

COVID-19 CAUSED BY THE SARS-CoV-2 AS AN OCCUPATIONAL DISEASE IN POLAND

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ABSTRACT

Background: The unexpected outbreak of the COVID-19 pandemic has led huge impact on health and safety of employees. Although now the epidemiological situation has improved, but it remains a challenge, especially in light of the emergence of new threats. The aim of the work is to present an epidemiological analysis of data on COVID-19 as an occupational disease in Poland. **Material and Methods:** The analysis covered all cases of occupational diseases sent by state sanitary inspectors to the Central Register of Occupational Diseases. The years 2020–2022 and such available data as: age, gender, activities and territorial differentiation were analyzed. The data were presented as absolute numbers and incidence rates per 100 000 employed persons and for healthcare workers also per 100 000 persons authorized to practice. **Results:** In the period 2020–2022 in Poland 7030 diseases recognized as occupational diseases were recorded, of which almost half were infectious diseases (47%). Among infectious diseases, dominated COVID-19 in number of 2059 cases. In this period 98.6% of all cases of COVID-19 were concentrated in the health care and social activities. According to workplaces, most diseases were caused by working in hospitals – 1825 cases (88.6% of all COVID-19 cases in the healthcare workers). Most cases concerned nurses – 1355 cases (65,8%) and doctors – 212 cases (10,3%). The incidence of COVID-19 in the group of physicians per 10 000 persons entitled to practice ranged from 2.6 in 2020 to 68.3 in 2022, while among nurses and midwives the rates were 7.9 and 194.9, respectively. **Conclusions:** The COVID-19 pandemic changed the picture of occupational diseases in Poland. Therefore, it is very important to understand the key contributions of people working in environments where workers are at increased risk of contracting COVID-19 due to the nature of their work, and to promote the recognition of COVID-19 as an occupational disease. *Med Pr Work Health Saf.* 2023;74(6):479–86.

Key words: occupational health, health care professionals, work-related diseases, epidemiological data, COVID-19, pandemic

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INTRODUCTION

Infectious and parasitic diseases have been the most frequently diagnosed occupational diseases in Poland for years. In 2019, 2065 cases of occupational diseases were diagnosed in Poland (12.9 cases per 100 000 employed person), of which 700 cases (33.9%) were infectious or parasitic diseases or their consequences [1]. Before the COVID-19 pandemic, the group of occupational infectious diseases was dominated by Lyme disease, tuberculosis and viral hepatitis. The COVID-19 has changed these proportions. The fact that COVID-19 can be considered an occupational disease was already known during the pandemic. The COVID-19 is an infectious disease that may be related to the work performed, in the environment of exposure to the SARS-CoV-2 virus. According to the Eurostat report, most Member

States, Norway and Switzerland, COVID-19 already recognise COVID-19 as an occupational disease or accident at work, in line with the conditions defined at national level. The recognition and compensation of occupational diseases is a national competence, however, in some cases it may be [2,3]:

- only an occupational disease,
- only an accident at work,
- depending on specific national criteria, an accident at work or an occupational disease,
- possibility of occupational origin, without specifying the exact form, whether it is an occupational disease or an accident at work.

In Poland, COVID-19 is recognized as an occupational disease. In order for it to be considered with certainty that a given COVID-19 infection qualifies as an occupational disease, it must be determined whether



the infection was work-related and occurred in connection with the performance of official duties.

While in the case of health care workers the cause and effect relationship is not in doubt due to the highest exposure to biological agents, the judicial process in cases where the SARS-CoV-2 virus is not a typical harmful factor, characteristic of the workplace, may cause some difficulties. In conclusion, COVID-19 can be considered an occupational disease, but each case should be considered separately. Ultimately, the competent state sanitary inspector decides whether a given disease is an occupational disease in a specific case.

The aim of the work is to present an epidemiological analysis of data on COVID-19 as an occupational disease in Poland, in particular, determining the professions with the highest risk of SARS-CoV-2 infection and examining the differences in incidence during the pandemic.

MATERIAL AND METHODS

This study is a descriptive epidemiological study, where the source of information is information from public data: statistics of occupational diseases (secondary data sources). The analysis covered all cases of COVID-19 as occupational diseases identified in the years 2020–2022 and obligatorily reported to the Central Register Occupational Diseases Institute of Occupational Medicine in Łódź, Poland. All those cases were certified in compliance with the Polish certification system. The analysis of the incidence of occupational diseases was carried out on the basis of routine system for recording occupational diseases, data contained in individual “Cards of occupational disease diagnosis” sent from all over the country to the Central Register.

The occurrence of occupational diseases has been described by the absolute number of cases and incidence per 100 000 employed persons (calculated as the number of new cases during the calendar year divided by

the number of workers in the reference group during the year, multiplied by 100 000) according to the definition provided by the Central Statistical Office [4–6], and for medical professions (doctor, dentist, nurse, midwife) additionally in the in relation to the number of persons entitled to practice [7]. The analysis included such variables as: diseases according to the current list of occupational diseases [8], gender, sections of the Polish Classification of Activities (Polska Klasyfikacja Działalności – PKD), occupations and territorial differences by voivodships.

RESULTS

In the period 2020–2022 in Poland 7030 diseases recognized as occupational diseases were recorded, of which almost half were infectious and parasitic diseases (47%). The dominant infectious disease, and even the most common occupational disease was coronavirus disease caused by the SARS-CoV-2 virus (2059 cases). The age of the patients at diagnosis was $M = 51.6$ years. Women predominated in the structure of COVID-19 cases. In this group, 1841 cases were found, i.e., 89.4% of all occupational cases of COVID-19. The incidence rate in 2022 was 7.0 per 100 000 employed person. The incidence among women was higher than among men. The rates were 13.6 and 1.4 cases per 100 000 employed person, respectively (Table 1).

COVID-19 cases by PKD

Among the PKD, 98.6% of all confirmed cases of COVID-19 in this period were concentrated in the Section Q – health care and social activities. In 2022 the incidence rate for COVID-19 as an occupational disease in this section, defined by the number of cases per 100 000 employed persons, was 111.4. The analysis showed that the highest number of occupational cases of COVID-19 was found among employed in health care activities – 1986 cases, i.e., 96.4% of all diseases in Section Q. In 2022 number of cases per 100 000 in this

Table 1. Diagnoses of COVID-19 as an occupational disease in 2020–2022 in Poland

Participants	COVID-19 as an occupational disease diagnoses								
	2020			2021			2022		
	n	%	rate per 100 000 employed persons	n	%	rate per 100 000 employed persons	n	%	rate per 100 000 employed persons
Female	35	92.1	0.46	861	88.9	12.6	945	89.7	13.57
Male	3	7.9	0.003	107	11.1	1.34	108	10.3	1.34
Total	38	100	0.24	968	100	6.55	1053	100	7.02

Table 2. Diagnoses of COVID-19 as an occupational disease by Polish Classification of Activities (Polska Klasyfikacja Działalności – PKD) sections in 2020–2022 in Poland

PKD	COVID-19 diagnoses							
	2020		2021		2022		total	
	n	%	n	%	n	%	n	%
PKD section								
M – professional, scientific and technical activities	–	–	–	–	17	1.6	17	0.8
N – administrative and support service activities	–	–	–	–	1	0.1	1	0.1
O – public administration and defence; compulsory social security	–	–	1	0.1	1	0.1	2	0.1
P – education	–	–	–	–	2	0.2	2	0.1
Q – human health and social work activities	38	100.0	963	99.5	1030	97.8	2031	98.6
human health activities	38	100.0	946	97.7	1002	95.2	1986	96.4
social work activities without accommodation	–	–	3	0.3	3	0.3	6	0.3
social work activities with accommodation	–	–	14	1.4	25	2.4	39	1.9
S – other service activities	–	–	4	0.4	2	0.2	6	0.3
PKD total	38	100.0	968	100.0	1053	100.0	2059	100.0

department of the economy, amounted to 139.1. Only 45 cases were recorded among social workers, which accounted for 2.2% of all cases in this activities. Among this group of employees, the incidence rate in 2022 was 31.9. Single cases of COVID-19 as an occupational disease were also recorded among employees of such sections of activity as: professional scientific and technical services (17 cases), other service activities (6 cases), public administration and defence; compulsory social security (2 persons), education (2 cases) and administrative and support service activities (1 case) (Table 2).

Occupational diseases, including COVID-19 among health care workers

A detailed analysis of the percentage of COVID-19 in the total number of all occupational diseases among human health care division is shown in Figure 1. In the years 2020–2022, 2142 cases of occupational diseases were found among people working in this division. The COVID-19 in this group accounted for 92.7% of all diagnoses (1985 cases), where it was 34.9% in 2020, rising to 95.2% in 2021 and 96.3% in 2022. In 2020, other diseases with a high number of cases were also tuberculosis (22 cases, 20.2% of all occupational diseases among health care workers), carpal tunnel syndrome (19 cases, 17.4%), viral hepatitis (11 cases, 10.1%). In 2021 and 2022, these diseases accounted for a small percentage of the total structure on occupational diseases in this group of workers.

According to workplaces, most diseases were caused by working in hospitals – 1825 cases, i.e., 88.6% of all

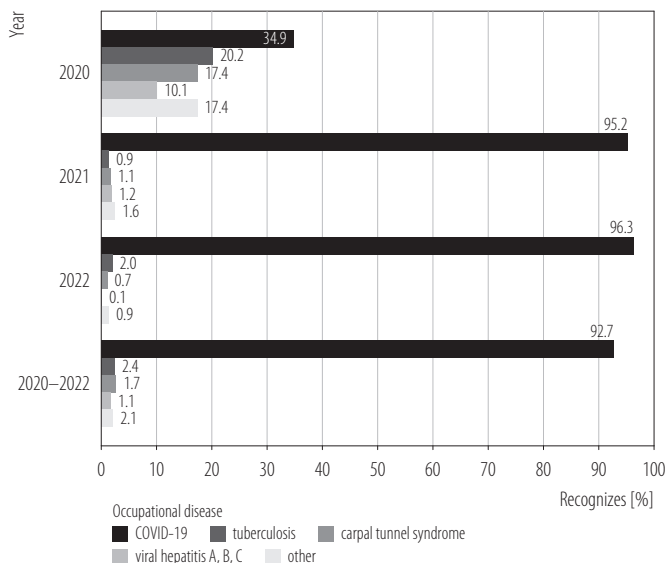


Figure 1. Occupational diseases among health care workers in 2020–2022

confirmed cases of COVID-19 in the entire group of healthcare workers. Most cases concerned nurses – 1355 cases (65.8% of all healthcare workers) and doctors – 212 cases (10.3%).

COVID-19 cases by voivodships

During the analysis period, the highest number of COVID-19 cases was recorded in the Małopolskie (40.1%) and Mazowieckie (24.5%) voivodships and the lowest in the Warmińsko-Mazurskie and Podkarpackie voivod-

Table 3. Diagnoses of COVID-19 as an occupational disease by voivodships in 2020–2022 in Poland

Place	COVID-19 diagnoses							
	2020		2021		2022		total	
	n	%	n	%	n	%	n	%
Voivodship								
Dolnośląskie	–	–	41	4.2	92	8.7	133	6.5
Kujawsko-Pomorskie	1	2.6	68	7.0	134	12.7	203	9.9
Lubelskie	–	–	6	0.6	14	1.3	20	1.0
Lubuskie	–	–	2	0.2	2	0.2	4	0.2
Łódzkie	–	–	4	0.4	4	0.4	8	0.4
Małopolskie	–	–	379	39.2	447	42.5	826	40.1
Mazowieckie	36	94.7	324	33.5	146	13.9	506	24.6
Opolskie	–	–	5	0.5	1	0.1	6	0.3
Podkarpackie	–	–	–	–	1	0.1	1	0.0
Podlaskie	1	2.6	25	2.6	46	4.4	72	3.5
Pomorskie	–	–	10	1.0	10	0.9	20	1.0
Śląskie	–	–	48	5.0	44	4.2	92	4.5
Świętokrzyskie	–	–	8	0.8	11	1.0	19	0.9
Warmińsko-Mazurskie	–	–	–	–	–	–	–	–
Wielkopolskie	–	–	48	5.0	99	9.4	147	7.1
Zachodniopomorskie	–	–	–	–	2	0.2	2	0.1
Poland – total	38	100.0	968	100.0	1053	100.0	2059	100.0

ships – 0% (Table 3). Additional, Table 4 shows the territorial differences in the incidence of COVID-19. In 2021, large differences in morbidity were observed. The highest incidence rates were recorded in the following voivodships: Małopolskie (26.5 per 100 000 employed person), Kujawsko-Pomorskie (9.9), also Mazowieckie (9.8) and Podlaskie (5.9). However, in the Podlaskie, Warmińsko-Mazurskie and Zachodniopomorskie voivodships, no occupational disease caused by exposure to SARS-CoV-2 virus was reported. In 2022, a large variation in incidence was also observed, from 0 and 0.1 per 100 000 employed persons in Warmińsko-Mazurskie and Podkarpackie to 34.7 and 20.8 in Małopolskie and Kujawsko-Pomorskie voivodships. Such a diversification of the incidence rates in voivodships may indicate the non-uniformity of the diagnostic and certification methods and criteria used, requiring in-depth analyses.

An additional analysis was carried out in relation to the number of persons entitled to practice medical professions: doctors, dentists, nurses and midwives. The analysis showed that the COVID-19 incidence rate in 2021 in the group of physicians calculated per 100 000

persons entitled to practice ranges from 0 (Podkarpackie, Warmińsko-Mazurskie and Zachodniopomorskie voivodship) to 179.8 (Mazowieckie voivodship) (Table 5) In 4 provinces exceeds the national level, which was the value of 65.80 cases per 10 000 persons entitled to practice. Incidence of COVID-19 as an occupational disease of nurses and midwives ranges from 0 (Lubelskie, Podkarpackie and Warmińsko-Mazurskie voivodship) to 892.6 (Małopolskie voivodship). On average in Poland it was 189.1 and in 3 voivodships it exceeded this value. In 2022, the incidence among nurses and midwives was already significantly exceeded the average for Poland (194.9) in 5 voivodships: Małopolskie (1034.0), Kujawsko-Pomorskie (510.8), Podlaskie (243.4), Wielkopolskie (218.4) and Dolnośląskie (212.2). In the group of physicians in the same 4 voivodships, the incidence rates exceeded the values for the country (68.3). These were the following voivodships: Małopolskie (225.1), Kujawsko-Pomorskie (146.5), Wielkopolskie (116.7) and Podlaskie (104.4). With regard to dentists, the incidence rate of COVID-19 per 10 000 people authorized to practice the profession for the entire country was 2.27 in 2022 and 25.9 in the Dolnośląskie voivodship.

DISCUSSION

Over the last 3 years, the infection caused by the new coronavirus (SARS-CoV-2) has spread at an unprecedented pace around the world, having a devastating impact on human health and was a huge challenge for the Polish healthcare system, in particular for healthcare workers who have suddenly become one of the groups most exposed to an unknown pathogen. This publication is a comprehensive summary of the epidemiological situation in the field of COVID-19 diagnosed in Poland as occupational diseases from full data from the Central Register of Occupational Diseases. The COVID-19 has entirely changed the occupational occurrence of infections in Poland. In the years preceding the pandemic, the Central Register of Occupational Diseases received about 600–700 diagnoses of infectious diseases annually, which resulted from occupational exposures. In 2020, 1850 cases of occupational diseases were diagnosed in Poland (11.5 cases per 100 000 employed person), of which 505 cases (27.3%) were infectious or parasitic diseases or their consequences. This percentage increased to 53.5% in 2022. This means that the number of diseases has more than doubled [9]. This situation may have been influenced by several factors, the most important of which is the higher probability of more undiagnosed infections of occupational origin and the situation in which it was not clear under what conditions COVID-19 would be accepted as an occupational disease at the beginning of the pandemic.

In Poland, the criteria for recognizing COVID-19 as an occupational disease were established by experts from the Polish Occupational Medicine Society and the Nofer Institute of Occupational Medicine [10]. The first condition is the certainty of acquiring the infection, which can be proven by demonstration:

- a positive result of a molecular test performed using the NAAT method (nucleic acid amplification tests), which is, e.g., an RT-PCR test confirming the presence of genetic material of the SARS-CoV-2 virus in a swab from the respiratory tract;
- or
- positive antigen test (detection of the presence of protein antigens of the SARS-CoV-2 virus in a swab from the respiratory tract using antigen tests);
- or
- positive serological tests (detection of anti-SARS-CoV-2 antibodies in a venous blood sample).

Positive serological results must be accompanied by the presence of documented symptoms of the disease.

Table 4. Incidence rate of COVID-19 by voivodships and per 100 000 persons entitled to practice in 2020–2022 in Poland

Place	Incidence rate per 100 000 persons		
	2020	2021	2022
Voivodship			
Dolnośląskie	–	3.75	8.64
Kujawsko-Pomorskie	0.14	9.91	20.84
Lubelskie	–	0.73	2.12
Lubuskie	–	0.63	0.66
Łódzkie	–	0.42	0.46
Małopolskie	–	26.52	34.69
Mazowieckie	1.09	9.85	4.54
Opolskie	–	1.63	0.35
Podkarpackie	–	–	0.15
Podlaskie	0.24	5.98	12.56
Pomorskie	–	1.19	1.20
Śląskie	–	2.92	2.77
Świętokrzyskie	–	1.75	2.92
Warmińsko-Mazurskie	–	–	–
Wielkopolskie	–	2.84	6.04
Zachodniopomorskie	–	–	0.40
Poland – total	0.24	6.17	7.18

Another criterion is the recognition of a causal relationship between the disease and the work performed. In case of medical personnel or other persons working in the health care sector, in the absence of evidence of a non-professional source of infection, the diagnosis of an occupational disease is possible after demonstrating constant work in direct contact with patients, and not only those who have been diagnosed with SARS virus infection -CoV-2. This approach is supported by the fact that medical staff throughout the working day deals with a large number of sick people who may not always be aware of the infection.

In case of other occupational groups, the decision to diagnose an occupational disease is made on an individual basis each time, inter alia, after confirming a significant risk of SARS-CoV-2 virus infection in the workplace (e.g., after proving long and close contact with people diagnosed with COVID-19) and in the absence of evidence of a non-occupational source of infection.

Undoubtedly, the large differences in the number of COVID-19 diagnoses as an occupational disease in individual regions of Poland require an in-depth discussion. The above differences do not necessarily result

Table 5. COVID-19 incidence rate per 100 000 persons entitled to practice in 2020–2022 by voivodships

Place	Incidence rate per 100 000 persons								
	physician			dentist			nurse, midwife		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
Voivodship									
Dolnośląskie	–	39.54	38.43	–	–	25.96	–	88.50	212.18
Kujawsko-Pomorskie	–	88.86	146.52	–	–	–	5.96	306.41	510.80
Lubelskie	–	22.25	65.61	–	–	–	–	14.27	18.57
Lubuskie	–	37.62	37.01	–	–	–	–	–	–
Łódzkie	–	24.73	16.23	–	–	–	–	4.70	4.63
Małopolskie	–	150.81	225.07	–	–	–	–	892.59	1034.02
Mazowieckie	10.96	179.78	64.55	–	–	–	53.75	423.98	151.48
Opolskie	–	76.37	–	–	–	–	–	34.29	11.32
Podkarpackie	–	–	–	–	–	–	–	–	4.45
Podlaskie	18.15	17.81	104.42	–	–	–	–	128.12	243.45
Pomorskie	–	30.26	9.77	–	–	–	–	22.42	33.04
Śląskie	–	21.67	53.42	–	–	–	–	63.40	67.20
Świętokrzyskie	–	24.47	48.08	–	–	–	–	38.45	45.20
Warmińsko-Mazurskie	–	–	–	–	–	–	–	–	–
Wielkopolskie	–	25.45	116.68	–	–	–	–	134.18	218.37
Zachodniopomorskie	–	–	–	–	–	–	–	–	7.56
Poland – total	2.65	65.80	68.32	–	–	2.27	7.97	189.21	194.88

from the prevalence of COVID in a given province. According to the authors of this article, this could be due to the lack of a broad information campaign in hospitals about the right to recognize COVID as an occupational disease, which in turn was associated with a low percentage of employees reporting in order to initiate the appropriate procedure.

Another reason could be difficulties related to the initiation and subsequent stages of the procedure in the medical units responsible for diagnosing occupational diseases in individual voivodships and therefore too long waiting time for the case to be considered.

Contrary to the epidemiological situation in Poland, where cases were predominately diagnosed in the healthcare sector, in Italy COVID-19 cases have been acquired and identified as occupational origin in a variety of workplaces. The distribution of the economic sectors involved was coherent with the activities classified as at risk during the lockdown period. The economic sectors mostly involved were human health and social work activities, but occupational compensation claims also include cases in meat and poultry processing plants

workers, store clerks, postal workers, pharmacists, and cleaning workers [11].

There is still a need to pay more attention to promotional activities in the field of reducing the incidence of occupational diseases. Apart from legal instruments, it is also important to support employers and employees and high-quality scientific research in order to prevent the health effects of people working in occupations with a risk of exposure, but also to provide necessary compensation to those injured. The emergence of COVID-19 cases in the world has created new challenges for employers, in particular assurances biosecurity and contamination prevention. Cooperation with employers and the working environment offer an underrated possibility of implementing educational programs in the field of health, including the prevention of occupational diseases among employees [12]. It is important that employee health protection policies respond to the changing threats associated with the pandemic. Reducing the occurrence and minimizing the effects of occupational diseases is possible through preventive and information activities aimed at disseminating knowledge

about hazards causing occupational diseases and ways to counteract these hazards. Such actions should focus on risk factors occurring in particular industries and professions, as well as regional differences in the incidence of particular occupational diseases. It is important to conduct information campaigns to build employees' knowledge on the prevention of occupational diseases and to promote behaviors that minimize the risk of occupational diseases. Health promotion programs should be focused on defined health goals at the enterprise level, but also at the regional and national level.

CONCLUSIONS

The impact of the unexpected COVID-19 pandemic was also noticed in the presented epidemiological analysis of the incidence of occupational diseases. The analysis showed that some occupational groups, especially those exposed to contact with infected people, e.g., in health and social care sectors are at higher risk of SARS-CoV-2 contracting, than others. Defining COVID-19 cases as an occupational disease is important not only for the certification implications for employees, but also for monitoring morbidity trends, comparing dependencies, and lessons learned for prevention. It is therefore very important to recognize the key contributions of those working in the health and social care sector, as well as in other sectors where workers are at increased risk of contracting COVID-19 due to the nature of their work and promoting the recognition of COVID-19 as a occupational disease.

Author contributions

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Statistical analysis: Beata Świątkowska

Interpretation of results: Beata Świątkowska, Marcin Rybacki, Wojciech Hanke

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