidisciplinary team caring for COVID patients to include a psychologist as a mental health specialist was included in the survey. The analysis of the data shows a high percentage of respondents who welcome such a proposal (66.00%, n=33), while those who cannot assess or respectively believe that the inclusion of a psychologist is not

necessary represent 20.00% (n=10) and 14.00% (n=7) of all respondents from the group of medical specialists ($\chi 2=24.280$, $p<0.05$) (Fig. 22).

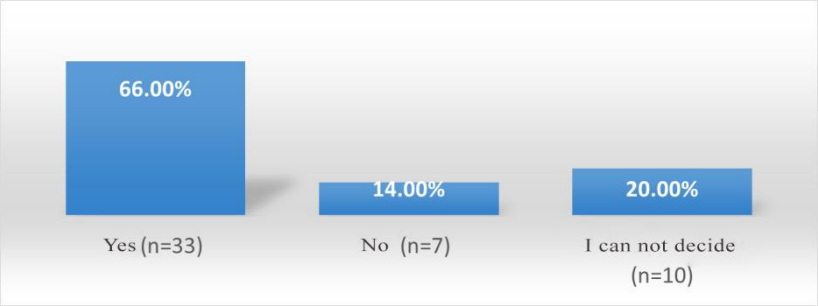


Figure 22. *Need to include a psychologist in the multidisciplinary team*

The psychologist would complement the composition of the multidisciplinary team in a good way, helping patients in the course of their treatment to master their emotional world as well as to regulate their thoughts and activities regarding the disease, which at the moment has subordinated their life rhythm to the rhythm of the hospital institution and the fight against the disease.

It is precisely the accompanying mental symptoms in the course of the development of the disease that necessitate thinking in terms of establishing a special behavioral approach by medical specialists towards COVID patients. A large portion of the surveyed medical specialists (68.00%, n=34) believe that COVID patients require a special behavioral approach from medical specialists, while 20.00% (n=10) of respondents hold the opposite opinion. A relatively small portion (12.00%, n=6) of the surveyed specialists are unable to assess this need in the context of treating COVID patients ($\chi 2=27.520$, $p<0.05$) (Fig. 23).

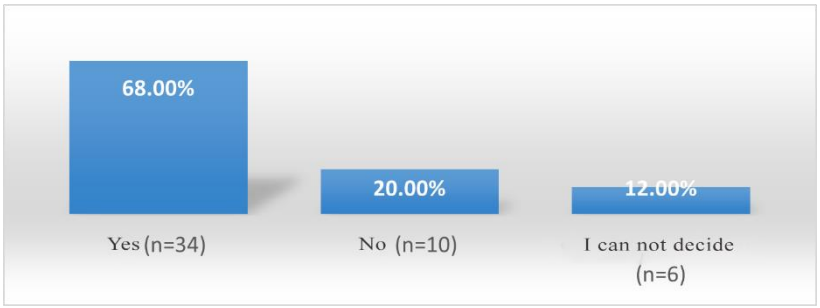


Figure 23*. Need for a special behavioral approach towards COVID patients*

Considering the fact that Covid is a new disease, about which very little was known at the beginning of its spread, many of the patients were subject to fears caused by the unknown of the disease, its course and prognosis, which gave rise to fear and uncertainty in them. Medical professionals were faced with a new situation in which, in addition to providing a therapeutic process,

they also had to reassure their patients, providing emotional support, understanding and calmness. The introduction of a special behavioral approach will give certainty to medical professionals how to react in a situation where a patient with Covid is worried or afraid of the development of the disease, which in turn will favor the patient's cooperation in the course of the therapeutic process.

Currently, there is no training program or approach to patients suffering from Covid. The creation of a program would contribute to increasing the competencies of medical specialists. This opinion is also supported by the respondents in our survey. Almost half of them (46.00%, n=23) believe that specialized training is needed for a special behavioral approach by medical professionals to patients with Covid, while no need is found by 36.00% (n=18) from the surveyed medical specialists. Those who cannot judge represent 18.00% (n=9) of the surveyed population (χ^2=8,040, p<0.05) (Fig. 24).

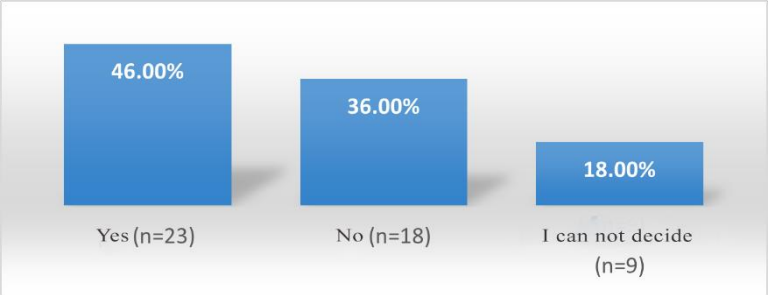


Figure 24. *Need for specialized training*

These data reveal the opinion that medical specialists do not feel prepared to work with COVID patients regarding their activities and behavior during hospital stays, including providing psychological assistance and support or crisis intervention if necessary. The opinion of surveyed specialists is that training for specialized behavioral approach is a necessity that will enhance their knowledge, skills, and competencies in providing high-quality care for COVID patients, not only from the perspective of therapeutic algorithms but also from the perspective of establishing and maintaining the psycho-emotional balance of the patient's personality. This would only complement the entire recovery process in a positive way through which the COVID patient passes.

In conclusion, based on the data obtained, we can say that healthcare workers have undertaken their daily duties during the pandemic relatively calmly and responsibly, working in a risky environment. Adequate education and preparation have enabled them to cope with any situation. However, this has still had a considerable impact on their mental state, manifested by anxiety, mild depressive states, inadequate sleep, and concern for the health of their loved ones. Working with patients affected by the virus, who are highly anxious and worried about the outcome of the disease, further complicates the work process. Nearly half of the surveyed healthcare professionals believe that additional specialized training for a special behavioral approach by medical specialists towards COVID patients is necessary, considering that COVID is a new disease that not only affects the body but also manifests with stress, anxiety, and often depression, depressive symptoms, or suicidal

thoughts, i.e., it affects the cognitive-behavioral sphere as well. In addition to physical treatment, it is necessary for a psychologist, as a mental health specialist, to be included in the team.

In the multidisciplinary team, a large part of its members believe that the medical laboratory technician plays a key role with their logistical-organizational role in diagnostics, which contributes to the faster establishment of the patient's condition and respective therapy directions. A significant number of medical specialists emphasize that the medical laboratory technician should have equal rights, opportunities, and responsibilities in forming the multidisciplinary team, as their expertise gained through work experience could be directed not only towards medical-clinical research but also towards providing moral support to doctors and patients, as well as explaining to the patient information related to the specific prescribed diagnostic examination, etc. All surveyed specialists show respect for the work of the medical laboratory technician in their comments and express their gratitude in one way or another for the effective joint work between the technician, doctor, nurse, and sanitation worker, considering teamwork as an opportunity to achieve higher therapeutic results for patients.

All surveyed individuals have had to provide COVID tests results to patients and have witnessed anxious reactions from them, expecting compassion and advice. In this regard, we believe it is necessary to allow medical laboratory technicians to provide information and explanations to patients about the results of conducted tests.

1.3. Analysis of data from a questionnaire survey among patients who have recovered from Covid

In the third group of respondents in our survey, 100 patients who had COVID were included, some of whom were hospitalized due to their condition, while others were not.

Data analysis shows that concerning gender, a higher relative proportion (80.00%, n=40) of female patients are represented in the study compared to the relative proportion (20.00%, n=20) of male patients.

The average age of surveyed patients in our study is 44.19 years (SD±14.389) with a minimum age of 20 years and a maximum of 74 years.

Almost all surveyed patients (90.00%, n=90) who had COVID report that before falling ill, they had concerns about their personal risk of contracting the coronavirus. Different levels of concern regarding the possibility of virus infection causing COVID were identified, with 39.00% (n=39) of surveyed patients expressing their concern as moderate, while almost equal relative proportions are those who self-define their concern as low (26.00%, n=26) or very strong (25.00%, n=25) ($\chi 2=16.880$, $p<0.05$) (Fig. 25).

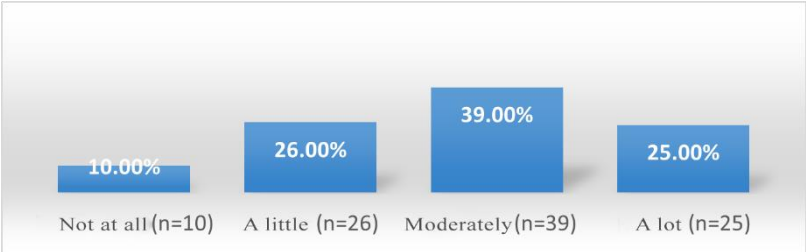


Figure 25. *Concerns about the personal risk of contracting Covid in the patient group*

Besides the concerns related to personal risk of contracting COVID, we also investigated the degree of concern regarding the possibility of infecting people in their close surroundings, including family and friends. Almost every respondent in the survey experienced concern related to the hypothetical possibility of infecting a close one with COVID, with the highest relative proportion being patients who experienced very strong concern (44.00%, n=44), followed by those who reported experiencing moderate (39.00%, n=39) and low levels of concern (14.00%, n=14). The relative proportion of surveyed patients who did not experience any concern regarding the possibility of any of their close ones getting infected with the coronavirus is low (3.00%, n=3) (Fig. 26).

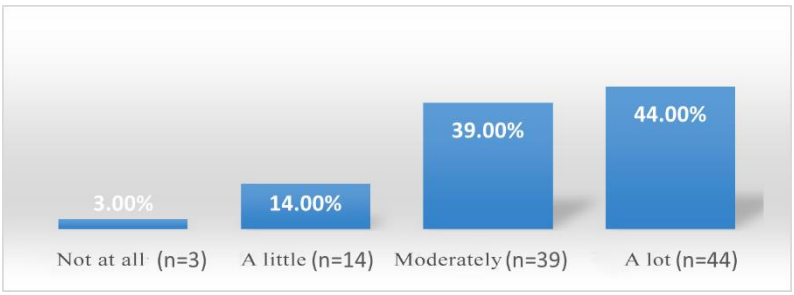


Figure 26. *Concerns related to the risk of infecting close people*

Similarly to the groups of respondents, medical laboratory technicians, and medical specialists, and in the group of patients who have had COVID, we analyzed the extent to which they have experienced various emotional feelings related to the COVID pandemic - **1) feeling of stress, 2) level of overload, 3) sense of nervousness, 4) experiencing uncertainty, 5) feeling of depression and manifestation of depressive symptoms, 6) perception of social support, and 7) feeling of social isolation.** The data collected from our survey shows that during the pandemic caused by coronavirus infection, patients have experienced different levels of stress without being able to identify a specific degree of feeling stressed in this respondent group ($\chi 2=2.800$, $p>0.05$). Equal relative proportions are observed among respondents who have experienced moderate or low levels of stress - 32.00% (n=32); very high levels of stress have been reported by just under 1/5 of the surveyed patients (18.00%, n=18), and very low levels of stress associated with the pandemic have been identified by 18.00% (n=18) of patients who had COVID. The same relative proportion applies to patients who have not experienced any stress during the COVID pandemic on a national and global scale.

Regarding the level of overload, it was found that overload was experienced by all surveyed individuals from this respondent group. The analysis of the collected data shows that nearly half of all patients (45.00%, n=45) who participated in our survey felt overload to a very high or moderately high degree ($\chi 2=10.840$, $p<0.05$), resulting from the developing pandemic situation.

Another emotional feeling whose degree we analyzed in the group of patients was the feeling of nervousness, which was found to be experienced to varying degrees by the respondents who participated in the anonymous questionnaire survey. The highest relative proportion (42.00%, n=42) was among those patients who felt slightly nervous during the pandemic. Moderately nervous were felt by just under a quarter of the surveyed individuals (24.00%, n=24), while highly nervous were 14.00% (n=14) of the surveyed patients. No form of nervous tension during the pandemic was identified in 1/5 of the total sample (20.00%, n=20) ($\chi 2=17.440$, $p<0.05$).

In the analysis of the feeling of uncertainty, no statistically significant difference was found between the relative proportions of patients experiencing this feeling to varying degrees - 29.00% (n=29) of them reported moderate uncertainty, with the same relative proportion of patients experiencing uncertainty to a small degree. Many patients felt uncertain to a degree of 16.00% (n=16) among the participants in our study, while slightly over a quarter of patients (26.00%, n=26) reported no degree of uncertainty ($\chi 2=4.560$, $p>0.05$).

The subjective assessment of the presence of depression and/or depressive symptoms, stemming from the development of the COVID pandemic in the patient group, shows that a statistically significant portion of patients did not experience any such symptoms (43.00%, n=43). To a small degree, depression and/or depressive symptoms were manifested in 31.00% (n=31) of the respondents. Moderately depressive states were reported by 17.00% (n=17) of the surveyed individuals, while only 9.00% (n=9) of the entire group of surveyed patients felt highly depressed ($\chi 2=27.200$, $p<0.05$). These data convincingly show that the COVID pandemic has not influenced an increase in the subjective feeling of depression and/or the manifestation of depressive symptoms among patients.

A statistically significant portion of patients report that they did not feel socially supported during the COVID pandemic (34.00%, n=34); to a small extent, social support was felt by 31.00% (n=31) of the respondents. For moderate social support, slightly less than 1/5 of the participants in our study reported (17.00%, n=17), while such strong support was felt by only 9.00% (n=9) of them ($\chi 2=27.200$, $p<0.05$).

Regarding social isolation, it was found that patients felt socially isolated to a moderate extent in 32.00% (n=32) of cases. (Table 4)

Table 4. Degree of experiential feelings during the Covid pandemic

A feeling	Not at all		A little		Moderately		A lot		χ^2	p-value
	N	%	N	%	N	%	N	%		
Stressed	18	18,00%	32	32,00%	32	32,00%	18	18,00%	7,843	p=0,052
Overloaded	18	18.00%	37	37,00%	27	27,00%	18	18,00%	9,840	p<0.05
Nervous	20	20,00%	42	42,00%	24	24,00%	14	14,00%	17,440	p<0,05
Insecure	26	26,00%	29	29,00%	29	29,00%	16	16,00%	4,560	p=0,207
Depressed	43	43,00%	31	31,00%	17	17,00%	9	9,00%	27,200	p<0,05
Socially supported	34	34,00%	31	31,00%	17	17,00%	9	9,00%	27,200	p<0,05
Socially isolated	22	22,00%	20	20,00%	32	32,00%	26	26,00%	3,360	P>0,05

A statistically significant portion of respondents in the group of patients who had COVID were initially diagnosed with COVID as a result of a laboratory test conducted in a medical diagnostic laboratory (82.00%, n=82), while the remaining portion (18.00%, n=18) established their virological status through a screening test at home or through a test conducted in the office of a general practitioner (Fig. 27).

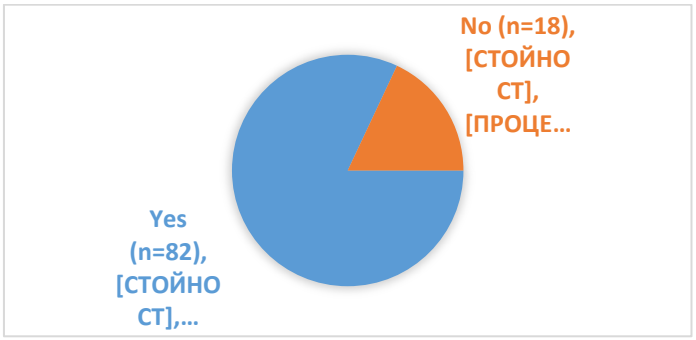


Figure 27. *Diagnosing a Covid infection in a medical laboratory*

The data convincingly demonstrate that the establishment of a positive virological status for COVID infection is carried out through a laboratory test conducted in a standalone medical diagnostic laboratory (SMDL) or in a laboratory that is part of the structure of a medical facility ($\chi 2=46.480$, $p<0.05$).

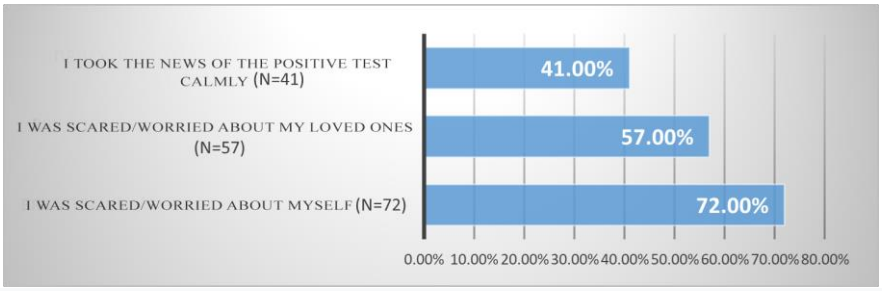
Slightly more than half (52.44%, n=43) of the patients who learned of their positive result from a COVID test conducted in a medical diagnostic laboratory reported that their result was communicated by a medical laboratory technician from the respective laboratory. Just over 1/4 of the respondents (26.83%, n=22) learned of their positive result after an online check in the information system of the

respective medical laboratory, while for the remaining patients (20.73%, n=17), the result was communicated by a doctor or nurse in the hospital or outpatient care ($\chi 2=13.927$, $p<0.05$) (Fig. 28).

**The percentage ratio is expressed as a percentage of the total number of respondents who reported that they were diagnosed after a test in a medical diagnostic laboratory (n=82).*

***Figure 28**. How to understand a positive result of a Covid test in a medical diagnostic laboratory**

Each of the surveyed patients reacted differently upon realizing that their COVID test had a positive result, with respondents who accepted the news calmly, without anxiety and tension, having the lowest relative proportion (41.00%, n=41), followed by those who expressed concern for their loved ones (57.00%, n=57), and the highest relative proportion (57.00%, n=57) being respondents from the patient group who indicated that they were deeply frightened and anxious for themselves upon realizing they were infected with the virus causing COVID ($\chi 2=11.927$, $p<0.05$). Undoubtedly, COVID is a disease that causes anxiety in patients upon understanding the presence of infection (Fig. 29).



**The cumulative percentage of the relative shares of each of the answers to the annexed question is greater than 100%, because some respondents indicated more than one answer to the question asked.*

***Figure 29.** Reaction upon understanding the positive result of the conducted test for Covid**

The high relative proportion of respondents who shared that their positive result from a COVID test was communicated by a medical laboratory technician gives us reason to conclude that every second patient had contact with a medical laboratory technician and respectively can evaluate the competence and professionalism demonstrated by the medical laboratory technician during communication with the respective patient, as well as the attitude of the technician towards the patient to whom the result was communicated.

According to the opinion of 39.53% (n=17) of the patients, the medical laboratory technician managed to alleviate the tension generated by understanding the positive result of the COVID test,

while for the remaining 60.47% (n=26) of the surveyed patients, the medical laboratory technician failed to create a sense of calmness after delivering the result ($\chi2=21.854$, $p>0.05$). Regarding tension reduction through the provision of additional information, slightly over half of the respondents (55.81%, n=24) in this subgroup of our survey expressed a positive opinion. Conversely, 44.19% (n=19) of the surveyed patients held the opposite view ($\chi2=1.257$, $p>0.05$) (Table 5).

Table 5. Actions of the medical laboratory technician to reduce the patient's tension when understanding the positive result of the COVID test.

Did the medical laboratory technician succeed ...	Total	Yes		No		χ^2	p-value
		N	%*	N	%*		
reduce tension, giving you peace of mind?	43	17	39,53%	26	60,47%	21.854	p>0.05
reduce your tension by giving you additional information?	43	24	55.81	19	44,19%	11.257	p>0.05

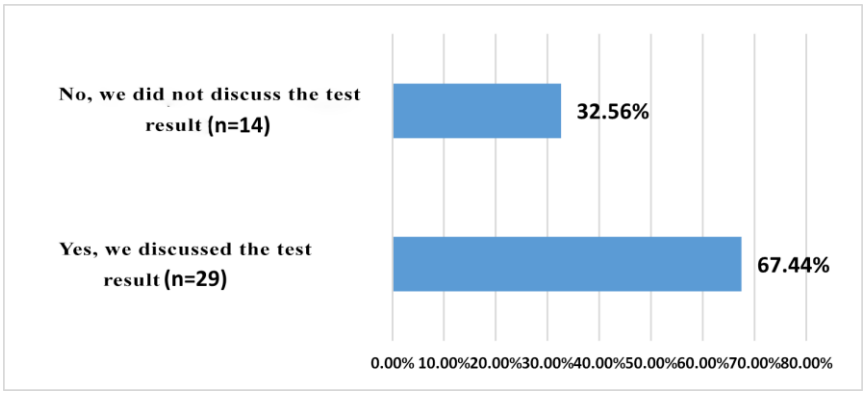
**The percentage ratio is expressed as a percentage of the total number of respondents who reported understanding their positive result from a COVID test from the medical laboratory technician (n=43).*

Despite the presence of respondents who give high ratings to the ability of the medical laboratory technician to reduce tension by instilling calmness or providing additional information, the negative responses to these questions in our survey are notable. This suggests the need to consider creating new skills for medical laboratory technicians in direct communication with patients regarding the results of medical diagnostic tests and beyond. The medical laboratory technician, in cases where they are the first medical professional to provide information about the results of a respective laboratory test, should have the knowledge and skills to instill calmness in the patient, provide initial information, and if necessary, handle any emotional reactions from the patient. This would lead to a reduction in the patient's anxiety and tension and instill a sense of calmness and assurance for the steps to follow after a positive result is determined.

There are also cases where patients report instances of rude behavior from the medical laboratory technician when communicating the results of the COVID test. Such behavior is reported by 16.28% (n=7) of the surveyed patients, while the remaining 83.72% (n=36) have not witnessed such behavior. These differences in the relative proportions of the two types of attitudes from the medical laboratory technician are statistically significant ($\chi2=14.143$, $p<0.05$), indicating that the majority of medical laboratory technicians approach patients with understanding and respect for their personhood and do not exhibit rude behavior, which would contradict established norms and ethical standards in medical practice and the profession.

Analysis of the patients' responses also identified cases where the medical laboratory technician only conveyed the result of the COVID test without displaying any reaction to the patient regarding

the test result (32.56%, n=14), while besides conveying the result, there was also discussion in 67.44% (n=29) of the respondents in the survey ($\chi 2=24.143$, $p<0.05$) (Fig. 30).



**Percentage is expressed as a percentage of the total number of respondents who reported that they learned of their positive Covid test result from the medical laboratory technician (n=43).*

***Figure 30**. Discussing the result of the laboratory test with the medical laboratory technician**

Each patient who participated in our anonymous survey at some point during their illness, whether at the time of diagnosis of the infection, during hospitalization, or after recovery during follow-up laboratory tests, had contact with a medical laboratory technician. It was precisely for this reason that a question was included in the survey aimed at assessing the patient's opinion on the attitude of the medical laboratory technician or technicians with whom they had contact during the treatment of the coronavirus infection or thereafter during the recovery process. For this purpose, respondents were asked to rate the medical laboratory technician on a ten-point scale, with 1 (one) being the lowest possible rating, indicating complete dissatisfaction with the attitude, skills, and competencies of the medical laboratory technician, and 10 (ten) being the highest possible rating, corresponding to complete satisfaction with the professionalism of the medical laboratory technician. The average rating given by respondents was 7.89 (SD±2.940). In addition to the medical laboratory technician, patients who participated in the anonymous survey were also asked to provide a similar rating for the other members of the medical team who participated in their treatment in a hospital or outpatient setting (Table 6).

Table 6. Assessment of the attitude of the medical laboratory assistant and other members of the medical team with whom the patients had contact

A specialist	N	Minimum score	Maximum score	An average grade	Std. Dev
Medical laboratory assistant	100	1	10	7,89	2,940
Other members of the medical team	100	1	10	8,39	2,482

The analysis of the data for the average ratings given by patients to the medical laboratory technicians and other members of the medical team involved in their treatment did not reveal a statistically significant difference, t(99)=2.292, p=0.24. This means that surveyed patients give high ratings to all stakeholders involved in their diagnosis and subsequent treatment.

Regarding the surveyed patients' personal risk of contracting COVID, the data show concerns about the possibility of infecting people in their close surroundings, including family and friends. Almost every respondent has experienced worry related to the hypothetical possibility of someone close to them being infected with COVID, with the highest relative proportion of patients experiencing very strong concern (44.00%, n=44). A high proportion of patients who had COVID but were not hospitalized reported such concerns (85.00%, n=85). The data concerning social support showed statistical significance among patients who reported not receiving social support during the COVID pandemic (34.00%, n=34).

The results of the study highlighted the necessity for a specific socio-psychological and diagnostic approach by medical laboratory technicians as part of a multidisciplinary team treating patients with SARS-CoV-2. There's a need for additional training and the inclusion of psychologists in multidisciplinary medical teams working in high-risk environments.

3.4. Validation of a mental health prevention model for medical laboratory workers.

Approaches to improving and maintaining the mental health of medical laboratory workers

Types of coping strategies for occupational stress

The study reveals that slightly over two-thirds of medical laboratory technicians were concerned about their frontline work during the COVID-19 pandemic. Nearly all experienced stress to varying degrees. Overloading was observed among all surveyed medical laboratory technicians, with this level being assessed as moderate by slightly over half of the respondents, while about one-third self-

identified as highly overloaded. A feeling of nervousness, as part of the negative experiences during the pandemic, was reported by 82.00% of the surveyed technicians.

These results suggest the need for implementing approaches aimed at reducing the levels of stress and anxiety among medical laboratory technicians, not only during health crises such as the COVID-19 pandemic but also in their daily work.

The presence of two types of strategies for dealing with stress (coping strategies) is accepted – problem

focused and emotionally focused.

Problem-focused coping (PFS) is aimed at managing or changing the problem that caused the distress. PFS coping is most effective in situations that are potentially controllable, ie. in situations where the person can do something specific to prevent, eliminate or reduce the problem that caused the stress - direct opposition or manipulation of the source of stress in the direction of changing the stressful situation, in favor of the affected person. This is a type of active problem solving.

Emotion-focused coping (EFC) is aimed at regulating the emotional response to the problem, i.e., reducing emotional stress. This form is most adequate when the stressful situation cannot be controlled, i.e., the individual cannot do anything to prevent, eliminate, or reduce the problem causing stress. EFC involves changing cognitive stereotypes - examining the problem from different perspectives, rather than based on previous similar situations that have led to negative consequences. At the core of stress experiences lies the negative appraisal, i.e., interpreting the problem as physically threatening or negatively affecting the individual's social status in the group, collective, society. If the problem is viewed and evaluated as less threatening and more enriching to experience and enhancing the individual's adaptive mechanisms, it would not lead to stress experiences at all. Thus, by changing the appraisal, a change in emotional reaction to such stressors is achieved.

A primary method for reducing stress is utilizing social support network resources. It can be emotional (EP), informational (IP), and material (MP). Emotional support is considered the most significant as it has the strongest impact on health and psychological comfort. Emotional support includes expressions of concern, sympathy, empathy, feeling understood, liked, loved, and supported by others, especially by close family and professional circles.

Informational support involves guidance, advice, and direction. It can be provided by friends, colleagues, relatives, as well as appropriate specialists or consultants on personal and professional issues.

Material support is provided through the use of material resources from others - colleagues, friends, family members, institutions, or organizations. It includes financial assistance, food, essential items, temporary housing, or other forms of aid. It is primarily used in cases of financial difficulties caused by critical events and situations, as well as prolonged unemployment leading to temporary inability to meet daily household needs.

Social support in cases of professional stress should primarily come from the direct vertical resources of the collective - support from superiors and horizontally from colleagues themselves.

A model for the prevention of mental health in medical laboratory workers

Analysis and Assessment of the Mental Health of Medical Laboratory Technicians

As a first step, the motivation of working MLTs can be examined through a survey on certain parameters. To objectify the mental state, it is necessary to use a specific assessment tool. We propose the use of the following two standardized and validated questionnaires:

- HADS (Hospital Anxiety and Depression Scale) is a self-assessment questionnaire designed to determine the intensity of anxiety and depressive states. The clinical scale for anxiety and depression (HADS) is a standardized and validated, popular, quick, and easy tool for measuring the intensity of anxiety and depressive states. It is a test applied in non-psychiatric settings and assesses both anxiety and depression, which commonly coexist. Anxiety often precedes depression in response to stressors, and early identification of excessive worry helps prevent depressive states. The test includes seven questions for anxiety and seven questions for depression and takes 2 to 5 minutes to complete. Participants are asked to choose one answer out of four options provided for each question. Questions with odd numbers (1, 3, 5, 7, 9, 11, and 13) are related to anxiety, while questions with even numbers (2, 4, 6, 8, 10, 12, and 14) are related to depression.
- The Maslach Burnout Inventory (MBI) is a questionnaire for professional burnout. Christina Maslach identifies professional burnout as a personality syndrome that includes exhaustion, emotional depletion, cynicism, distrust, and rejection of social values, resulting in unproductiveness. The mentioned instrument provides information on three components, namely: emotional exhaustion, depersonalization, and personal accomplishment. There are 22 statements that respondents evaluate in two aspects - frequency and intensity. Maslach's three components result from an in-depth factor analysis of data on experiences related to burnout. The instrument measures the three scales separately. Other validated and standardized questionnaires can also be used.

Other validated and standardized questionnaires can also be used.

Implementing preventive measures to combat professional stress:

- **First preventive measure includes:**

✓ Optimization of work schedule

✓ Training on communication skills: specialized training to improve communication skills, conflict management, problem-solving, teamwork, and others.

- **Second preventive measure includes**:

- ✓ Supporting psycho-emotional well-being through: training groups, focus groups, informal group activities (team building).
- ✓ Implementation of interventions for mental health: In case of burnout and/or anxiety-depressive states, behavioral disorders, aggressive manifestations, individuals are directed for consultation with a psychologist/psychiatrist.

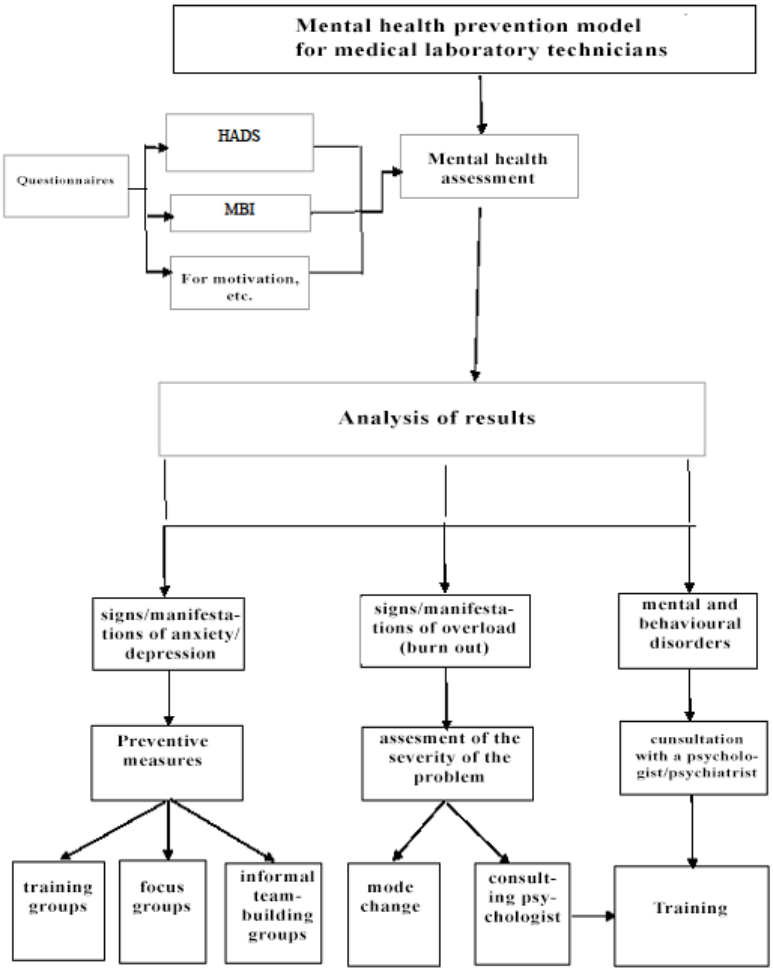


Figure 31. *ML mental health prevention model*

To implement the model for preventing mental health issues among medical laboratory technicians, several key stages are applied:

First stage: It is necessary to involve all working MLTs. Investigating motivation is a process that begins as soon as they enter the position and continues to develop throughout their professional realization. It is essential to examine the future expectations of the laboratory technicians at the outset, even before starting the work process. The data obtained should serve as a basis for comparison with subsequent studies on motivation and satisfaction during labor realization.

Second stage: The next stage involves conducting studies related to motivation, anxiety, depression, and burnout periodically during work.

Third stage: Based on the results obtained from the study and observations, the main preventive measures that can be applied in the specific case are identified. The preventive measures include:

- ✓ Changing and/or optimizing the work schedule and providing training on communication skills.
- ✓ Supporting the psycho-emotional state of employees through the formation of training and focus groups, team-building, and in the presence of burnout and/or anxiety-depressive states, behavioral disorders, aggressive manifestations, employees should be directed for consultation with a psychologist/psychiatrist.
- ✓ Specialized training.

Fourth stage: Decision-making on the implementation of a specific preventive measure.

Fifth stage: Implementation of the specific preventive measure.

Sixth stage: Measurement of the results of the implemented preventive measure.

Seventh stage: Necessity for changing the preventive measure. There are two possibilities:

- ✓ The results are acceptable, and the preventive measure is applicable.
- ✓ The results are unacceptable. Correction of the preventive measure is necessary, and the decision-making process is revisited.

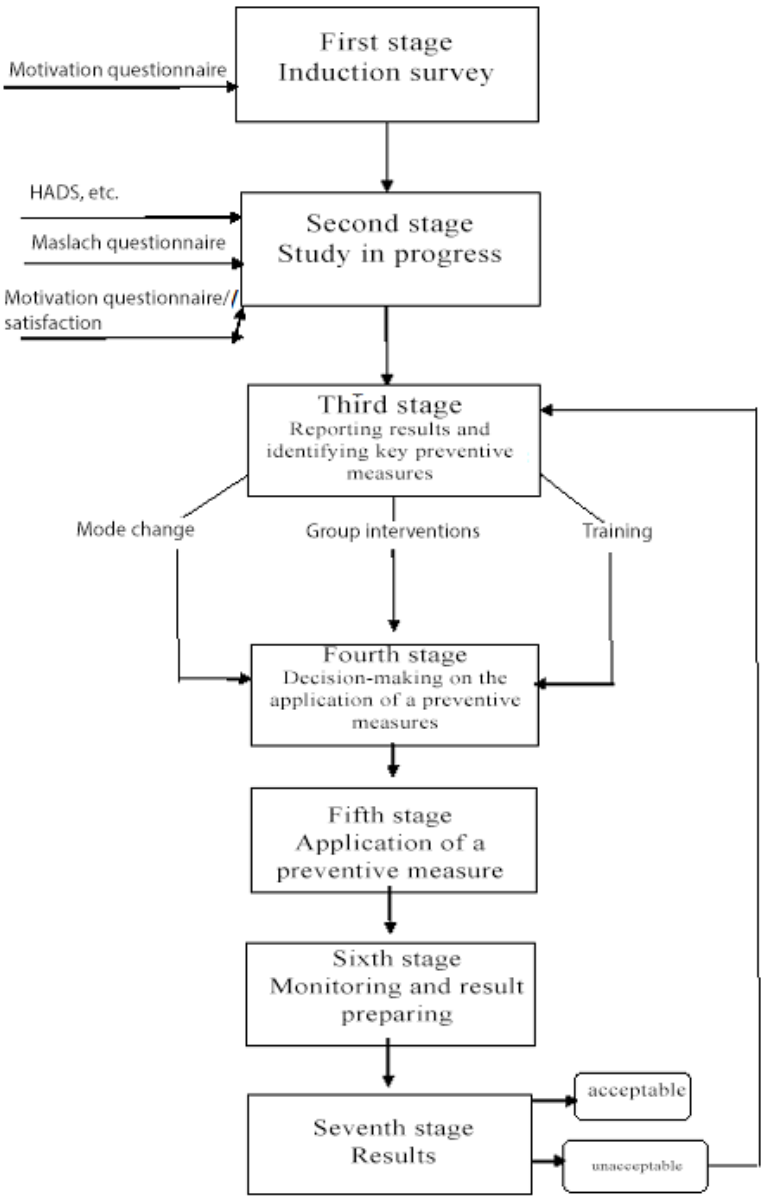


Figure 32. *Algorithm of the model*

3.5. Validation of a training model for medical laboratory assistants at the training level in a College of Medicine.

Clinical-laboratory constellations in Covid

COVID is a rapidly spreading infectious disease caused by the SARS-CoV-2 virus. Rapid and accurate diagnosis involves identifying the genetic material of the pathogen using the most accurate PCR methodology, as well as serological tests that detect the presence of antibodies of classes M and G of immunoglobulins in the patient's blood. These antibodies indicate that the body has encountered this virus, and the immune system has responded by forming antibodies against it.

A recommended package of clinical-laboratory investigations: **general**, **expanded**, and **specialized**, related to the disease, assisting in diagnosis and differential diagnosis - laboratory diagnostic differentiation.

The main goal of these studies is to provide information about the patient's health status, the possible impact on various organs of the human body caused by the disease.

The examination of the complete blood count can provide us with orientation about the patient's condition and help determine the severity and prognosis of the disease. Lymphocytes (Ly) are decreased in 85-90% of patients upon admission to the hospital. In a small portion of patients, upon discharge, lymphocytes return to within the reference range. Granulocytes (Gr) are increased after 3-4 days in connection with the inflammatory process and tissue necrosis. The decreased platelet count is associated with the onset of hypercoagulability, leading to the detection of microthrombi in the lung parenchyma and microcirculation of other parenchymal organs, a syndrome resembling microvascular thrombosis associated with DIC (Disseminated Intravascular Coagulation). The decreased platelet values upon hospitalization return to within the reference range around the 5-6th day. In some cases, the patient's condition worsens, and the platelet count decreases again. In patients with a fatal outcome, the platelet count progressively decreases in the last days. The decreased lymphocyte count is a poor prognostic indicator for the development and severity of this disease. Other changes in the blood count include a high white blood cell count, increased neutrophil granulocytes, indicating a superimposed bacterial infection.

COVID infection affects almost all organs, especially in severe cases, so indicators pointing to serious inflammatory changes are monitored. CRP (C-reactive protein), an acute-phase protein whose production is stimulated by IL-6, is also a biomarker for severe COVID infection, with high levels in patients' serum indicating hyperinflammation, binds molecular grups found on a large number of bacteria and fungi, bound to them it helps bind the complement that facilitates their phagocytization.. Elevated CRP levels occur in both bacterial and severe viral infections complicated by bacterial superinfection.

D-dimer is one of the earliest tests for demonstrating fibrin formation in the body. Its elevation indicates fibrin formation and accumulation, indicating thrombosis or risk of thrombosis. D-dimer levels increase in venous thrombosis, pulmonary embolism, endothelial damage in diabetes (diabetes being a risk factor for complications in COVID patients), and atherosclerosis. Monitoring D-dimer levels provides information about increased thrombosis in the body, a fact present in any inflammation. ESR (erythrocyte sedimentation rate) is a sensitive but nonspecific test that accelerates in inflammatory and bacterial infections. The incubation period, i.e., the time from infection to the onset of symptoms, is on average 5-7 days (between 2-27 days). Lung damage occurs 3-5 days after the onset of coughing. In immunologically healthy individuals, lung involvement lasts about 2 weeks, followed by slow and prolonged spontaneous recovery. In mild COVID cases, humoral immunity is activated 5-7 days after the onset of the first clinical symptoms, starting with the synthesis of IgM antibodies, followed by IgG antibodies production a few days later. The peak of IgM and IgG antibodies occurs 7-14 and 21-28 days after the onset of symptoms, respectively. Clinical recovery correlates with the appearance of IgM and IgG antibodies in the patient.

The cellular-humoral processes described above are associated with the body's immune response to COVID infection, which is monitored with indicators from the group of "specialized investigations" - immunoglobulins, interleukins, etc.

The second package of "expanded" COVID investigations broadens the diagnostic framework by adding additional tests to the above-mentioned one, of ASAT, ALAT, GGTP, LDH, PT, APTT, Fibrinogen (marker of inflammatory process) and Ferritin. Ferritin reflects the body's iron reserves and is also an acute-phase protein that increases during acute inflammation. The elevation occurs within 1-2 days of the acute process onset, with the peak between days 3-5. LDH is an enzyme that catalyzes a reaction in the glycolytic pathway. Elevated levels indicate tissue damage in various diseases, including pneumonia. The highest values are found in parenchymal necrosis due to intoxications or hypoxia. Observations show that LDH levels in hospitalized patients are highest on days 8-9 of hospitalization, likely coinciding with the onset of the cytokine storm. ASAT, ALAT, and GGTP are enzymes organ-specific to the liver and significantly increase towards the end of the disease due to severe infection and drug treatment. Between the 5th and 10th day of treatment, therapeutic doses of heparin cause a moderate asymptomatic increase in transaminases; their activity decreases after treatment cessation. 85.81% of hospitalized patients show elevated levels of ASAT, ALAT, and GGTP.

The observed dependence between these values is that when the platelet count and lymphocyte percentage are lowest, LDH, CRP, and D-Dimer levels are highest. This correlates with the severity of the disease and the fatal outcome.

The **"specialized"** tests include: blood gas analysis, cardiac biomarkers - Troponin. AKR - with Covid - hypoxia - PaO2 below 60 mm Hg and O2Sat below 90% have indications for oxygen therapy. If these values persist, despite oxygen therapy – indications for high-flow oxygen therapy and readiness for artificial ventilation in the intensive care unit. PaCO2 – in the beginning it is possible to have compensatory hyperventilation with normo or hypocapnea, which later turns into ventilatory failure with hypercapnea. Metabolic acidosis, later and respiratory acidosis with a tendency to deepen with severe respiratory failure.

Oxygen saturation - supply of cells, tissues and organs with oxygen, insufficient supply is called hypoxia. Blood oxygen levels and hypoxia can decrease due to: low oxygen levels in the air (high sea level) or reduced capacity of the body to take in oxygen in lung disease or pneumonia caused by Covid. Elevated levels of cardiac biomarkers due to myocardial damage, possibly associated with infection-induced myocarditis and ischemia. Elevated troponin levels due to cardiac damage are associated with significantly higher mortality. Impaired kidney function is common in Covid patients and in many cases acute kidney injury develops during hospitalization. It is recommended to monitor kidney function with the indicators: Creatinine, Urea, Uric acid. In urine examination, proteinuria was observed in 83% of patients, massive leukocytes, granular or hyaline cylinders in the sediment.

A large number of patients who have recovered from Covid report increased values of the indicators of the so-called fat profile – cholesterol, triglycerides, HDL and LDL. This points to "Metabolic Syndrome", along with changes in blood sugar and uric acid levels. The different presentation of SARS-CoV-2 infection, ranging from asymptomatic to uncomplicated pneumonia to fatal acute respiratory distress syndrome and concomitant multiorgan damage, together with the lack of specific symptoms in Covid, shows that its correct diagnosis requires a complex of clinical, radiographic and laboratory tests.

Dynamics in laboratory results can be a criterion for the severity of the disease and represent objective and standardized criteria guiding therapy.

CONCLUSION

According to WHO information from 05/05/2023 for the period from 01/30/2020 to now, the Covid virus has killed at least 20 million people worldwide. The pandemic was declared on 11/03/2020, on 05/05/2023 the WHO announced that the pandemic status of Covid-19 was lifted, no longer a global health emergency. Lessons learned from the Covid-19 pandemic on the occupational health and safety of healthcare workers are aimed at information management worldwide in response to this pandemic and future emergencies.

The activities of medical specialists have undeniable social significance - each with its own competence and specificity. Any work related to the organization and provision of health care contributes to the well-being of the individual and society as a whole.

In the conditions of modern globalization and a passing pandemic situation from Covid, health authorities, citizens and medical specialists faced a serious challenge. This indicates a need for working and tested techniques and algorithms to "rely on" in the diagnosis and treatment of affected patients.

The data in our survey showed that almost every respondent experienced concern related to the hypothetical possibility of contracting Covid, as well as a high relative proportion of patients who recovered from Covid who were not hospitalized, but all of them were clinical patients. laboratory and had contact with medical laboratory workers. Data on social support showed statistical significance among patients who reported not having been hospitalized.

This showed the need to create a specific socio-psychological and diagnostic approach to the treatment of patients with SARS-COV-2., as well as the need for additional training and the need to include a psychologist in multidisciplinary medical teams working in a risk environment.

CONCLUSIONS

1. Nearly 60% of all health professionals have contracted Covid in a work environment, concern for the health of relatives and patients, insufficient information about the disease worldwide, social isolation and uncertainty are the cause of a change in mental stability and balance with manifestation of mild depressive states.

2. A statistically significant difference ($\chi 2=8.000$, $p<0.05$) was found regarding concerns about frontline work in pandemic conditions, which is explained by the uncertainty that the pandemic caused from its beginning, as well as the lack of sufficient information about occupational risk from exposure to the pathogen that causes Covid.

3. In the group of medical laboratory workers, every third had a very high workload, and every second had a moderate workload ($\chi 2=44.400$, $p<0.05$). This indicates the need to introduce techniques and practices to reduce tension.

4. The data related to the feeling of equality in the multidisciplinary team by the respondents confirm the role of the medical laboratory technician in the construction and functioning of the multidisciplinary teams for the treatment of patients with Covid.

5. Patients give a high assessment of the behavior and attitude of the medical laboratory workers towards them -7.89, respectively - 8.39 to the other members of the medical team involved in their treatment.

6. The results show the need to conduct thematic training, strategies and trainings to deal with stress and anxiety at the workplace in a risky environment.

RECOMMENDATIONS

To the Ministry of Education:

- ✓ Change in the regulatory framework with a formulated proposal for inclusion in REGULATION No. 1 of February 8, 2011 for professional activities, to allow medical laboratory technicians to have the opportunity to provide information/interpretation to patients about the obtained laboratory results.

To the manuals of the specialty "Medical laboratory assistant" in the Medical Colleges

- ✓ To include the prepared constellation in the thematic plan of the curriculum of the students of the "Medical Laboratory Technician" specialty.

To BAHP and the Medical Universities

- ✓ Organization of post-graduate training of medical laboratory assistants on several main topics: coping with stress based on constructive coping strategies; prevention of burnout; mastering brief interventions and motivational techniques when working with patients; communication skills; specific laboratory indicators and their changes in Covid. On the basis of these trainings, laboratory assistants are expected to develop a specific social-psychological approach to be applied not only to patients with Covid, but also to all other patients.

CONTRIBUTIONS

Based on the conclusions, recommendations and results of the own research, contributions of a theoretical-cognitive and practical-applied nature can be formulated.

With a theoretical-cognitive nature:

1. An analysis of normative documents and published literature on the subject in Bulgarian and international sources was carried out.
2. The opinion of practicing medical laboratory technicians was studied regarding the need for additional training to master techniques for a specific psychological approach to patients, as well as to determine the place of medical laboratory technicians in multidisciplinary teams.
3. The factors influencing the mental health of medical laboratory workers and other health care professionals working with patients with Sars-Cov-2 have been identified.
4. An analysis was made of the opinion of patients who have recovered from Covid-19 regarding the need for a specific psychological approach to them by medical laboratory technicians.
5. A clinical laboratory constellation for Covid patients was prepared with a proposal for inclusion in the thematic plan of the curriculum of the students of the "Medical Laboratory Technician" specialty.

Of a practical-applied nature:

1. An author's model for the prevention of mental health of medical laboratory workers and an implementation algorithm were developed.
2. A constellation has been developed for clinical-laboratory research of patients infected with the Covid virus with a proposal to include it in the curriculum of ML during their training in medical colleges.
3. Thematic units are proposed for medical laboratory technicians, on the basis of which they will be able to build a specific socio-psychological approach to patients during laboratory control.

List of publications related to the dissertation work

of Ivelina Dragieva Dobreva

1. **Ivelina Dobreva** ***PROPOSAL FOR THE CREATION OF CLINICAL-LABORATORY CONSTELLATIONS FOR COVID-19*** XXXIX international scientific conference the power of knowledge 16-18. December 2022 knowledge international journal vol.55

2. Pavlina Teneva, **Ivelina Dobreva** ***KNOWLEDGE OF ANALYTICAL PRINCIPLES IN LABORATORY HEMATOLOGY AND THEIR RELATION TO THE MOST COMMON ERRORS IN THE PRE-ANALYTICAL STAGE*** XXXIX international scientific conference the power of knowledge 16-18. December 2022 knowledge international journal vol.55

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