Internal and Emergency Medicine (2020) 15:1609–1611
https://doi.org/10.1007/s11739-020-02482-1

CE - LETTER TO THE EDITOR

Decline in emergency medical service missions during the COVID-19 pandemic: results from the fifth largest city in Germany

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Received: 3 August 2020 / Accepted: 20 August 2020 / Published online: 6 September 2020

Dear editor,

During the SARS-CoV-2 pandemic far-reaching measures like social distancing, self-isolation as well as the closure of universities, schools and child daycare were initiated by the federal government in Germany. This ultimately brought the public life to a halt. To secure medical resources like intensive care unit capacities and personal protective equipment the federal Ministry of Health recommended a postponement of all elective surgical procedures on March 16th. Since that date, the medical community in Germany describes an unexpected decline in patient numbers in almost every healthcare department. This seems to be a worldwide phenomenon, e.g. Rodríguez-Leor et al. report a drop by 40% in the percutaneous coronary intervention (PCI) in ST-elevation myocardial infarction (STEMI) in Spain [1].

So far, the data on Emergency Medical Service Missions (EMS-M) numbers during the COVID-19 pandemic in Europe are scarce. The Emergency Medical Service in Frankfurt on the Main covers a population of approximately 750,000 inhabitants with additional 350,000 inbound commuters per day. We performed a retrospective observational study to report the current numbers from the fifth largest city in Germany.

All EMS-M carried out in the greater area of Frankfurt on the Main and handled by the Emergency Medical Service between January 2018 and May 2020 were analyzed. To determine the factor of the lockdown-measures during the COVID-19 pandemic, two different time periods were defined: 10.02.2020 to 22.03.2020 ("before Lockdown", bLD) and 23.03.2020 to 03.05.2020 ("during Lockdown",dLD). The second period, dLD, has been the period after the initiation of far-reaching measures (e.g., social distancing) by the German federal government. Both time periods were evaluated in comparison to the previous years of 2018 and 2019. To estimate the "real" extent of the lockdown on the emergency missions, we projected the total numbers and incidences (per 100,000 inhabitants) for this time frame using a linear regression model based on the years of 2018 and 2019.

Furthermore, we performed a subgroup analysis for the five most common emergency indications, using the general German patient allocation code (PZC), which describes a certain diagnosis cluster based on field triage by the rescue service professional on scene. These five major indications have been defined as: "ACS", including acute coronary syndrome as well as the ST-elevation myocardial infarction (STEMI), "Trauma", being the combination of severely injured patients, polytraumatized patients with or without traumatic brain injury (TBI), "Stroke" and "Psychiatric Emergency". In this context, "Psychiatric Emergency" covers medical conditions like acute suicidal tendency, psychiatric admissions and psychosis.

All data was obtained from the Ministry of Health, City of Frankfurt on the Main.

The total number of rescue missions in the dLD period dropped by 23.02%. The rescue mission in the bLD era dropped by 3.1% compared to the mean of 2018 and 2019.

The documented "ACS" rescue missions showed a drop of 19.3% in the dLD era (compared to the equivalent periods of 2018 and 2019(bLD), see Fig. 1). We also registered a decline in the "Stroke"-subgroup during look-down by 24.8% (bLD 2018–2020 = 286 to dLD-2020 = 215, see Fig. 1) and of 28.6% compared to the input figures from 2018 and 2019. On the other hand, we were able to record an

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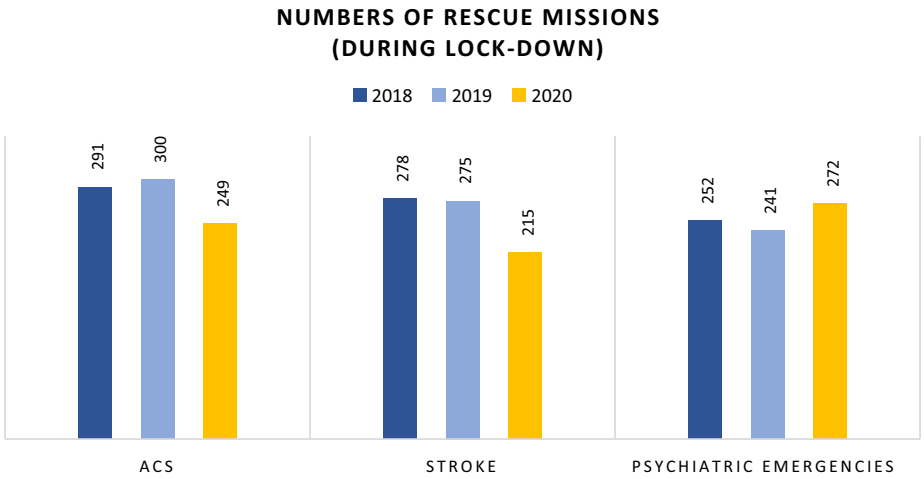

Fig. 1 Numbers of rescue missions covering three different medical conditions (ACS, Stroke and Psychiatric Emergencies) during the lock-down period

increase in the subcategory "Psychiatric Emergency" during look-down (+9.6%) in relation to the comparative periods before the look down 2018 to 2020 (dLD2020 = 272 vs 269 mean 2018–2020 without LD see Fig. 1).

We calculated a linear regression model to compare the actual numbers of EMS-M to the numbers one would expect using the date of 2018 and 2019. We were able to demonstrate a highly significant difference ($p = 0.00175$).

To exclude the impact of inbound commuters and changing population size, we calculated the incidences for each subgroup. We documented a decrease in the ACS-subgroup in the dLD era of 16.9%, of 23.3% in the Stroke-subgroup and of 20.7% in total EMS-M numbers in the dLD period, respectively (see Table 1—per 100,000 inhabitants). For an overview over the total numbers in incidences see Table 1.

We report an unexpected decline in the EMS-M numbers during the COVID-19 pandemic in Germany. This affects any medical condition to varying degrees. This trend intensifies during the dLD era after the 22nd of March 2020. The decline in the "ACS"-subgroup (per 100,000) by 16.9% in our analysis is not as high as reported by Metzler et al. [2] from Austria but unexpectedly high nevertheless.

The number of acute stroke admissions has fallen in multiple countries including Chile, Colombia, Iran, Greece, UK, Belgium and Italy [3]. Morelli et al. report a "disappearance of Ischemic stroke" in their northern Italian health department [4]. Our results are not as dramatic as reported by others, but we would not have expected a drop by more than 20% (per 100,000) during the dLD era.

Is the extent of the decrease related to the number of COVID-19 patients per region? At the time of writing we count 1265 confirmed COVID-19 cases (168.6/100,000) in the greater area of Frankfurt. These numbers seem rather small in relation to the reported figures from Italy, with up to 812.8/100,000 infections and a drop of hospital admission due to acute stroke to nearly nil [4].

If the increase in "Psychiatric Emergencies" is a result of the above named measures to control the viral spread is arguable, at least. Usher et al. report an increase in domestic violence as a result from rising psychological strain in Australia during the COVID-19 pandemic [5]. This might be an

Table 1 Total numbers of rescue mission and numbers per 100,000 inhabitants during different time periods

Year	10.02.2020 to 22.03.2020	Before lockdown		23.03.2020 to 03.05.2020	During lockdown	
	2018	2019	2020	2018	2019	2020
Rescue mission (total)	8180	8251	7959	7557	7605	6090
Per 100,000 inhabitants	1093.80	1087.69	1041.75	1010.49	1002.53	797.12
Acs	321	330	299	291	300	249
Per 100,000 inhabitants	42.92	43.50	39.13	38.91	39.54	32.591
Stroke	321	302	268	278	275	215
Per 100,000 inhabitants	42.92	39.8	35.07	37.17	36.25	28.14
Trauma	8	22	9	15	20	11
Per 100,000 inhabitants	1.06	2.09	1.17	2.0	2.63	1.43
Psychiatric emergencies	225	280	349	252	241	272
Per 100,000 inhabitants	30.08	36.91	45.68	33.69	31.77	35.60

indicator for greater psychosocial stress and could ultimately lead to the increase of "Psychiatric Emergencies".

We assume that the number of daily commuters decreased significantly during the dLD era. This should be taken into account when interpreting these numbers. A subsiding number of inbound commuters during the bLD-era must be anticipated as well.

To the authors knowledge these are the first reported EMS-M numbers from Germany relating to the COVID-19 pandemic. Like other healthcare professionals report from countries across the globe we see a decline in rescue mission numbers during the COVID-19 era. Up to now, neither the reason for this is nor its consequences are fully understood. Future research should also focus on long-term effects of a delayed treatment of serious medical conditions like ACS and stroke.

Funding No funding was received.

Compliance with ethical standards

Conflict of interest No conflict of interest.

Human and animal rights statement This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Each of the authors confirms that this manuscript has not been previously published and is not currently under consideration by any other journal. Additionally, all of the authors have approved the contents of this paper and have agreed to the *Internal and Emergency Medical* Journal's submission policies.

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