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RESEARCH ARTICLE

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The changing pattern of acute spinal referrals during primary and secondary waves of the COVID-19 pandemic

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Abstract

Introduction: The COVID-19 pandemic has had a devastating effect on health systems globally. This led to changes in patient access to healthcare particularly spinal services. This study investigates the impact of the pandemic on the volume of patients being referred to and accessing spinal services during both the first and second waves.

Methods: All emergency spinal referrals and related hospital attendances to the emergency department in a busy district general hospital were analysed. The data were evaluated at three time points each covering a 3-month period. Data collected included patient demographics, duration and nature of symptoms, reason for referral, clinical and MRI findings, length of stay in hospital, any interventions performed and the follow-up plan.

Results: There were a total of 316 emergency referrals across the three time periods. The number of referrals fell by 15% between the pre-COVID-19 period and the first wave. Comparing the first and second waves, the number of referrals was increased by 58%. Comparing the second wave to the pre-COVID-19 period, referrals were 34% greater in the second wave ($p < 0.005$).

Conclusion: We highlight an increase in referrals to our spinal service during the secondary wave, having fallen during the first wave. We hypothesise that the increase in referrals, despite similar restrictions to the first wave, is a result of changing patterns of behaviour due to the fear of contracting COVID during the first wave and difficulty in accessing primary care services in the second wave.

KEYWORDS
COVID-19, spinal services, spinal surgery, spinal trauma

1 | INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has had a devastating effect on health services globally, with the United Kingdom (UK) being one of the worst affected countries in the world (World Health Organization, 2021). The World Health Organization declared the outbreak of SARS-CoV-2 virus (and the resulting disease, COVID-19) a global pandemic on 11 March 2020 (World Health Organization, 2020). Subsequently, on 16 March 2020, the UK government implemented a series of restrictions including social distancing measures to reduce the potential spread of the virus and a national lockdown followed on 23 March 2020 in order to reduce the pressure of resources within the National Health Service (NHS) (Prime Minister's Office, 2020).

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Despite these measures, the NHS found itself under extreme pressures resulting in the recommendation that all elective surgery cease for a period of at least 3 months to expand critical care capacity (Stevens & Pritchard, 2020). Understandably, this led to a drop in both trauma and elective orthopaedic capacity. In addition, patient attendance to emergency departments (EDs) and indeed admissions and referrals in trauma and orthopaedics dropped significantly (Elhalawany et al., 2020; Scott et al., 2020). The cause of this is multifactorial but includes the changes in social behaviour and population mobility as well as reluctance to attend hospital for fear of contracting COVID-19 (Ahuja et al., 2021; Elhalawany et al., 2020; Scott et al., 2020).

Spinal services, both referrals and emergency presentations, were particularly affected by the changes brought about during the first wave of COVID-19 (Ahuja et al., 2021; Zahra et al., 2020). It is known that delays in presentation and hence treatment of spinal conditions can have an impact on functional recovery (Weinstein et al., 2010). With this in mind and the potential for further waves of COVID-19, the British Association of Spine Surgeons released guidance on 14 May 2020 to help maximise access to spinal services and prioritise the existing waiting list for spinal operations both during and after the pandemic (British Association of Spine Surgeons, 2020).

While hospital attendance and emergency burden fell during the first wave, little has been reported about these patterns during subsequent waves. Given the need to treat spinal conditions promptly to ensure the best functional outcome, this study aims to assess whether the patterns demonstrated in the first wave carried through to the second in a UK district general hospital (DGH). We hypothesised that the reduction and delays to presentation demonstrated in the first wave would result in increased presentations subsequently because of deteriorations in patient's conditions.

2 | METHODS

This was a single-centre prospective control study with retrospective control group. Approval was obtained from our institutional quality governance team. All emergency spinal referrals and hospital attendances to the ED in a busy DGH were analysed. Patients' data were retrieved from hospital electronic patient record system, and images were reviewed using a picture archiving and communication system.

The data were evaluated for three time points each covering a 3-month period:

1. Before COVID-19 from December 2019 to February 2020.
2. The primary COVID-19 wave from April to June 2020.
3. The second COVID-19 wave from December 2020 to February 2021.

Data collected included patient demographics, duration and nature of symptoms, reason for referral, clinical and MRI findings, length of stay in hospital, any interventions performed and the follow-up plan. The data were then analysed for changes in the pattern over the three time periods and then compared with historical data from similar episodes in 2018–2019. Data were analysed using SPSS v.22 (IBM) software. To examine the difference between different time periods, an analysis of variance test was performed for continuous data. Post hoc analysis with Bonferroni correction was applied to express the statistical significance between different subgroups. With 95% confidence interval, the difference was taken as significant when the value of p is <0.05.

3 | RESULTS

Over the period of the study, there were 316 emergency referrals in total across the three time periods. There were 136 males and 180 females, with an average age of 50.3 years (22–87 years). The average wait in accident and emergency was 3.2 h (1–4 h), and the majority of referrals were general practitioner referrals. For patients requiring a scan, the average time from presentation to scan was 3.7 h (1.5–5 h) (Table 1).

The number of referrals when comparing the pre-COVID-19 period and the first wave was decreased by 15% (Figures 1 and 2). Comparing the first and second waves, the number of referrals was increased by 58%. Comparing the second wave to the pre-COVID-19 period, referrals were 34% greater in the second wave ($p < 0.005$).

Fifty-eight patients had intervention over the study period of which 46.6% had surgery and the remainder had an injection. Seven patients (2.2%) were transferred to our tertiary referral service. Of the 257 patients, who were discharged without intervention, 7.5% re-presented with similar problem within 3 months.

When elective clinics restarted, 19% (61 patients) were seen in a clinic with an average waiting time of 2.4 weeks (2–6 weeks).

Of the patients who underwent surgical treatment, two patients developed minor wound complications, which were managed locally.

4 | DISCUSSION

This study demonstrates an increase in referrals to the spinal service of a UK DGH during the second wave of the COVID-19 pandemic. Despite similar restrictions to the first wave being in place during the second, similar decreases in referrals and presentations were not seen. During the first wave, there were 84 referrals; during the second wave, 133 referrals were seen, an increase of 58.3%. While there are studies which show similar decreases in referrals during the first wave (Ahuja et al., 2021; ElGhamry et al., 2021; Riley & Verma, 2021; Zahra et al., 2020), to our knowledge, no studies explore the subsequent challenges of spinal services during the second wave.

The number of operations performed at our centre varied between time periods. Comparing pre-COVID-19 with the first wave, there were more interventions overall (17 vs. 19). Similarly, the second wave compared to the pre-COVID period showed an increase in interventions with 22 being performed. This compares to the

TABLE 1 Patient demographics and management

	Pre-COVID	Early-COVID	Late COVID
Number of patients	99	83	133
Male:Female	47:52	31:53	58:75
Average age	52	48	51
Average time to scan (range)	3.9	2.5	4.9
Average waiting time in ED	3.2	2.1	4.5
Transfer to higher centre (%)	1 (1)	1 (1.2)	5 (3.7)
Emergency surgery at centre (%)	2 (2)	4 (4.8)	2 (1.5)
Total emergency surgery (%)	3 (3)	5 (6)	7 (5.2)
Semi-elective surgery (%)	4 (4)	3 (3.5)	5 (3.7)
Injections (%)	10 (10)	11 (13.3)	10 (7.5)
Weeks to clinic follow-up for above patients	2.2	2	3.1
Discharged	82	64	111

Abbreviation: ED, emergency department.

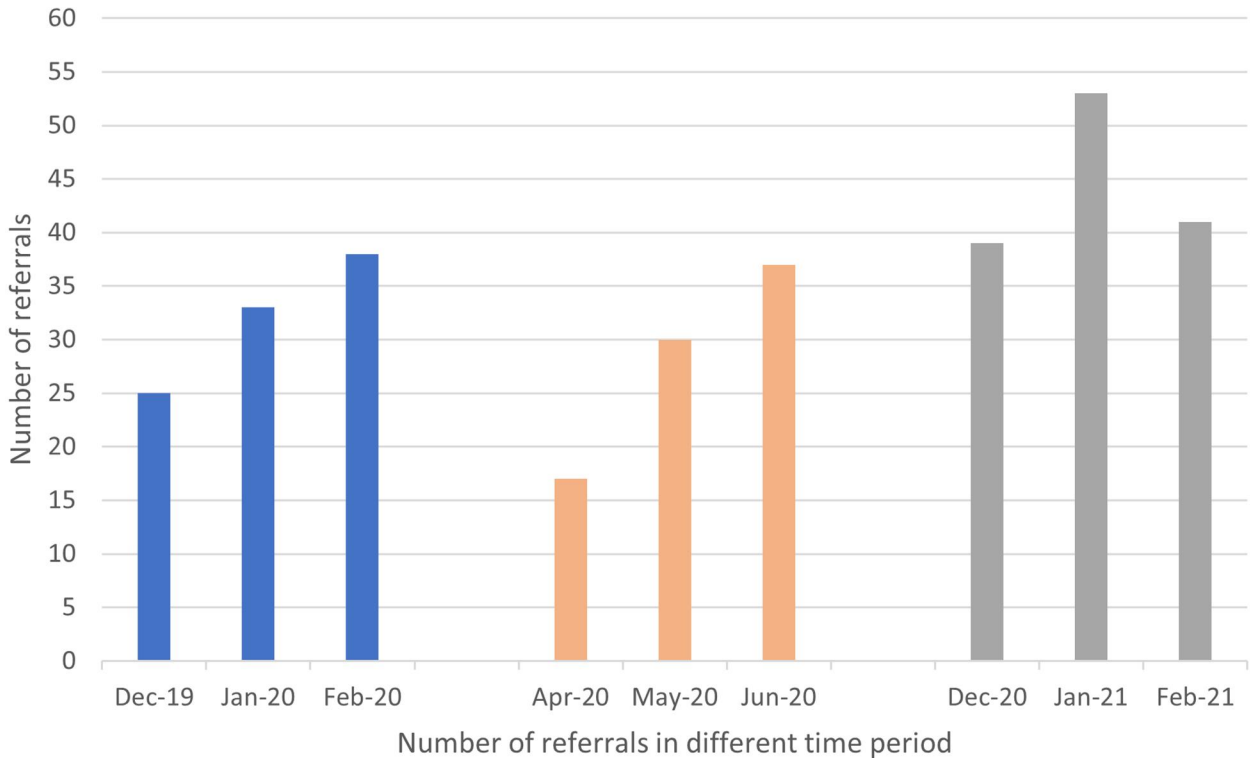

FIGURE 1 Trends in referrals to the spinal service over time

literature in which Jayakumar et al. found that the volume of operations for acute cauda equina syndrome did not decline significantly between the pre-COVID-19 period and during the first wave (Jayakumar et al., 2020). Conversely, Ahuja et al. found that the number of emergency procedures performed during the first wave declined significantly (Ahuja et al., 2021).

Within our DGH, the spinal clinic service suffered little disruption. The wait time and volume of appointments remained consistent between time periods. The biggest change to our service clinic wise was the use of telemedicine while face-to-face interactions were being limited. This is consistent with the literature where telemedicine was the primary review modality in the elective setting (Melian et al., 2021; Ryu et al., 2021).

This study found no significant difference in complications rate. The literature has shown that the rate of complications and the 30-day mortality did not change significantly between the pre-COVID-19 period and the first wave (Bajunaid et al., 2020). In this study, all emergency surgeries were all done within 24–36 h. Some studies

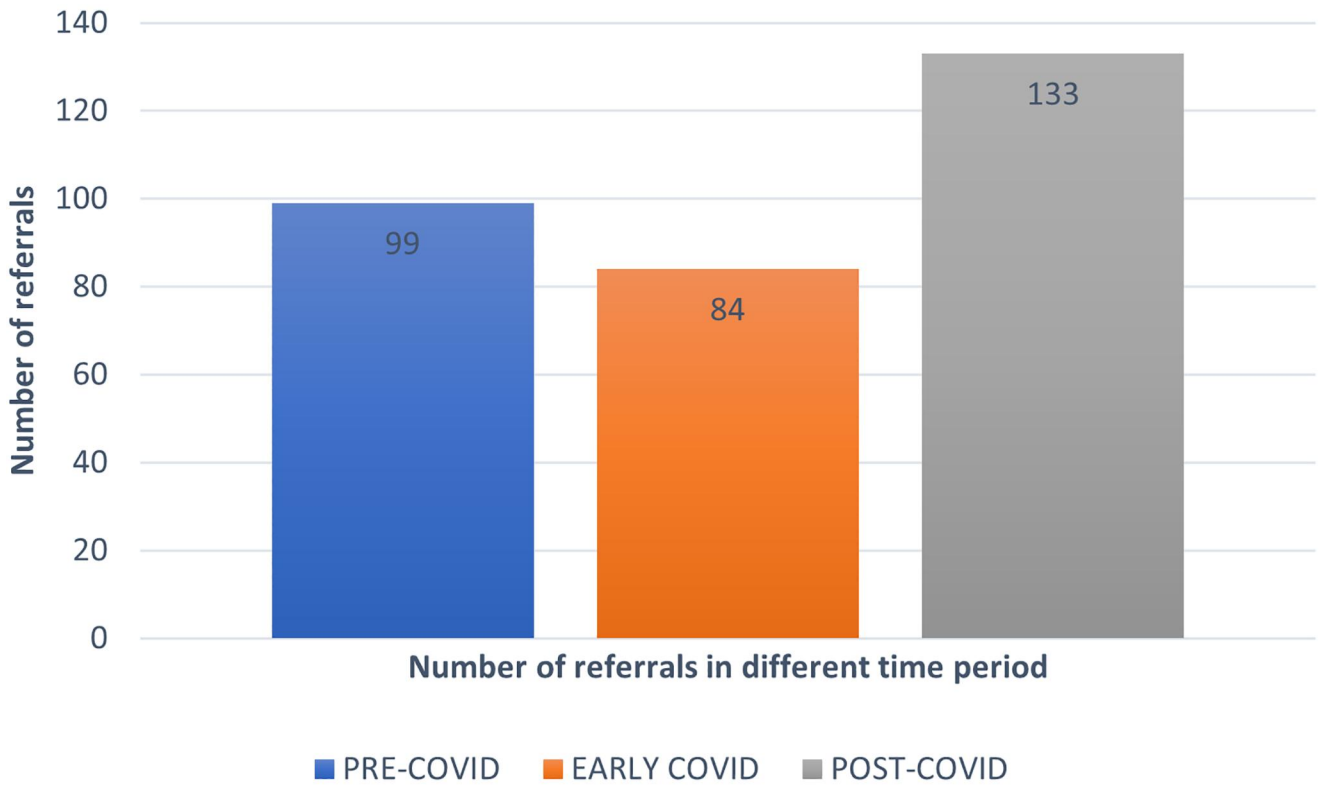

FIGURE 2 Number of referrals by time period

report that the time to an emergency operation did not change compared with pre-COVID-19 (Wong & Cheung, 2020) or decreased significantly (Giorgi et al., 2020).

While this study examines trends in acute spinal referrals over multiple waves of the COVID-19 pandemic, it does have some limitations. Firstly, data on the exact length of time to intervention were unavailable. This makes it difficult to assess the impact of the ongoing pandemic on this aspect of spinal services. Secondly, this study focuses on acute referrals to the spinal service; while this would capture the majority of patients, it is possible that some would be missed as they were referred via other means, for example, ward-based referrals. Despite these limitations, the period of time covered, the number of patients reviewed and the statistical analysis of the data obtained were useful to strengthen this study.

5 | CONCLUSION

We report the changes in referral volumes at a UK DGH as well as the impact on waiting lists. There was a significant drop in referrals during early phases of lockdown, which subsequently rebounded to a significantly higher number. This highlights the importance of flexibility in spinal service delivery and the need to ensure adequate access to community spinal services to enable the early identification of patients requiring spinal care. Without this foresight, there is the potential for spinal services to be overwhelmed during subsequent waves of the COVID-19 pandemic or indeed other pandemics which may emerge.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ETHICAL APPROVAL

Approval for this study was obtained from our institutional quality governance team and was conducted in accordance with the 1964 Helsinki declaration and its later amendments.

AUTHOR CONTRIBUTIONS

Rajib Naskar contributed to study design, data analysis, manuscript preparation and final approval; Kwaku W. Baryeh contributed to data analysis and interpretation, manuscript preparation, critical revision and final approval; Sindhu Pavuluri contributed to data acquisition and analysis, manuscript preparation and final approval; Trichy Rajagopal contributed to design conception, data interpretation, manuscript preparation, critical revision and final approval.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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