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LETTER TO THE EDITOR

Impact of the COVID-19 outbreak on neurological consultation in an emergency department

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Dear editor-in-chief,

The outbreak of the COVID-19 pandemic and restrictive measures applied worldwide led to a reduction in the number of emergency department (ED) visits [1]. While patients with common neurological conditions, such as headache, epilepsy and back pain, used ED to receive rapid treatment prior to the COVID-19 outbreak, fear of infection in hospital seemed to reduce numbers of these ED visits and rather shift the interest of patients to telemedicine [2]. Therefore, we decided to analyse the effect of the COVID-19 pandemic on the number of neurological ED visits during the first wave of the pandemic in a single large neurological referral ED in Kosice, Slovakia, with respect to the specific type of neurological disease. All patients who were referred for neurological consultations (3:30 p.m. to 7:30 a.m. the following day) from 1 March to 31 May 2020 (a COVID-19 period) and the corresponding interval of 1 March to 31 May 2019 (a non-COVID period) were included. Patients were classified based on the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) principal diagnosis codes for stroke (I60–I69; G45–G46; ischaemic, transitory ischaemic attack, intracerebral and subarachnoid haemorrhage), headache, epilepsy, back pain, vertigo/dizziness, and remaining neurological conditions (G00–G96.9 except G54–55; G40–41; G43–G44; G45–G46; I60–I69). Statistical analyses were performed using IBM SPSS statistic 25 for Windows (SPSS Statistics, IBM Corporation, Armonk, NY). The non-parametric, two-sample Mann–Whitney *U* test was chosen to compare the number of patients for both periods. Differences in age and gender between referrals of individual diagnoses were calculated using the Chi-squared and independent sample *T* tests.

During the non-COVID period (March–May 2019), a total of 727 patients with a mean age of 57.6 ± 19 years (45.4% were men), visited our neurological ED (Table 1). The Covid-19 outbreak lead to a 44.4% decrease in all visits to the neurological ED (404 versus 727; $p < 0.001$; mean age 60.2 ± 17.7 years (51.3% were men)). The most significant decrease was seen in patients presenting with back pain (− 57.2%; $p < 0.001$), epilepsy (− 57.6%; $p < 0.001$) and "remaining neurological diseases" (− 45.8%; $p < 0.001$). We did not identify any significant differences for referrals of any group of disorders in terms of gender or age between the non-COVID and COVID-19 period.

In terms of the trend over time of total ED visits (Fig. 1), we did observe a gradual decrease in ED visits, from 36 patients/week at the beginning of March 2020 to 15 patients/week at the end of March 2020. Since then, there has been a slight increase in ED neurological visits, with a stable number of visits until the end of April (24–29 per week). Upon first release of restrictive measures, we observed a gradual increase in ED visits, with a peak at the end of May, when the number of visits returned to that of the non-COVID period.

Based on our results, we can claim that the COVID-19 pandemic had an impact on the number of acute neurological ED consultations. Previous evidence showed that the number of general ED consultations was reduced during the first wave of the COVID-19 pandemic, and the authors suggest that the decline in ED visits can be attributed to mandatory social distancing [1]. The decline in stroke-related events in our ED was less significant (− 8.2%; $p = 0.283$) than those thus far reported from some other countries [3], which can be potentially explained both by the early start of the national media campaign "Do not stay at home with stroke" and also by the lower incidence of COVID-19 positive patients compared to other countries at that time; thus,

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Table 1 Frequencies and differences of ED visits between the non-COVID period (March–May 2019) and COVID-19 period (March–May 2020)

Characteristics	Non- COVID period		COVID-19 period		Difference		Mean ± SD (per week)		Statistical significance
	n	%	*n*	%	*n*	%	2019	2020	
Overall	727	100%	404	100%	− 323	− 44.4	55.92 ± 7.74	31.08 ± 10.20	< 0.001
Stroke	147	20%	135	33%	− 12	− 8.2	11.31 ± 4.09	10.38 ± 3.01	< 0.283
Back pain	180	25%	77	19%	− 103	− 57.2	13.85 ± 3.24	5.92 ± 3.84	< 0.001
Epilepsy	66	9%	28	7%	− 38	− 57.6	5.08 ± 1.26	2.15 ± 1.34	< 0.001
Headache	61	8%	36	9%	− 25	− 41.0	4.69 ± 2.06	2.77 ± 2.45	< 0.020
Vertigo/dizziness	66	9%	23	6%	− 43	− 65.2	5.08 ± 2.93	1.77 ± 1.42	< 0.001
Commotio cerebri	42	6%	19	5%	− 23	− 54.8	3.23 ± 1.74	1.46 ± 1.51	< 0.006
Remaining conditions	144	20%	78	19%	− 66	− 45.8	11.08 ± 4.07	6.00 ± 3.87	< 0.001
Syncope	21	3%	8	2%	− 13	− 61.9	1.62 ± 1.45	0.62 ± 0.77	< 0.069

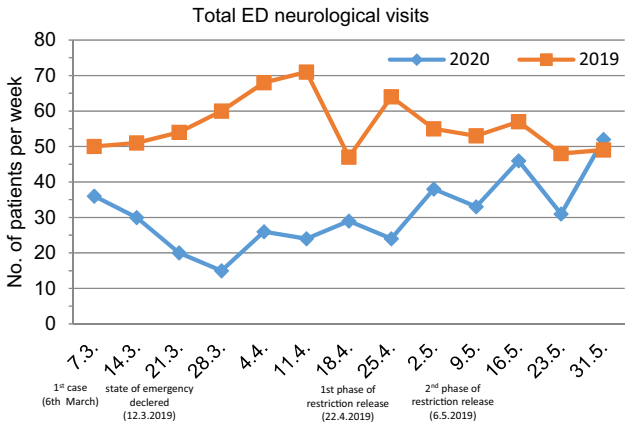

Fig. 1 Trends in the number of patients examined in the neurological ED during the COVID-19 and non-COVID periods

patients with a serious illness such as stroke were not worried about visiting the hospital. Other common neurological visits to the ED, such as vertigo and back pain, decreased significantly (65.2% and 57.2%, respectively), raising questions about the urgency of such visits in ED. Feral-Oierssenes and colleagues [4] also noted that the usual ED patients seem to have disappeared, despite the fact that hospitals have managed to maintain effective emergency pathways for non-COVID-19 patients. Nevertheless, this experience from other hospitals also confirms that some patients overuse the ED, even though they could be treated in out-patient clinics during working hours. Similar to Haki and Kaya [5], we did not observe a significant difference between age and gender for any of the disease groups; thus, the decrease in referrals seems to be more general rather than specific for a certain demographic subgroup.

Our results support the impact of the COVID-19 pandemic on neurological consultation in an ED. A significant decrease in patient visits was observed in the most common neurological diseases, except for cerebrovascular diseases. This phenomenon may have several explanations. First, in non-pandemic times EDs serve as a place for rapid examination and treatment, partly supplementing out-patient care services, mostly due to the long waiting period for appointments. Thus, ED abuse is often seen in cases that should be treated by out-patient specialists. Second, fear of COVID infection prevented patients from visiting the ED, facilitating another possible way to help, preferably through the patient's GP or online/telephone consultation with out-patient specialists. A more detailed evaluation of ED visits would be beneficial for reorganization of out-patient medical care and elimination of ED abuse by patients who do not have an acute problem.

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Declarations

Conflict of interest The authors declare no conflicts of interest in relation to this manuscript.

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