Letter to the Editor

Milena Matecka, Kinga Ogrodzińska, Gabriela Salczyńska and Olga Ciepiela*

Laboratory work safety rules and guidelines during COVID-19 pandemic in Polish clinical laboratories – do our laboratories work according to a recent IFCC Taskforce Recommendations?

<https://doi.org/10.1515/cclm-2020-0764>

Received May 19, 2020; accepted July 2, 2020; published online July 16, 2020

Keywords: COVID-19; IFCC recommendation; laboratory professionals; personal protective equipment; safety; survey.

To the Editor,

Due to worldwide spread of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a pandemic has been announced by the World Health Organization. In the second half of May 2020, there were almost five million confirmed cases, with total deaths of 316,853, worldwide [1].

Healthcare personnel are exposed to the hazardous influence of the virus. Effective healthcare functioning depends on laboratory professionals who provide diagnostic tests that allow practitioners to confirm COVID-19 and monitor the health status of patients affected by the disease who are also suffering from many other diseases. Recently, Lippi et al. published the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) Taskforce recommendations, which advise on how to prevent COVID-19 infections in clinical laboratories [2]. Just before its publication, we conducted a survey among Polish laboratories to assess if and how the recommendations of the Centers for Disease Control and Prevention (CDC) or

World Health Organization (WHO) are implemented by Polish laboratories. Now, in the light of guidelines issued by the IFCC, we can critically evaluate the preparedness of Polish clinical laboratories at maintaining appropriate biosafety levels.

The survey consisted of 19 questions concerning tests that are performed in the laboratory with regard to the COVID-19 pandemic; biosafety and social distancing procedures, which were implemented in the laboratory; and these regarding mental conditions and work efficiency during the COVID-19 outbreak (Supplemental Material 1). The survey was distributed electronically and available from April 27, 2020 to May 10, 2020 among employees of Polish medical laboratories. Data was collected from different 154 laboratories in all 16 voivodeships. The Medical Laboratory Scientists (MLS) constituted 94.2% of respondents, 5.2% Medical Laboratory Technologists (MLT) and 0.6% Laboratory Helpers. The survey was accordant with the rules of Bioethical Committee of Medical University of Warsaw. All answers were anonymized.

The majority of laboratories (57.8%) that took part in the survey did not perform tests that allowed practitioners to diagnose/monitor the response to COVID-19. These were clinical laboratories focused on biochemical, immunochemical and hematological tests. In all, 24% of laboratories were running molecular RT-PCR tests to detect SARS-CoV-2, and 31.8% were testing for the presence of specific antibodies against SARS-CoV-2. Samples from patients suffering from or suspected of COVID-19 were analyzed in 83.8% of laboratories, and only 5.8% of responders reported that, in their laboratories, no samples from COVID-19 patients were tested. As many as 10.4% of responders didn't know if samples from COVID-19 confirmed/suspected patients were analyzed in their laboratories.

Further questions regarding safety rules that were introduced in laboratories indicated that only half of the surveyed laboratories materials from COVID-19 patients were transported in biohazard zip-locked bags. No specific

***Corresponding author: Olga Ciepiela**, PhD, Associate Professor, Department of Laboratory Medicine, Medical University of Warsaw Banacha 1a, 02-097 Warsaw, Poland, Phone/Fax: +48 22 599 2405, E-mail: olga.ciepiela@wum.edu.pl

Milena Matecka: Department of Laboratory Medicine, Medical University of Warsaw, Warsaw, Poland

Kinga Ogrodzińska and Gabriela Salczyńska: Students Scientific Group of Laboratory Medicine, Medical University of Warsaw, Warsaw, Poland

protection during the transport of samples was reported in 43.5% of the submitted answers (Figure 1A).

Only 47.4% of employers provided sufficient amounts of personal protective equipment (Figure 1B). Insufficient and sufficient amount of personal protective equipment is a subjective feeling of surveyed people, because they did not feel adequately or inadequately protected against SARS-CoV-2 infection. Employers should ensure a sufficient supply of personal protective equipment (laboratory staff must wear long-sleeved aprons or barrier suits, disposable gloves, shoe protection, safety goggles or visors, and face masks (FFP2 or N95 recommended) to minimize the risk of airborne infection. Based on the data obtained during the study, there is a shortage of personal protective equipment in clinical laboratories. A deficiency of personal protective equipment was declared in 51.3% of clinical laboratories. Among the laboratories surveyed, 1.3% were not equipped by employers. The most often used personal protective equipment in Polish laboratories were diagnostic nitrile gloves (90.3%), reusable safety visors (85.7%), surgical masks (83.1%) and long-sleeved interlining lab coats (72.7%) (Figure 1D).

In the vast majority of laboratories (71.4%), samples from COVID-19 confirmed/suspected subjects were centrifuged without any additional safety rules, together with samples from regular patients. Only in 11.7% of surveyed

laboratories was there a centrifuge dedicated only for COVID-19 that was placed in a separated and secured area (Figure 1C).

In 31.2% of laboratories, there were no special procedures regarding the performance of laboratory tests on patients with confirmed/suspected COVID-19. In all, 19.5% of respondents reported that analyses which bear a risk of aerosol spreading were excluded from the scope of performed tests in patients with confirmed/suspected SARS-CoV-2 infection (Figure 2A). In 36.4% of laboratories, no restrictions regarding social distancing, including wearing of masks or keeping a distance between employees, were introduced (Figure 2B).

The last group of questions were aimed to assess work effectiveness and the mental condition of laboratory employees. Respondents were more likely to indicate that their effectiveness during the pandemic did not change (53.2%), but 32.5% still felt that their efficacy was reduced (Figure 2C). Despite unchanged work efficiency, the vast majority (66.2%) indicated that the SARS-CoV-2 pandemic influenced their mental condition (Figure 2D).

Nationwide guidelines for medical laboratories regarding the management of samples of patients suspected or infected with COVID-19 have not yet been published. Our survey showed that safety rules implemented in Polish clinical laboratories based on recommendations

Figure 1: Second group of questions regarding rules and equipment that are applied to protect personnel against possible infection. Respondents answered about material transport in biohazard bags (A), amount (B) and sort (D) of personal protective equipment provided by employers, as well as rules of centrifugation (C).

Figure 2: Third group of questions concerning restrictions providing minimalization of risk of biological material-borne infection and social distancing.

Respondents answered about restrictions introduced (A) and regulations concerning social distancing among personnel (B); the last group of questions concerning self-assessment of work efficiency (C) and mental condition (D) during the COVID-19 pandemic among laboratory professionals.

issued by Provincial Consultants in the field of microbiology and laboratory diagnostics do not guarantee sufficient protection against COVID-19 infections.

The IFCC recommendations refer mainly to the group of laboratory professionals who work in routine clinical laboratories [2], thus the surveyed group should be highly interested in implementation of these guidelines. It is alarming that 10.4% of respondents lack knowledge about whether their clinical laboratories performed tests for COVID-19 infection. Such knowledge would increase risk awareness and force us to use protective rules more carefully.

According to recommendations, all specimens should be transported in biohazard bags that are appropriately secured. It is recommended to clearly mark the pouches with biohazard labels [2]. The results obtained provide us with a worrying conclusion that not following the correct transport procedures in these facilities may be associated with a greater risk of spreading SARS-CoV-2 infection in medical facilities.

During the pandemic, no reduction in the number of analyzed samples was observed in suspected patients compared to those not suspected of COVID-19 infection. The surveyed laboratory professionals did not report a

significant decrease in the number of ordered tests in patients suspected of infection compared to patients not suspected of infection. The most frequently ordered laboratory tests in patients with suspected SARS-CoV-2 infection in Polish clinical laboratories are complete blood count and C-reactive protein (CRP) concentration (Fig. S1).

The study provided us with information on the course of the material pre-treatment process and the use of separate equipment for centrifuging material from patients suspected or infected with SARS-CoV-2. Recommendations on the conditions of material preparation for laboratory tests, especially centrifugation of potentially infectious material, indicate that this process should take place in a deliberately separated zone, and be performed using tightly closed centrifuges [3, 4]. The safety precautions listed in the recommendations have not been introduced in almost 31.2% of clinical laboratories.

The universally recognized and enforced principle of social distancing, which includes at least a 2 m distance between people recommended by the WHO [2, 5], has not been implemented in 36.4% of laboratory professional workplaces. It is essential that clinical laboratories apply the principles of social distancing in their widest sense and as far as possible. It is also recommended to use team

segregation, in other words, separating office positions related to results or administrative authorization from the space in which laboratory tests are performed [2]. The introduction of team segregation would allow us to reduce the spread of the virus. We should warn that interpersonal contact with co-workers bears a risk of infection, since many cases of COVID-19 remain asymptomatic [6]. Based on our own experiences, as one of the largest clinical laboratories in Poland, running almost three million tests a year, full team segregation is difficult to introduce due to the limited number of employees. In our laboratory, apart from a team of laboratory technicians, there are 12 laboratory professionals who are qualified to authorize tests results and extracting two teams of six people would not ensure sufficient coverage of day and night shifts.

In the survey, we also ask if respondents find their work efficacy reduced compared with the pre-pandemic period. The majority did not observe any reduction in their efficiency, despite an increased workload together with a reduced number of team members being widely recognized [7].

What is alarming is that the increased mental load during the COVID-19 pandemic has translated into the worsened mental state of the studied laboratory employees. As many as 66.2% of them confirm the negative impact of the current pandemic on their mental condition. The causes of work-related stress and worsened mental condition among medical professionals has already been described [8–10]. However, most studies regard frontline workers. Our results show that laboratory professionals, due to stressful work conditions and urgent need for providing reliable test results as quickly as possible, are a group of medical professionals who also require daily psychological support.

The majority did not observe any reduction in work efficiency, despite an increased workload together with a reduced number of team members being widely recognized. It might be associated with the separation of routine clinical laboratories from molecular laboratories during the COVID-19 outbreak. The separation allows the workload in the first type of laboratory to remain quite constant.

Based on the survey results, we observed that the recommendations of authorities are not fully implemented in Polish laboratories. A similar situation may probably be

found in other countries, thus we suggest to translate the recommendations of the IFCC to all the languages of the members of the IFCC and disseminate them around the world.

Research funding: None declared.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Competing interests: Authors state no conflict of interest.

Ethical approval: The survey was accordant with the rules of Bioethical Committee of Medical University of Warsaw.

References

1. worldometers.info. COVID-19 Coronavirus Pandemic; 2020.
2. Lippi G, Adeli K, Ferrari M, Horvath AR, Koch D, Sethi S, et al. Biosafety measures for preventing infection from COVID-19 in clinical laboratories: IFCC Taskforce Recommendations. *Clin Chem Lab Med* 2020;58:1053–62.
3. Prevention CfDca. Interim guidelines for collecting, handling, and testing clinical specimens from persons for Coronavirus Disease 2019 (COVID-19); 2020.
4. PH England. COVID-19: safe handling and processing for samples in laboratories. www.gov.uk 2020.
5. WHO. Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19). Interim guidance 27 February 2020; 2020.
6. Day M. Covid-19: identifying and isolating asymptomatic people helped eliminate virus in Italian village. *BMJ* 2020;368:m1165.
7. Lippi G, Plebani M. The critical role of laboratory medicine during coronavirus disease 2019 (COVID-19) and other viral outbreaks. *Clin Chem Lab Med* 2020;58:1063–9.
8. Kaufman KR, Petkova E, Bhui KS, Schulze TG. A global needs assessment in times of a global crisis: world psychiatry response to the COVID-19 pandemic. *B J Psych Open* 2020;6:e48.
9. Neto MLR, Almeida HG, Esmeraldo JD, Nobre CB, Pinheiro WR, de Oliveira CRT, et al. When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. *Psychiatry Res* 2020;288:112972.
10. Zaka A, Shamloo SE, Fiorente P, Tafuri A. COVID-19 pandemic as a watershed moment: a call for systematic psychological health care for frontline medical staff. *J Health Psychol* 2020.

Supplementary Material: Supplementary material to this article can be found online at <https://doi.org/10.1515/cclm-2020-0764>.