SHORT COMMUNICATION

Interventions of emergency medical teams in Poland during the SARS-CoV-2 pandemic

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Introduction The coronavirus disease 2019 (COVID-19) pandemic is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus spread rapidly throughout the world due to its high contagiousness. Furthermore, effective methods of post-exposure prophylaxis and specific treatment have not been developed. Social distancing seems to be the main preventive method to reduce the spread of SARS-CoV-2; however, in case of illness, it may delay the contact with the healthcare provider, and thus, impede the diagnosis and treatment.[1,2]

The aim of the study was to assess the number of ambulance calls, type of emergency that led to the call, and final *International Classification of Disease, Tenth Revision, Clinical Modification (ICD-10)* diagnoses established by the leader of an emergency medical team (EMT) during the pandemic as well as to compare similar periods in 2018 and 2019.

Methods This was a retrospective analysis of dispatcher order cards and medical rescue cards from the following periods: March 15 to May 15, 2018 (period 1); March 15 to May 15, 2019 (period 2); and March 15 to May 15, 2020 (period 3). The study included all interventions of EMT in the study period. The emergency of the caller was defined by a medical dispatcher using predefined categories (22 categories). We assessed date of notification and the emergency that was the reason for the call (death, fainting, mental disorder, traffic accident, traumatic injury, stroke, sudden cardiac arrest, dyspnea, pregnancy, chest pain, cardiac issues). These data were provided by the medical dispatcher. Moreover, we assessed the final diagnosis made by the EMT leader (*ICD-10* codes are listed in TABLE 1). Data were obtained from the State Emergency Medical Support System upon the consent of the Ministry of Health. The approval of the bioethical committee as well as patient informed consent were not required for the purpose of this study.

The population of Poland between 2018 and 2020 was approximately 38.5 million and this number was the basis for the statistical analysis. The size of the population was taken from data of the Main Statistical Office (Polish, Główny Urząd Statystyczny) (period 1, 38 414 000; period 2, 38 388 000; and period 3, 38 358 000).

Statistical analysis Discrete variables were presented as numbers. Risk ratios (RR) and 95% CIs were used to compare the study subgroups. Due to multiple comparison, the *P* value of less than 0.017 was regarded as statistically significant. Statistical analysis was performed using the STATISTICA 10 software (StatSoft Inc., Tulsa, Oklahoma, United States) and MedCalc software (Mariakerke, Belgium).

Results and discussion A total of 550 815 EMT interventions were noted in period 1, 527 837 in period 2, and 400 878 in period 3. During period 3, which corresponds with the first months of the COVID-2019 pandemic, the total number of interventions was approximately 25% lower than in the corresponding

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TABLE 1 Comparison of chosen causes of emergency calls and *ICD-10* codes in the coronavirus disease 2019 era in comparison with corresponding periods in 2018 and 2019

Variable	Period 1 (n = 550 815)	Period 2 (n = 527 837)	COVID-19 era (n = 400 878)	COVID-19 era vs period 1		COVID-19 era vs period 2		Period 2 vs period 1[a]	
				RR (95% CI)	*P* value	RR (95% CI)	*P* value	RR (95% CI)	*P* value
Emergency									
Death	199	55	45	0.226 (0.164–0.313)	<0.001	0.819 (0.552–1.214)	0.32	0.277 (0.205–0.373)	<0.001
Fainting	48 121	45 157	26 074	0.543 (0.534–0.551)	<0.001	0.578 (0.569–0.587)	<0.001	0.939 (0.927–0.951)	<0.001
Mental disorders	27 143	27 376	25 706	0.948 (0.932–0.965)	<0.001	0.940 (0.924–0.956)	<0.001	1.009 (0.992–1.026)	0.29
Traffic accidents	18 473	17 600	8593	0.466 (0.454–0.478)	<0.001	0.489 (0.476–0.501)	<0.001	0.953 (0.934–0.973)	<0.001
Traumatic injuries	64 622	58 680	39 727	0.616 (0.608–0.623)	<0.001	0.678 (0.669–0.686)	<0.001	0.909 (0.899–0.919)	<0.001
Paralysis, slurred speech	16 939	17 032	16 833	0.995 (0.974–1.017)	0.65	0.989 (0.968–1.010)	0.31	1.006 (0.985–1.028)	0.58
Sudden cardiac arrest	4518	4780	5084	1.127 (1.083–1.173)	<0.001	1.064 (1.023–1.107)	0.002	1.059 (1.016–1.103)	0.006
Dyspnea	55 544	51 755	42 363	0.764 (0.754–0.773)	<0.001	0.819 (0.809–0.830)	<0.001	0.932 (0.921–0.944)	<0.001
Pregnancy	3312	2873	3268	0.988 (0.941–1.037)	0.62	1.138 (1.083–1.197)	<0.001	0.868 (0.826–0.912)	<0.001
Chest pain	43 668	43 103	36 146	0.829 (0.817–0.841)	<0.001	0.839 (0.828–0.851)	<0.001	0.988 (0.975–1.002)	0.07
Cardiological problems	37 218	41 955	35 547	0.956 (0.943–0.970)	<0.001	0.848 (0.836–0.860)	<0.001	1.128 (1.112–1.144)	<0.001
ICD-10 code									
I20 – angina pectoris	1557	1309	711	0.457 (0.418–0.500)	<0.001	0.544 (0.496–0.596)	<0.001	0.841 (0.782–0.905)	<0.001
I21 – acute myocardial infarction	2842	2689	2187	0.771 (0.729–0.815)	<0.001	0.814 (0.769–0.861)	<0.001	0.947 (0.898–0.998)	0.04
I48 – atrial fibrillation	9645	9582	7004	0.727 (0.705–0.750)	<0.001	0.732 (0.709–0.755)	<0.001	0.994 (0.966–1.022)	0.65
I46 – sudden cardiac arrest	6098	5852	5538	0.909 (0.877–0.943)	<0.001	0.947 (0.913–0.983)	0.004	0.960 (0.926–0.995)	0.03
I50 – heart failure	5959	5493	4337	0.729 (0.701–0.758)	<0.001	0.790 (0.759–0.822)	<0.001	0.922 (0.889–0.957)	<0.001
I64 – stroke	10 639	10 248	9529	0.897 (0.872–0.922)	<0.001	0.931 (0.905–0.957)	<0.001	0.964 (0.938–0.990)	0.008
I10 – hypertension	30 157	32 761	27 297	0.906 (0.892–0.921)	<0.001	0.834 (0.821–0.847)	<0.001	1.087 (1.070–1.104)	<0.001
J45, J46 – asthma	1944	1466	1057	0.544 (0.505–0.587)	<0.001	0.723 (0.667–0.781)	<0.001	0.755 (0.705–0.808)	<0.001
J81 – pulmonary oedema	1418	1165	873	0.617 (0.567–0.671)	<0.001	0.750 (0.687–0.819)	<0.001	0.822 (0.761–0.888)	<0.001
R07 – chest pain	26 934	27 594	22 859	0.850 (0.835–0.865)	<0.001	0.829 (0.815–0.844)	<0.001	1.025 (1.008–1.042)	0.004
R06 – breathing disorders	21 248	21 390	17 881	0.843 (0.826–0.860)	<0.001	0.837 (0.820–0.853)	<0.001	1.007 (0.988–1.027)	0.46
R55 – fainting	34 989	31 889	16 504	0.472 (0.464–0.481)	<0.001	0.518 (0.508–0.528)	<0.001	0.912 (0.898–0.926)	<0.001
R50 – fever	11 663	11 651	10 477	0.900 (0.876–0.924)	<0.001	0.900 (0.875–0.924)	<0.001	1.000 (0.971–1.026)	0.97
R96 – sudden death and R98 – unexpected death	6266	5899	5760	0.920 (0.888–0.954)	<0.001	0.977 (0.942–1.013)	0.21	0.942 (0.909–0.979)	0.001

a To assess the fluctuations in the rates of causes of emergency calls and *ICD-10* codes, their RR and 95% CI in 2019 in comparison to 2018 were also presented.

Abbreviations: COVID-19, coronavirus disease 2019; EMT, emergency medical team; RR, relative risk; *ICD-10*, *International Classification of Disease, Tenth Revision, Clinical Modification*

pre–COVID-19 periods in 2018 and 2019. TABLE 1 presents the numbers of interventions resulting from the specified emergencies that were the reasons for calls, as well as chosen *ICD-10* codes.

Our study shows that the number of EMT interventions decreased significantly during the COVID-19 pandemic in comparison with earlier periods. It corresponded with a decrease in the number of patients admitted to the emergency department.[3] Public health interventions implemented upon the Polish Anti-Crisis Act including obligatory quarantine, epidemiological supervision, border sanitary control and border closure, cancellation of mass events, introduction of distance learning, closure of cultural institutions, assignation of designated hospitals for infectious diseases as well as introduction of the state of a pandemic were effective in limiting the COVID-19 pandemic outcomes in Poland.[2] The effectiveness of preventive measures was visible in the numbers of deaths due to the pandemic in Poland in comparison with other countries. Social distancing limited not only the number of deaths due to COVID-19 but also the number of patients admitted to medical units due to other diseases. Approximately 30% of all SARS-CoV-2 infections occur in hospitals.[4] Therefore, unnecessary visits are not recommended. Furthermore, patients were encouraged to contact physicians via telephone.[5]

The study also indicated that the number of the EMT interventions did not change for all diagnoses. The reasons for that are complex and might be related to patients deciding to refrain from visits in the emergency department. In some cases, such a decision might result in not making a justified call. According to our results, the number of calls categorized by dispatchers as sudden cardiac arrest increased, and the number of interventions with the *ICD-10* code I46 given by the EMT leader decreased. These results are incoherent and require further analysis. Of note, in cases in which the condition of the patient was unclear, the dispatcher tended to give a more serious diagnosis to avoid delay. Furthermore, the number of interventions due to sudden and unexpected death also significantly decreased. Researchers from other countries reported an increase in cardiac arrest incidence,[6] which might have been caused by a higher incidence of COVID-19 in those areas.

The number of emergencies that are the most frequent reasons for the EMT interventions, that is, chest pain and definite myocardial infarction, significantly decreased in the COVID-19 pandemic. Similar trends were observed in Poland and, for example, Italy.[7,8] This finding is commonly considered a result of less frequent visits to the emergency department. Nevertheless, the incidence of myocardial infarction decreased due to obligatory social quarantine and change in lifestyle during the pandemic.[9]

Similarly, a decrease in the number of interventions in patients with asthma or due to traffic accidents may be related not only to less frequent contact with healthcare professionals but also with lower air contamination and traffic, as well as sleeping longer hours in the COVID-19 pandemic. Furthermore, similarly to other reports, the number of strokes decreased.[10]

A slight decrease was observed in the number of calls which were classified by dispatchers as death or proclaimed by EMT leaders as sudden or unexpected death. This finding does not support the assumption that a decrease in the number of cardiovascular patients was caused by a drop in the number of deaths in this group, which would be a result of a delay in the EMT arrival during the pandemic. In fact, the total number of deaths during the COVID-19 pandemic significantly decreased in comparison with the earlier periods.[11]

The balance between keeping social distance and using the healthcare system when necessary is difficult to maintain. The patients are the most threatened by lack of a vaccine for SARS-CoV-2 and the risk that it may be ineffective, which indicates the necessity for development of further strategies.[12]

The total number of EMT interventions decreased during the COVID-19 pandemic. The decreased number of EMT interventions is related to less frequent calls. Moreover, the number of cardiac arrests recognized by the EMT was lower in the COVID-19 pandemic in comparison with the corresponding pre–COVID-19 periods.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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