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Penetrating trauma during a global pandemic: Changing patterns in interpersonal violence, self-harm and domestic violence in the Covid-19 outbreak

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ABSTRACT

Introduction: The restrictions imposed on social activity in response to the Covid-19 pandemic have had a profound impact globally. In the UK, the NHS was placed on a war-footing, with elective surgery, face-to-face outpatient clinics, and community care facilities all scaled back as a temporary measure to redistribute scarce resources. There has been concern during this period over increasing levels of violence in the domestic setting, as well as self-harm.

Methods: Data was collected on all patients presenting with traumatic penetrating injuries during the 'lockdown' period of 23rd March to 29th April 2020. Demographics and injury details were compared with the same period in the two preceding years.

Results: Overall trauma fell by 35% compared with the previous year. Over one in four penetrating injuries seen were a result of self-harm, which was significantly higher than in previous years (11% in 2019, 2% in 2018). There were two cases of injuries due to domestic violence, while a total of 4 cases of injury arose in separate violent domestic incidents. Self-harm commonly involved penetrating injury to the neck.

Discussion: Our centre has seen an increase in the proportion of penetrating injuries as a result of both self-harm and violence in the domestic setting. The number of penetrating neck injury cases, which can represent suicidal intent or a major presentation of psychiatric illness, is of particular concern. We must further investigate the effect of social restrictions on violent injury, and how home confinement may influence a changing demographic picture of victims.

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Introduction

On Monday the 23rd March 2020, the UK government imposed temporary restrictions on individuals' movements and activities in response to the Covid-19 pandemic, which was spreading rapidly. Individuals were instructed to work from home where possible, avoid all social interactions outside the household, and only to leave the place of residence for

essential trips to buy food, visit a doctor or for 1 h of exercise a day.

Within trauma care, a fall in the number of cases had been anticipated for some time before the restrictions were imposed. Confinement at home was perceived to be safer from a traumatic injury perspective for many individuals, who may otherwise be injured in road accidents or interpersonal violence. Penetrating trauma is most commonly a result of person-to-person violence outside of the home.¹ Self-harm is

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another important aetiology in penetrating injury. The social restrictions imposed in response to Covid-19 have resulted in greater isolation of all individuals, however the impact on those with pre-existing mental health conditions may have been greater. The effects of restrictive measures on the provision of community mental health care have been well documented in the media and literature, with already vulnerable people less able to access vital services and more at risk of Covid-19 and other illness.^{2,3}

Domestic violence is defined as any incident or pattern of incidents of controlling, coercive or threatening behaviour, violence or abuse between those aged 16 or over who are or have been intimate partners or family members regardless of gender or sexuality.⁴ Violence perpetrated in the home can have a particularly catastrophic impact, where children and vulnerable adults may be directly or indirectly involved. Such violence and abuse may be hidden from society during normal times. Prolonged social isolation now means that physical injuries may be even less visible than before, offering victims fewer options for seeking help at what may be an extremely dangerous time. Incidents involving self-inflicted penetrating injury arising from violence in the domestic setting and between household members, while not necessary meeting the definition for domestic violence, nonetheless require analysis in order to fully appreciate the effect of domestic confinement on violent behaviour and injury.

Material and methods

Data was collected prospectively and reviewed retrospectively on trauma attendances to King's College Hospital in South London between Monday 23rd March and Monday 29th April 2020, representing the first 5 weeks of the Covid-19 'lockdown'. All trauma patients identified as having a penetrating injury were included. Data collected included: demographic information, injury aetiology and body part involvement. Similar data was reviewed over the same 5-week periods in both 2019 and 2018 for comparison.

Results

Penetrating trauma figures and demographic information for patients presenting during the period 23rd March to 29th April 2020 can be found in Table 1. Overall trauma numbers for the 5 weeks of 'lockdown' had significantly fallen compared with previous years. In the 2020 group there were 30 cases of penetrating trauma, compared with 46 cases over the same period in 2019, representing a fall of 35%.

The breakdown of patients based on aetiology across the three periods can be seen in Table 2. The main aetiological

groups were interpersonal violence (IPV) and self-harm. Both domestic violence, as well as all injuries arising in a domestic setting regardless of aetiology, were analysed (Table 3). Two of the instances of self-harm occurred in the context of a violent domestic incident between family members. Accidental injury was also analysed; one case involved major limb trauma due to a circular saw accident during DIY in the home.

Interpersonal violence (IPV) as a proportion of total penetrating trauma was down compared with previous years, though it remained the commonest aetiology overall. Figure 1 shows IPV as a proportion of all penetrating injuries over the three years. There were 46 IPV-related penetrating trauma cases in 2018 (96% of total), and 41 in 2019 (89% of total). We compared those figures with the same time period in 2020 and there were just 19 cases. Furthermore, IPV represented an even smaller proportion (63%) of all cases compared with previous years.

Figure 2 shows that the proportion of cases arising from self-harm during the 2020 'lockdown' rose to over a quarter of the total (27%), compared to 11% in 2019, and just 2% in 2018. While this increase is in itself deserving of closer analysis, the demographic picture must also be examined. Of the patients from the 2020 group, all except one were males and the mean age was 38.5 years, with a range from 14 to 72 years. Injury mechanism included a shotgun, broken glass, a razor blade and a kitchen knife.

In the 2020 group of patients, the actual number of cases and the proportion of injuries resulting from domestic violence rose (see Tables 2 and 3). Of the two domestic violence incidents, one involved a male who stabbed a female partner in the chest, while the other involved a young male using a screwdriver against a family member. There were also two cases of self-harm in the context of a violent domestic incident, each involving a male in an argument with a partner. These two injuries occurred as a result of violence in the domestic setting, without being included in the domestic violence figures.

Table 4 shows injuries involving the head and neck; given the relatively short 5-week period being analysed, overall numbers were low. Of the 7 patients identified, 4 of these (57%) sustained injuries as a result of self-harm, representing a rise on the previous years (20% and 0% for 2019 and 2018). All self-harm incidents to the head and neck region involved a penetrating neck injury, representing specific and complex challenges in management.

Discussion

The significant fall in overall penetrating trauma of 35% during the period of lockdown is unsurprising, given that most

Table 1 – Overall trauma figures for 23rd March to 29th April.

	2018	2019	2020
n.	48	46	30
Of which female	3	1	3
Mean age in years	29.8	32.2	30.6

Table 2 – Injuries based on aetiology for each year.

	2018	2019	2020
n.	48	46	30
IPV (% of total)	46 (96%)	41 (89%)	19 (63%)
Self-harm (% of total)	1 (2%)	5 (11%)	8 (27%)
Accidental (DIY)	0	0	1
Domestic violence	1	0	2

Table 3 – All injuries occurring in the domestic setting for each year.

	2018	2019	2020
n.	48	46	30
All violence occurring in the domestic setting	1	0	4 (13%)
-Of which domestic violence	1	0	2
-Of which self-inflicted	0	0	2

penetrating trauma is a result of interpersonal street violence.¹ With fewer people on the streets, and a closure of pubs, clubs and bars, the factors commonly associated with person-to-person violence had been significantly altered. Understanding the factors involved in the aetiologies of violent penetrating injury enables clinicians to approach service provision, resource allocation and emergency management more comprehensively.⁵ In turn this will allow better care of our patients. In the context of a global pandemic which has caused significant strain across all aspects of our public services, not least within the NHS itself, the importance of understanding the challenge faced, as well as adopting an effective strategy, is even more apparent.⁶

Finding: Interpersonal violence (IPV) as a proportion of total penetrating trauma was down, though it remained the commonest aetiology overall.

Government-imposed restrictions during March and April 2020 have had a significant impact on the volume of interpersonal violence-related injury seen. Person-to-person violence resulting in penetrating injury usually involves a sharp instrument, or less commonly a firearm.^{1,7} Household confinement, a greater police presence on the streets, and a ban on large gatherings may have all contributed to a reduction in interpersonal violence injuries at our centre. Importantly, the overall proportion of IPV-related injuries has reduced, suggesting that this is not just a case of overall

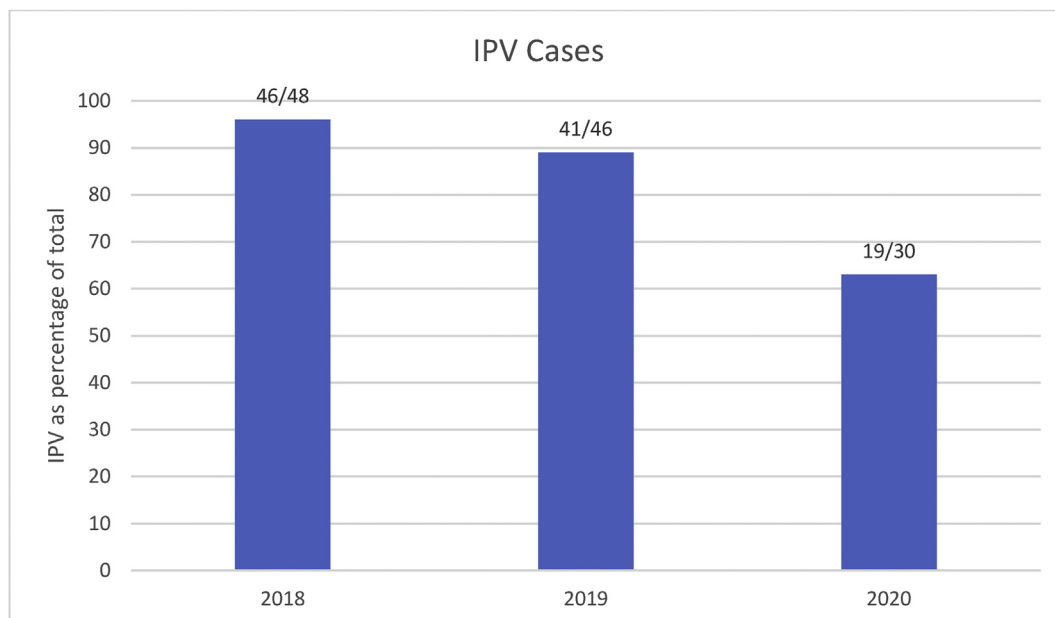
volume reduction, but instead a true change in the driving factors for different injury aetiologies. With fewer injuries arising in the street, we must analyse if sudden societal changes have pushed violence behind closed doors. We must also analyse how the victims of violent injury may have changed.

In our 2019 study of penetrating trauma patients, there were 478 cases seen at our centre over a single year.¹ Of these, 83% had injuries resulting from interpersonal violence, and this patient group was overwhelmingly represented by males (88%) under the age of 30 (69%). The demographic profile of the patients presenting with injuries secondary to self-harm (DSH) was distinct, with a slight female predominance, while victims of terror-related violence were split evenly between males and females, and on average significantly older. There is evidence that there may be demographic characteristics within different cohorts of penetrating injury patients based on aetiology.^{1,8–10} This is important for our current findings, in that the proportional reduction in the number of cases attributable to IPV must be analysed to see how this translates into changes within the DSH group, for example.

Finding: Over one in four of all penetrating trauma injuries during the government 'lockdown' was a result of self-harm.

Self-harm can be defined as happening when an individual hurts or harms themselves.¹¹ It may involve cutting or inserting something into the body, and may occur calmly and deliberately, or in a state of heightened emotion and distress. There are numerous ways in which the Covid-19 pandemic and resulting 'lockdown' may adversely impact an individual's mental health and increase self-harming behaviour.

There is a well-established association between loneliness and social isolation and the development of mental health disorders, including an increase in self-harm and suicide.¹² Individuals with mental health disorders are more likely to be socially isolated; however, the introduction of the social distancing order may further isolate these already

**Figure 1 – Interpersonal violence numbers and as a percentage of total penetrating trauma.**

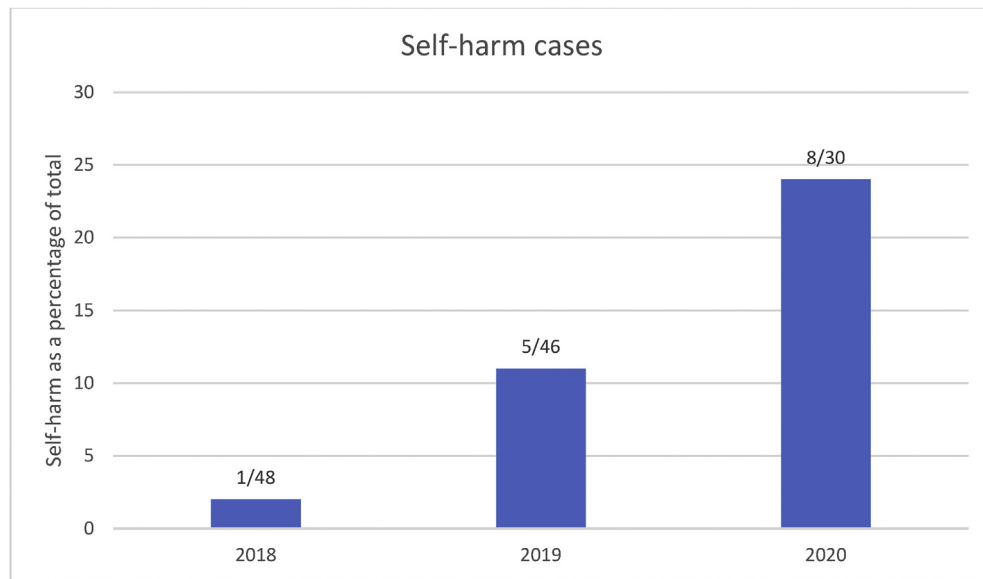


Figure 2 – Self-harm numbers and as a percentage of total penetrating trauma.

marginalised individuals and reduce their access to vital support systems. As psychiatric services have had to rapidly reconfigure there has also been a change in how services are delivered including reduced face to face consultations, a reduction of inpatient psychiatric beds and reduced access to psychological therapy. It is also important to consider that patient's may be reluctant to seek emergency mental health care through traditional means or seek admission (e.g. via accident and emergency) due to fear of contracting Covid-19, leading to delayed presentations and heightened levels of distress in the community.³

In addition, the pandemic has resulted in an increase in other psychosocial stressors associated with self-harm and suicide such as financial stress, domestic violence, unemployment, and alcohol consumption. The more generalised feelings of uncertainty and fear associated with the pandemic may also lead to an increase in mental health disorders, mental distress and resulting self-harm.

During 'lockdown', penetrating injury arising from self-harm accounted for more than one in every four cases; this astonishing statistic is in contrast to just one in fifty on 2018, and one in 10 in 2019. Strikingly, all but one case in the current study were male, with a mean age of 38.5 years. In our 2019 study looking specifically at head and neck penetrating injury over an entire year, the mean age of patients presenting following self-harm was 30.9 years, with over half of patients (57%) female. When we separately analyse head and neck cases in our current study, the findings are in even greater contrast to previous figures, with self-harm

accounting for 57% of all attendances, and an average age of 49 years.

The results suggest a shift towards older males accounting for more cases of self-harm involving all body areas. This shift is particularly pronounced with injuries where the head and neck were involved; all patients in this group had self-inflicted penetrating neck injuries, suggesting suicidal intent. The impact of restrictive measures was seen explicitly in some cases, including that of an elderly man who was a full-time carer for his wife, and who felt isolated and unable to cope without the frequent visits from family.

Finding: The proportion of injuries resulting from both domestic violence, and from all forms of violence in a domestic setting, rose during the 'lockdown' period.

Addressing injuries linked to domestic violence is important in that the social restrictions arising from the pandemic have left all of us spending more time in home confinement, more isolated from those around us. While this current study looks only at physical penetrating injuries, it should be noted that many physical injuries resulting from domestic abuse may involve blunt trauma.¹³ Indeed, our department has noted an increase in all forms of physical injuries arising from domestic abuse, and it must also be remembered that physical aggression and injury is just one of many forms of domestic abuse, including but not limited to emotional abuse, sexual abuse and coercive control.⁴ Awareness and recognition of potential domestic violence in maxillofacial injuries is particularly important, given that facial injuries are reported in up to 94% of cases of domestic violence.¹³ The charity Refuge has reported a 50% rise in calls to its helpline, compared with the average before the pandemic, while its website has experienced surges of traffic of up to 700% over this period of restrictions.¹⁴

During the 5-week period analysed, the most serious case of domestic violence involved a male perpetrator against a female partner, with multiple stab wounds to the chest. Another case involved violence between two male members

Table 4 – Head & neck trauma figures.

	2018	2019	2020
n.	7	5	7
IPV	7	4	3
Self-harm	0	1	4

of the same family, with one sustaining a sharp instrument injury. Evaluation of all injuries occurring within the domestic setting, resulting in both harm to another, or self-harm, was deemed important in order to assess the impact of home confinement on all forms of violence. This approach is in recognition of the complex nature of violence perpetrated in the home and between members of a family or household. On this basis, in addition to the two cases of domestic violence there were a further two cases of injury arising from violence in a domestic setting. These separate incidents involved arguments between co-habiting partners, resulting in self-inflicted penetrating trauma in both cases. Thirteen percent of all penetrating trauma during 'lockdown' arose from all forms of violence in the domestic setting, including domestic violence, representing an increase compared with the same time period in the two previous years.

Finding: Of the 7 patients with penetrating injury to the head and neck region, 4 of these (57%) sustained injuries as a result of self-harm. All self-harm to the head and neck region involved a penetrating neck injury.

Our findings show that patients presenting with injuries due to self-harm were more likely to have involved the head and neck region. Indeed, half of all self-harm injuries involved a penetrating neck injury, which is a method associated with suicidal intent. Penetrating neck injuries can have rapidly catastrophic outcomes, and management is multidisciplinary involving emergency physicians, radiologists and maxillofacial, ENT and vascular surgeons.¹⁵ The increase in the frequency of this injury pattern during the lockdown is particularly worrying. Psychiatrists recognise major self-mutilation (MSM) as a rare but catastrophic complication of severe mental illness, and self-inflicted injuries to the head and neck are recognised as a possible first presentation of psychosis.¹⁶ Further research is needed into the effect of social restrictions on those with hitherto undiagnosed mental health conditions, as well as on those with an existing mental health diagnosis.

Conclusions

Traumatic penetrating injury has many aetiologies, with interpersonal violence and self-harm being the two most commonly seen at our centre. Violence disproportionately affects those who are more disadvantaged, and government measures to reduce knife crime, particularly in the capital, are well publicised. Over the period of lockdown, we have seen a clear shift towards injuries which are self-inflicted. In view of the indefinite period of restrictions that may lie ahead as a result of the ongoing pandemic, identifying who is most at

risk, and implementing measures to help those groups or individuals, is of the utmost urgency.

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