

### Motivation and Contribution:

The aim of this study was to examine whether there was a decline in hospital admissions for epistaxis in Germany during the COVID-19 lockdown. Given the potential impact of the COVID-19 pandemic on healthcare delivery and the need for timely treatment of epistaxis to prevent complications, it is important to investigate whether there has been a decline in hospital admissions for this condition during the lockdown period. By examining hospital admission rates for epistaxis during the COVID-19 lockdown period and comparing them to pre-lockdown rates, we can determine whether there was a significant decrease in hospital admissions for this condition.

Motivated by the pressing need to understand how the COVID-19 pandemic might have influenced the healthcare-seeking behavior of individuals, the authors of this study meticulously collected and analyzed nationwide data. The authors recognized that fear of potential coronavirus exposure could have deterred patients from seeking necessary medical attention, even for severe conditions such as epistaxis. This study not only highlights the authors' commitment to addressing a critical gap in medical research during a global crisis but also showcases their dedication to ensuring comprehensive and accurate data collection.

The findings of this study will provide valuable insights into the impact of the COVID-19 pandemic on the management of epistaxis and may inform the development of strategies to ensure timely access to care for patients with this condition. Furthermore, the authors' contributions extend beyond the immediate scope of the research by shedding light on the broader challenges of maintaining regular healthcare services during times of crisis. Through this study, the authors aim to support healthcare systems in adapting to unforeseen disruptions and guaranteeing that patients receive the essential care they require, irrespective of external circumstances.

### More recent work:

This approach is positioned in the temporal course prior to the outcome following the inpatient admission and can therefore be considered as a complement to other recently published studies that have dealt with patient outcomes after coronavirus infection. In this domain, models using machine learning approaches have been introduced to, for example, estimate the mortality risk of patients with pre-existing diabetes based on various input parameters or to perform early classification of COVID-19 patients through deep learning techniques.<sup>25,26</sup>

Kumar, S., Chaube, M. K., Alsamhi, S. H., Gupta, S. K., Guizani, M., Gravina, R., & Fortino, G. (2022). A novel multimodal fusion framework for early diagnosis and accurate classification of COVID-19 patients using X-ray images and speech signal processing techniques. *Computer methods and programs in biomedicine*, 226, 107109.

Aggarwal, A., Chakradar, M., Bhatia, M. S., Kumar, M., Stephan, T., Gupta, S. K., ... & Al-Dois, H. (2022). COVID-19 risk prediction for diabetic patients using fuzzy inference system and machine learning approaches. *Journal of Healthcare Engineering*, 2022.

Description of the used model (ITS with ARIMA) in „2.2 statistical analysis“:

To evaluate the data, weekly case numbers were presented using an Interrupted Time Series Analysis (ITS). This is a quasi-experimental design suitable for measuring the population-level impact of healthcare interventions.<sup>31,32</sup> The ITS was presented in tabular form. An AutoRegressive Integrated Moving Average (ARIMA) forecast model without seasonal effects was used as a counterfactual in order to provide a more accurate estimate of what would have happened in the absence of the intervention than linear regression.<sup>33</sup> The counterfactual was calculated from the pre-lockdown group as well as from the lockdown group. The results were presented as a percentage deviation from the predicted value, with the respective time boundaries of the Interrupted Time Series corresponding to the start and end of the COVID-19 lockdown.

Figure 1 explained with more details:

Cases had decreased by 22% from 401.5 (sd 84.2) in the pre-lockdown period to 314.2 (sd 20.6) during the lockdown period, irrespective of age and gender ( $p < 0.05$ ). Subsequently, there was a marginal, non-significant increase of 0.3% to 315.0 (sd 56.2). Notably, Figure 1 illustrates that the majority of patients were middle-aged and male.

When considering gender, a notable decrease of 29% ( $p < 0.01$ ) was observed during the lockdown period for female patients, while male patients experienced a decrease of 21%. In the post-lockdown period, cases increased by 11% among females, whereas male patients showed a slight additional decrease of 2% (Table 2, Figure 1b).

The lockdown period led to a significant decrease in epistaxis cases, especially among young people (0-39 years of age), with a reduction of 51% ( $p < 0,001$ ). After the end of the restriction period, there was a clear, and continuing statistically significant, increase in patient numbers by 50% ( $p < 0,01$ ). In the age group of 40-79 years, there was also a significant decrease in the number of cases by 22% ( $p < 0,01$ ) with the start of the lockdown period, which remained constant thereafter. Only in the group of the oldest patients (80+ years of age), a statistically constant weekly number of cases was observed. This number decreased by 11% at the beginning of the lockdown period and then by an additional 8% (Table 2, Figure 1a).

Conclusion to summarize contributions and outcomes:

Our study demonstrated that, based on actual case numbers and simulated calculations using ARIMA forecast along with ITS analysis, the pandemic-induced lockdown led to a direct reduction in hospitalizations, particularly among young patients with epistaxis, and an immediate surge in hospitalizations upon its conclusion. This might be caused by fear of exposure to COVID-19, unintended consequences of public health recommendations to minimize non-urgent healthcare or stay at home orders and match with results from previous studies.<sup>39-44</sup>

Conversely, these measures did not lead to any change in older patients, which suggests that at least in this age group, the symptoms of epistaxis should not be underestimated, even with regard to a possible exposure to the coronavirus.

These findings highlight how a nationwide intervention, such as the COVID-19 lockdown in this instance, can directly impact hospital admissions within specific segments of the population.

Review by Journal Chief Editor:

Thank you for revising the manuscript according to the reviewer comments. However, I still have several notes that must be addressed to improve the quality of this manuscript. 1) Materials and Methods: Since this is the retrospective observational study, under the "Patient population" sub-section, the authors should clearly indicate the eligibility criteria (inclusion and exclusion) of the participants for their study. What population of patients will be used (adult or pediatric or both)? What is the exposure? What will be compared? What is the outcome of interest? All of these should be clearly indicated. 2) Materials and Methods: Do the database used by the authors also have data regarding the type of epistaxis (anterior or posterior)? 3) The language quality of this manuscript can be polished to increase the clarity of each statement.

Dear Mrs. Liu,

Thank you once again for your efforts and the additional suggestions regarding the manuscript. I have incorporated the extra information into the "Materials and Methods" section, which is highlighted in yellow. To enhance the language flow and improve the clarity of our statements, I have rewritten both of the conclusion sections (manuscript and article highlights). Please let me know if further corrections are desired or necessary.

Best regards

Adrian Hoenle