Comparison of deliberate self-harm incidents attended by Helicopter Emergency Medical Services before and during the first wave of COVID-19 in the East of England

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ABSTRACT

Introduction There is significant interest in the mental health impact of the COVID-19 pandemic. Helicopter Emergency Medical Services (HEMS) attend the most seriously unwell and injured patients in the community; their data therefore present an early opportunity to examine self-harm trends. The primary aim was to compare the incidence of deliberate self-harm incident (DSH-I) encounters by HEMS before and during the first wave of COVID-19.

Methods Data were obtained from all three East of England HEMS: total number of activations and stand-downs, number of DSH-I activations and stand-downs, self-harm mechanism and number of 'severe' DSH-I patient encounters, in two 61-day periods: 1 March to 30 April in 2019 (control) and 2020 (COVID-19). Severe DSH-I was defined as cardiac arrest and/or died prehospital. Proportions were compared with a Fisher's exact test.

Results There were a total of 1725 HEMS activations: n=981 (control) and n=744 (COVID-19), a decrease of 24.2% during COVID-19. DSH-I patient encounters increased by 65.4%: n=26 (control) and n=43 (COVID-19). The proportion of encounters that were DSH-I and severe DSH-I both significantly increased during COVID-19: p=0.002 and p=0.001, respectively. The absolute number of hangings and falls from height both approximately tripled during COVID-19, whereas the number of other mechanisms remained almost constant.

Conclusion Despite a reduction in overall HEMS patient encounters, there were significant increases in both the proportion of DSH-Is and their severity attended by HEMS during the first wave of the COVID-19 pandemic in the East of England.

Key messages

What is already known on this subject

- Previous viral pandemics have been associated with adverse effects on population mental health, but the effects of COVID-19 are unknown.
- Helicopter Emergency Medical Services (HEMS) attend the most seriously unwell and injured patients in the community.
- HEMS data present an early opportunity to estimate the incidence of self-harm and suicide during COVID-19.

What this study adds

- In this retrospective cohort study of data from three regional HEMS, we demonstrated that deliberate self-harm patient encounters increased by 65% during the first wave of COVID-19, despite a reduction in overall activity.
- The proportion of overall HEMS encounters that were deliberate self-harm incidents (DSH-I) or severe DSH-I (cardiac arrest or died prehospital) both significantly increased during the first wave of COVID-19.
- The majority of the increase in DSH-I and severity of HEMS attendances were due to violent mechanisms (hanging and falls from height).

INTRODUCTION

On 11 March 2020, the WHO declared the severe SARS-CoV-2, the virus that causes COVID-19, a worldwide pandemic. Within 8 weeks, the UK reported almost 40 000 deaths.[1] On 23 March, UK Government implemented a police-enforced lockdown to slow the spread of the disease.

In addition to physical health concerns, there is significant interest in the mental health impact of the COVID-19 pandemic.[2 3] The predicted effect of COVID-19 on mental health is multifactorial and includes: social isolation, reduced access to mental health services, anxiety about contracting the virus, bereavement and economic hardship.[4] A recent public survey identified that social isolation (which is associated with anxiety, depression, self-harm and suicide) is expected to be a significant adverse factor.[4] However, the mental health consequences of COVID-19 are unknown; research is therefore urgently needed.[3 4]

Helicopter Emergency Medical Services (HEMS) in the UK attend the most seriously ill and injured patients in the community.[5] Therefore, HEMS data present an early opportunity to examine trends in self-harm and suicide. The primary aim was to compare the incidence of deliberate self-harm

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incident (DSH-I) encounters by HEMS before and during the first wave of the COVID-19 pandemic.

METHODS

Emergency medical service

East of England is a geographic area of 20 000 km^2, containing a population of 6.4 million (June 2016). The statutory emergency medical service (EMS; East of England Ambulance Service NHS Trust) deploys physician-paramedic teams to patients with any pathology (including cardiac arrest, medical emergency or trauma) who require an enhanced level of care above the standard ambulance service response.[6] Within the region there are three HEMS: East Anglian Air Ambulance, Magpas Air Ambulance and Essex & Herts Air Ambulance. These organisations have a total of five bases, from which helicopter or car-based teams are dispatched.[7] There were no changes to tasking criteria during COVID-19.

Data retrieval

Each organisation interrogated their electronic medical record (HEMSbase2, Medic One Systems Ltd, UK) to identify: total number of activations and stand-downs, number of DSH-I activations and stand-downs, self-harm mechanism and number of 'severe' DSH-I patient encounters in two 61-day periods: 1 March to 30 April in 2019 (control) and 2020 (COVID-19).

Stand-down was defined as 'HEMS not required, either en route or after arrival, before patient contact'; encounters = (activations – stand-downs). Self-harm was defined as 'any act of self-poisoning or self-injury'; 'severe'=cardiac arrest and/or died prehospital. The dispatching clinician initially coded cases as 'intentional self-harm' in HEMSbase2 after interrogation of 999-call information and communication with EMS providers at the scene; this data field was updated if required by HEMS teams after treating the patient (for encounters).

Data analysis

Data were analysed in Prism for macOS (V.9.0.0, GraphPad Software, San Diego, California, USA). Proportions were compared with a Fisher's exact test and reported as a p value, and a Baptista-Pike calculated OR with a 95% confidence interval (95% CI). Age (mean±SD) was compared with an unpaired two-tailed t-test and reported as a p value.

RESULTS

Overall activity

There were a total of 1725 HEMS activations: n=981 (control) and n=744 (COVID-19), which is a decrease of 24.2%. The overall stand-down rate was comparable between years, 40.7% (control) and 39.4% (COVID-19), OR 1.1 (95% CI 0.9 to 1.3), p=0.62; resulting in n=582 HEMS encounters (control) and n=451 (COVID-19), which is a decrease of 22.5%.

DSH-I activity

During COVID-19, there was an 11.0% increase in the number of DSH-I activations, n=73 (control) and n=81 (COVID-19) and a significantly lower DSH-I stand-down rate: 64.4% (control) compared with 46.9% (COVID-19), OR 0.5 (95% CI 0.3 to 0.9), p=0.04 (figure 1).

Primary outcome

There was a 65.4% increase in DSH-I patient encounters: n=26 (control), n=43 (COVID-19) (figure 1). There were no significant differences between the mean age and the proportion of male patients between the periods examined (table 1).

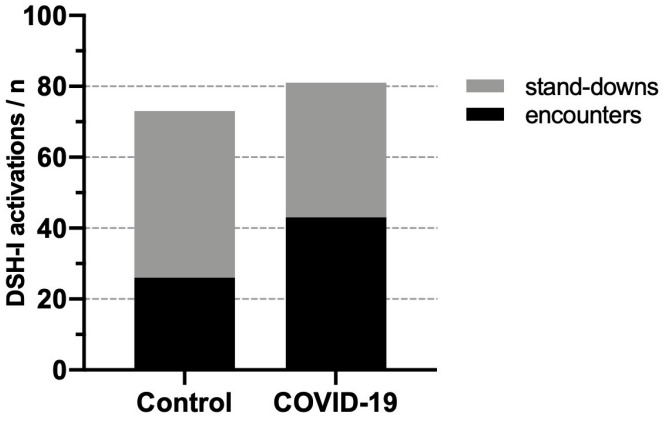

Figure 1 The number of HEMS deliberate self-harm incident (DSH-I) activations, stand-downs and patient encounters during two 61-day periods (March–April): 2019 (control) and 2020 (COVID-19) in the East of England. Stand-downs+encounters (bar totals)=total number of HEMS activations for DSH-I. Activation: dispatched by the ambulance; encounter: patient contact. HEMS, Helicopter Emergency Medical Service.

DSH-I as a proportion of overall activity

DSH-I accounted for 26/582 (4.5%) of overall encounters during the control period and 43/451 (9.5%) of overall encounters during COVID-19, OR 2.3 (95% CI 1.4 to 3.7), p=0.002.

DSH-I mechanism and severity

The absolute number of hangings and falls from height both increased during COVID-19, whereas the number of other mechanisms remained almost constant between the control and COVID-19 periods (table 1, figure 2).

The number of DSH-I patient encounters by HEMS that were 'severe' increased from n=5 (control) to n=18 (COVID-19) (table 1). The increase in severity was predominantly observed to be in the hanging and fall from height mechanism categories (figure 2). The proportion of overall encounters that were 'severe' DSH-I were 5/582 (0.9%) in the control period and 18/451 (4.0%) during COVID-19: OR 4.8 (95% CI 1.9 to 11.9), p=0.001.

DISCUSSION

This retrospective cohort study of data from three HEMS has demonstrated that deliberate self-harm patient encounters increased by 65% during the first wave of COVID-19. The proportion of HEMS patient encounters that were self-harm more than doubled, and the proportion that had a cardiac arrest or died prehospital (as a marker of severity) quadrupled between the control and COVID-19 periods.

An increase in suicide was reported in the elderly in Hong Kong during the 2003 SARS epidemic.[8] However, there are very few data on self-harm and suicide during both COVID-19 and previous viral pandemics. There was a reduction in self-presentation and referral to mental health services in England during the first months of lockdown,[9] but this is likely to be due in part to reduced healthcare access. Indeed, a UK study of nearly 45 000 adults found that 18% experienced thoughts of suicide or self-harm and 5% harmed themselves during the first month of lockdown.[10]

Table 1 Demographics and self-harm mechanism of patients attended by HEMS during two 61-day periods: 1 March to 30 April 2019 (control) and 2020 (COVID-19)

DSH-I patient encounters	Control	COVID-19	OR (95% CI)	P value
Patient encounters (n)	26	43	–	–
Male sex (n (%))	16 (61.5)	29 (65.9)	–	0.80
Age/years (mean (±SD))	40.0 (±21.2)	42.4 (±17.9)	–	0.62
Hanging (n (%))	6 (23.1)	17 (39.5)	2.2 (0.7 to 6.9)	0.19
Fall >2 m (n (%))	3 (11.5)	10 (23.3)	2.1 (0.6 to 7.9)	0.34
Wound (n (%))	8 (30.8)	8 (18.6)	0.5 (0.2 to 1.5)	0.26
Overdose (n (%))	7 (26.9)	6 (14.0)	0.4 (0.1 to 1.5)	0.21
Other (n (%))	2 (7.7)	2 (4.7)	0.6 (0.1 to 4.0)	0.63
Severe DSH-I				
Patient encounters (n)	5	18	–	–
Hanging (n (% of hanging))*	2 (33.3)	11 (64.7)	3.7 (0.6 to 22.3)	0.34
Fall >2 m (n (% of fall >2 m))	0	3 (30.0)	∞ (0.2 to ∞)	0.53
Wound (n (% of wound))	1 (12.5)	2 (25.0)	2.3 (0.2 to 38.0)	1.00
Overdose (n (% of overdose))	1 (14.3)	2 (33.3)	3.0 (0.3 to 49.7)	0.56
Other (n (% of other))	1 (50.0)	0	0.0 (0.0 to 9.0)	1.00
Total (n (% of DSH-I))	5 (19.2)	18 (41.9)	3.0 (0.9 to 8.4)	0.07

Other: mechanisms that if listed may affect patient anonymity.
*The percentages reported in this section are the proportion of all DSH-I patient encounters for each mechanism that were classified as 'severe'; for example, in the control period, two out of six (33.3%) hangings were 'severe'.
DSH-I, deliberate self-harm incident.

Despite the concerns of an increase in suicide during lockdown, this has not been reflected to date in real-time national suicide surveillance statistics[11]. However, these national figures should be interpreted with caution as they are early data and could hide differences in area or population group. Therefore, our data, which appear to show an increase in the incidence of self-harm and its severity during COVID-19, are perplexing. It is possible that national data does not well represent our region, and also possible that HEMS were dispatched differently. Although the dispatch criteria were not consciously changed in COVID-19, we know that the overall number of activations reduced by a quarter, and it is possible that HEMS were available to attend incidents that they would not regularly be dispatched to.

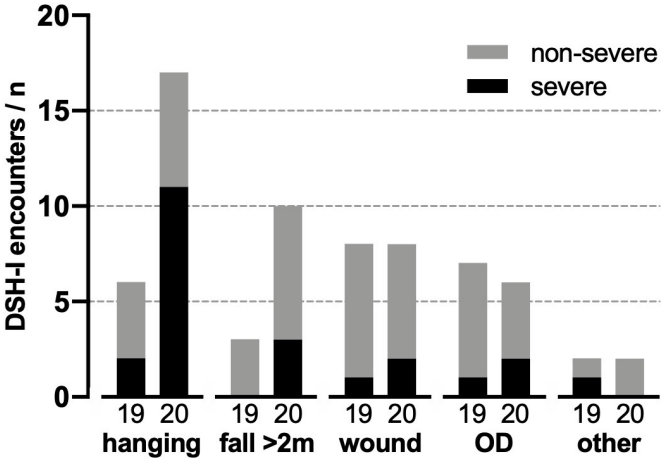

Figure 2 The number of HEMS deliberate self-harm incident (DSH-I) patient encounters by mechanism and severity during two 61-day periods (March–April) in 2019 and 2020 in the East of England. Severe +non-severe (bar totals)=total number of patient encounters for that mechanism. 19: 2019; 20: 2020; other: mechanisms that if listed may affect patient anonymity; severe: patient encounters that included a cardiac arrest and/or died prehospital; total: all patient encounters. HEMS, Helicopter Emergency Medical Service; OD, overdose.

However, we can be certain that HEMS providers' exposure to DSH-I in the East of England has increased during COVID-19. Prehospital clinicians are already known to have a higher prevalence of anxiety, depression and post-traumatic stress disorder than the general population,[12] and it is possible that COVID-19, and an increase in DSH-I encounters may worsen this situation.[13] Indeed, a high incidence of mental illness has already been reported in frontline healthcare workers during the pandemic.[14] Prehospital organisations should be cognisant of these risks to ensure the psychological well-being of their workforce.

Limitations

This is not a total epidemiological study, and therefore, these data from HEMS should not be assumed to be an accurate estimate of population incidence of self-harm. Furthermore, the findings may not be generalisable to other regions. The statistical tests employed in this study assume that samples are independent (ie, that the same patient does not appear in both cohorts). Owing to data governance and the constraints of prehospital patient identification, this assumption cannot be tested or corrected for. In the unlikely scenario that the same patient appears in both cohorts, it is possible that that patient's chosen method of DSH may be over-represented in the second cohort. However, lack of complete independence of samples would have no effect on the number or proportion of HEMS DSH-I encounters (they still had the encounter).

CONCLUSION

Despite a reduction in overall HEMS patient encounters, there were significant increases in both the proportion of deliberate self-harm incidents and their severity attended by HEMS during the first wave of the COVID-19 pandemic in the East of England.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This service evaluation used anonymised data captured during routine patient care. Therefore, specific ethical review was not required. Each contributing organisation had institutional approval for the study, and the project was registered with the EAAA Department of Research, Audit, Innovation and Development (EAAA 2020/001).

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