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INVITED ARTICLE

FORENSIC AUTOPSIES DURING COVID-19 PANDEMIC IN POLAND

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ABSTRACT

COVID-19 has taken the world by storm since late 2019, so we decided to investigate whether this storm also affected forensic autopsies. The study aimed to check whether the COVID-19 pandemic influenced the number of forensic autopsies conducted in the Department of Forensic Medicine, Medical University of Lodz, Poland. For this, the monthly number of forensic autopsies performed from January 2019 to December 2023 was counted, covering the pre-pandemic (2019), pandemic (2020-2022) and post-pandemic (2023) periods in Poland. The results were compared with the monthly number of SARS-CoV-2 infections and the monthly number of deaths due to COVID-19 in Poland in the same period. The results showed that the mean monthly number of autopsies in the pre-pandemic and post-pandemic periods was similar (22.2±3.6 vs. 23.4±5.5), while the mean number during the pandemic was significantly lower (17.2±5.4). A major reason for this could have been the general slowing down in the pace of life driven by various types of lockdowns, which could have had an impact on reducing crime and, therefore, also on cases where the state prosecutor could have suspected that death had been caused by criminal means. Another reason could have been society's fear of a new, completely unknown disease. This fear may also have influenced the prosecutors and further affected their willingness to order forensic autopsies.

Keywords: *COVID-19; forensic autopsy; medico-legal death investigation; Poland*

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INTRODUCTION

The COVID-19 pandemic has had an unprecedented impact on many areas of our lives. To recall the development of events at the beginning of the pandemic, let us refer to the calendar[1,2,3].

- December 31, 2019: China informed WHO about unusual pneumonia cases in Wuhan, the capital of Hubei province, with a population of 11 million.
- January 1, 2020: First patients identified as workers at Huanan Seafood Market in Wuhan.
- January 7, 2020: WHO announced that the cause of the disease was a new virus belonging to the Corona family - nCoV.

- January 10, 2020: The first death from nCoV was reported in China.
- January 12, 2020: WHO called the nCoV virus the new coronavirus.
- January 20, 2020: WHO published reports on the coronavirus. The nCoV virus is transmitted from person to person - identified cases of infection in health care workers.
- January 30, 2020: WHO declared a global emergency.
- January 31, 2020: The beginning of virus testing in Poland.
- February 11, 2020: WHO named the disease COVID-19.
- February 14, 2020: WHO calls named the virus SARS-CoV-2.
- March 4, 2020: The first Polish patient infected with SARS-CoV-2 was identified at a hospital in Zielona Góra (Western Poland, close to the border with Germany) - he arrived by coach from Germany.
- March 5, 2020: The virus had spread to 84 countries.
- March 9, 2020: Sanitary control was introduced at the Polish borders.
- March 11, 2020: WHO declared a pandemic.
- March 12, 2020: The first death was reported in Poland. A national emergency state was declared in the United States, and flights to the European Union (EU) were suspended.
- March 13, 2020: Poland's borders were temporarily closed, and air connections were suspended.
- March 14, 2020: The Minister of Health declared a state of epidemic threat in Poland (i.e., a legal state was declared in connection with the risk of an epidemic to take preventive measures specified by law).
- March 15, 2020: The first charter flights of LOT Polish Airlines enabled Poles to return home.
- March 16, 2020: All educational institutions and universities in Poland were closed.
- March 17, 2020: EU closed borders for citizens of nonmember countries.
- March 20, 2020: The Minister of Health declared a state of the epidemic in Poland (i.e., a legal state was declared in connection with an epidemic to take anti-epidemic and preventive measures specified by law to minimize the effects of the epidemic).
- March 24, 2020: The Tokyo Olympic Games were postponed to the next year.
- March 31, 2020: Restrictions were introduced in Poland on staying in public places, including limiting access to parks, boulevards, promenades, and other areas of recreation.
- April 16, 2020: It became mandatory in Poland to cover one's nose and mouth in public places.
- April 20, 2020: The beginning of the gradual lifting of restrictions in Poland.

The European Medicines Agency (EMA) approved the first COVID-19 vaccine on December 21, 2020. It was the mRNA-based Pfizer-BioNTech vaccine sold under the brand name “Comirnaty”. The logistics of distributing and storing the vaccine was a huge challenge due to storage requiring extremely low temperatures, ranging from -90°C to -60°C[4]. Its delivery to Poland began on December 25th, 2020, and vaccinations were given from December 27th, 2020, with priority being given to medical staff[5].

COVID-19 has taken the world by storm since late 2019[6]. This study aims to investigate how this affected forensic autopsies in Poland.

AIM OF THE PAPER

To study the impact of the COVID-19 pandemic on the number of forensic autopsies conducted in the Department of Forensic Medicine, Medical University of Lodz.

METHODS

The monthly number of forensic autopsies ordered to be performed at the Department of Forensic Medicine, Medical University of Lodz by 4 district prosecutor's offices (Łódź Bałuty, Łódź Górna, Łódź Widzew, Zgierz) was counted. These were prosecutor's offices that usually outsource almost all autopsies in their area of operation to our department. The period from January 2019 to December 2023 was analyzed: 5 years (60 months) covering the pre-pandemic (2019), pandemic (2020-2022) and post-

pandemic (2023) periods in Poland. The results were presented in the form of a graph, which was compared with charts that presented the monthly number of SARS-CoV-2 infections in Poland and the monthly number of deaths due to COVID-19 in Poland during the same period[7].

RESULTS

The monthly number of forensic autopsies done in the period 2019-2023 is shown in Fig. 1. The bars show the values for each month, and the black line is the trend calculated for 3 months. It was observed that in the pre-pandemic year (2019), an average of 22.2 (SD=3,6) autopsies, in the pandemic years (2020-2022), 17.2 autopsies (SD=5,4), and in the post-pandemic year (2023) 23.4 autopsies (SD=5,5) were performed per month. The t-Student statistical test showed that the means for 2019 and 2020-2022 are statistically significantly different (p=0.0043), as are the means for 2020-2022 and 2023 (p=0.0023), whereas, in the case of the means for 2019 and 2023, there was no basis to reject the hypothesis of their equality (p=0.5160). The monthly number of SARS-CoV-2 infections and deaths due to COVID-19 in Poland in the same period are shown in Fig. 2 and Fig. 3, respectively.

DISCUSSION

The total number of clinical and forensic autopsies in Poland is systematically decreasing, both in absolute terms and as a percentage of all deaths. For example, in 1971, autopsies were performed for 16% of all deaths, but in 2023, only for 4% of all deaths autopsies were performed[8]. The most plausible reason for this almost linear downward trend is the decrease in the number of clinical autopsies, which is also the global trend[9]. However, this hypothesis cannot be verified because the official statistics in Poland do not distinguish between clinical and forensic autopsies.

We discussed the medicolegal death investigation system in Poland in detail in a previous publication[10]. Under the Polish Code of Criminal Procedures[11], if suspicious of criminal activity, an external examination of the body at the scene and a forensic autopsy shall be performed. This suspicion is the only statutory prerequisite for a forensic autopsy. According to the Code, these procedures are mandatory. These investigations are aimed at identifying the cause of death and details relevant to the circumstance of death. The decision on whether to deploy them is taken solely by the state prosecutor conducting the investigation. A mere suspicion that death has been caused by criminal means obliges the state prosecutor to order an external examination of the body at the place of its discovery and a forensic autopsy[10].

Of course, whether a given situation will be considered suspicious by a particular state prosecutor depends on their judgment. Therefore, various external circumstances can affect a prosecutor's decision. The COVID-19 pandemic could also have been such an external factor.

The research results support this hypothesis. The monthly number of autopsies in the pre-pandemic and post-pandemic periods was similar (22.2±3.6 vs. 23.4±5.5), while the number during the pandemic was significantly lower (17.2±5.4). It seems, however, that one of the reasons could have been a general slowing down in the pace of life driven by various types of lockdowns, which could have had an impact on reducing crime and, in turn, reduced the number of suspicious cases for the state prosecutor. On March 31st, 2020, restrictions on staying in public places were introduced in Poland, which included limited access to parks, boulevards, promenades, and other recreational places, and from April 20th, 2020, these restrictions were gradually lifted. In April 2020, the first significant decrease in forensic autopsies was visible. Another reason could have been society's fear of a new, completely unknown disease. It should be noted that the first wave of the pandemic in Poland in April 2020, although small compared to the subsequent waves, resulted in up to 610 deaths. This fear may also have influenced prosecutors and further affected their

decisions. With time, the number of autopsies increased almost to the pre-pandemic level. This could be explained by the easing of restrictions and the society becoming accustomed to the new situation. However, in the following period (summer 2021 and summer 2022), further large declines were observed, which were not at all correlated with the number of infections or deaths. Explaining why this happened would require more extensive research.

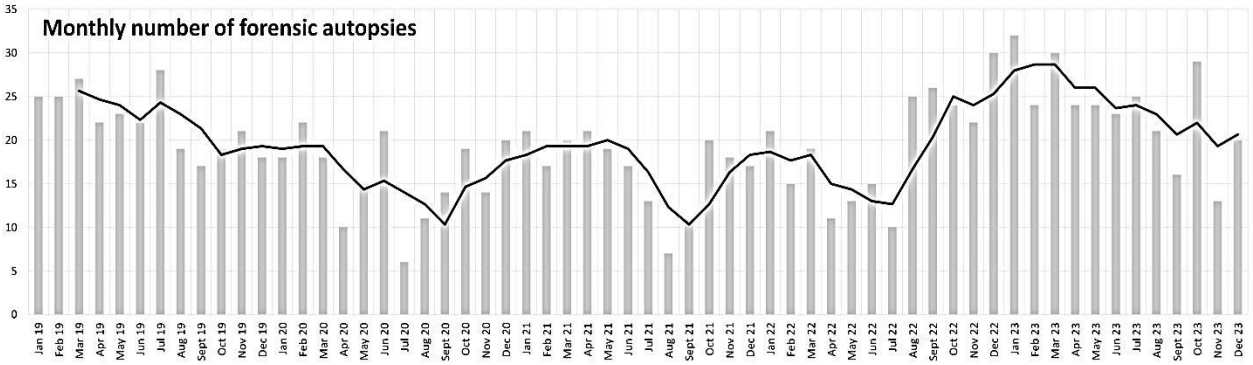

Fig. 1: Monthly number of autopsies commissioned to be performed at the Department of Forensic Medicine of the Medical University of Lodz in the period 2019-2023.

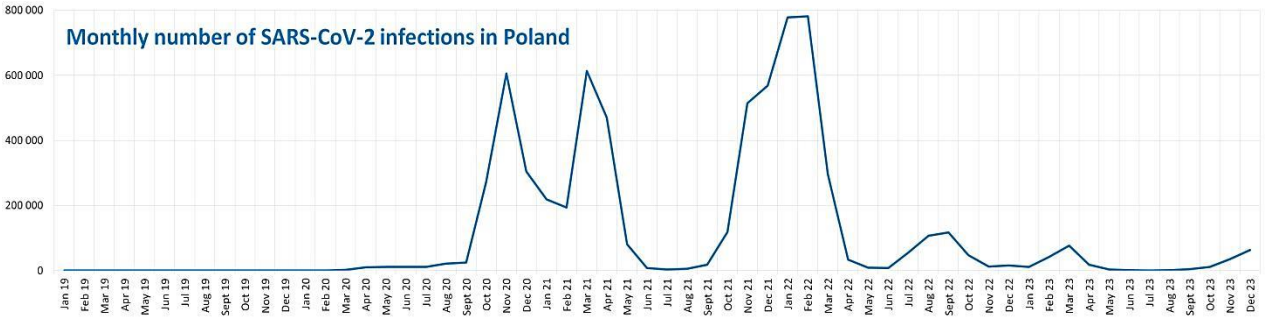

Fig. 2: Monthly number of SARS-CoV-2 infections in Poland in the period 2019-2023.

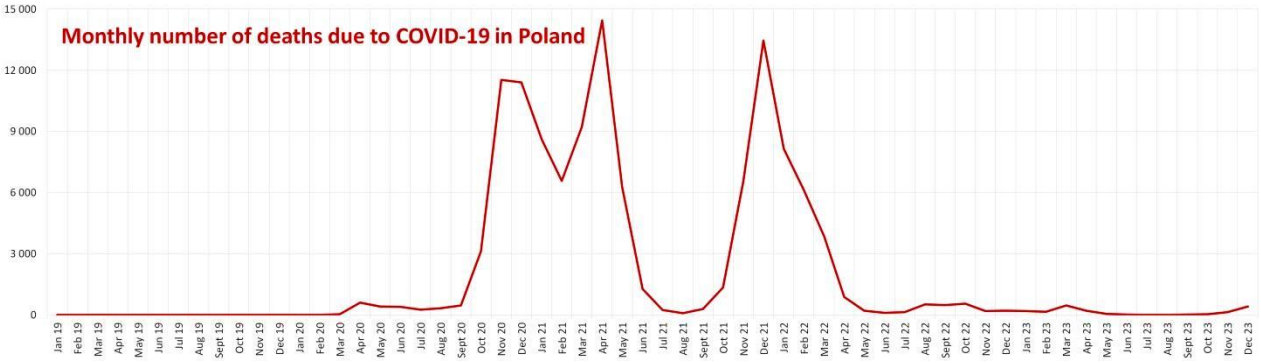

Fig. 3: Monthly number of deaths due to COVID-19 in Poland in the period 2019-2023.

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CONFLICTS OF INTEREST

The authors declared no conflicts of interest.

ETHICAL ISSUES

None.

SOURCES OF SUPPORT

None.

AUTHOR CONTRIBUTIONS

AS: Conception and design of the work; the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; and final approval of the version to be published. **KW:** Conception and design of the work; the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; and final approval of the version to be published. **JB:** Conception and design of the work; the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; and final approval of the version to be published.

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