



Impact of the COVID-19 Pandemic on Incidence and Stage of Head and Neck Cancer in Scotland

Kelten Clements¹

Supervisor: Professor David Conway¹

¹School of Medicine, Dentistry and Nursing, University of Glasgow, Glasgow, UK

Background

In line with healthcare services around the world, the National Health Service in Scotland was faced with a unique set of challenges during the COVID-19 pandemic. One significant measure taken during March 2020 was to free-up the maximum possible inpatient and critical care capacity by postponing all non-urgent elective operations, limit outpatient clinic appointments to emergency cases and redeployment staff to critical care, as well as asking the population to stay at home.¹ This was accompanied with a rapid reduction in referrals from both primary care and accident and emergency departments.^{2,3} The elective services that were postponed, are essential to the early detection and treatment of cancer, and reduced patient access to these services carried risks of adverse collateral impact on head and neck cancer (HNC) morbidity and mortality.⁴ This is further reinforced by modelling that predicted upshifting of HNC stage (a measure of cancer extent with higher stages having poorer prognoses) as a result of a backlog of undiagnosed HNC cases.^{5,6}

While currently published studies have focused on comparing pre-pandemic to pandemic cohorts,^{7,8} there has been no formal synthesis of this currently published evidence, also the impact on the post-pandemic period and the impact at a population level has yet to be fully evaluated, and it is essential that these are analysed to determine the full impact of the pandemic. Three studies were conducted - a comprehensive review of international literature, a clinical database study, and a national population data analysis - to determine full impact of the COVID-19 pandemic on HNC by analysing indicators likely to predict trends. These included analysing changes in curative-intent and palliative-intent treatment rates, disease stage and changes in number of diagnosis.

Methods

Three substantial studies were undertaken to investigate this question:

Rapid Literature Review

This rapid review methodology was based on established systematic review methods and followed a pre-defined review protocol with a systematic literature search of PubMed, Web of Science, Scopus, China National Knowledge Infrastructure Database. Data on stage were summarised as odds ratios (OR) with 95% confidence intervals (95% CI). Data related to changes in numbers of diagnosis, referrals and workload levels were summarised as a narrative synthesis.

Retrospective Cohort Study

This retrospective cohort study evaluated patients with HNC reviewed at multidisciplinary team (MDT) meetings between June to October 2019 (pre-pandemic) and June-October 2021 (post-pandemic). Data related to demographics, tumour characteristics and treatments were collected and analysed.

Population Based Analysis

This population level analysis of data collected from the three regional Scottish cancer networks: West of Scotland Cancer Network (WoSCAN), North cancer alliance (NCA), and Southeast Scotland Cancer Network (SCAN). Percentage difference between numbers of cases observed during the pandemic and pre-pandemic average were calculated to show effect size.

Results

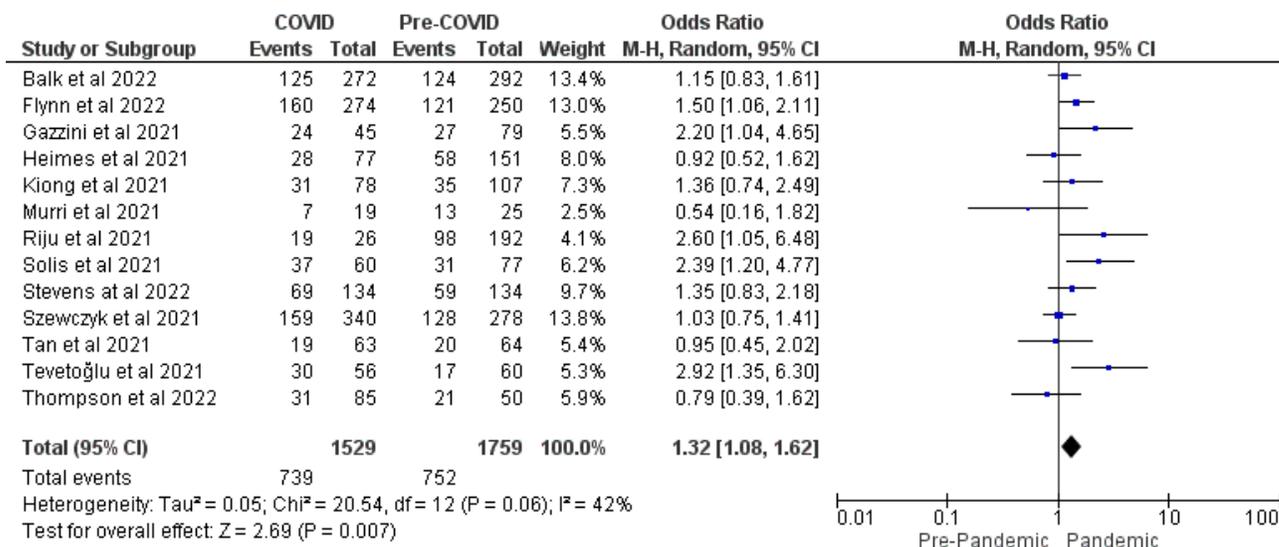


Figure 1 Advanced tumour extent (T3 and T4 stage) forest plot

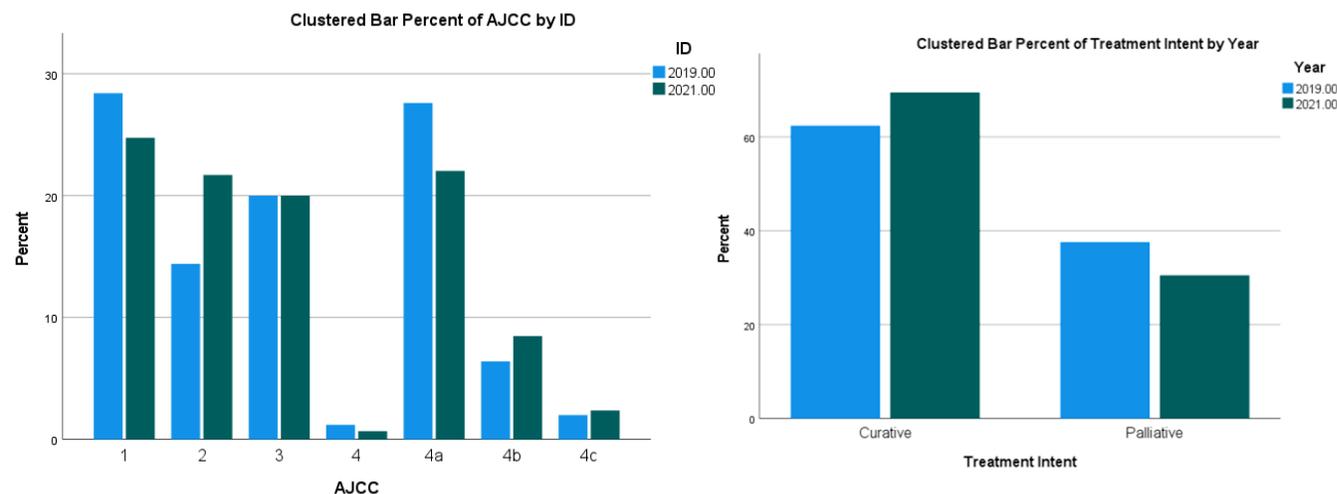


Figure 2 Percentage of new HNC cases of each AJCC Stage Figure 3 Proportion of new HNC cases receiving palliative versus curative treatment

Results

Rapid Literature Review

31 reports were included in this review. Patients diagnosed with HNC during the pandemic were 16% more likely to have nodal involvement (OR=1.16; 95% CI 1.00, 1.35), 17% more likely to have a late overall stage (OR=1.17; 95% CI 1.01, 1.36), and 32% more likely to present with advanced tumour extent (T3 and T4 stage) (OR=1.32; 95% CI 1.00, 1.62) (Figure 1).

Retrospective Cohort Study

545 patients were evaluated - 250 in the 2019 and 295 in the 2021 cohort. There were no significant differences in symptom duration between the cohorts ($p=0.359$) or patient performance status ($p=0.821$). There were no increased odds of presenting with a late (stage III or IV) AJCC cancer stage in 2021 compared with 2019 (OR=0.90; 95%CI 0.76, 1.08) (Figure 2); nor increased odds of receiving palliative rather than curative treatment in 2021 compared with 2019 (OR=0.68; 95%CI 0.45, 1.03) (Figure 3).

Population Level Analysis

During the first year of the pandemic from April 2020 to March 2021 the number of new HNC cases fell by 3% from the pre-pandemic average (Figure 4) and there were no changes in the socio-economic demography of the presenting cases (Figure 5).

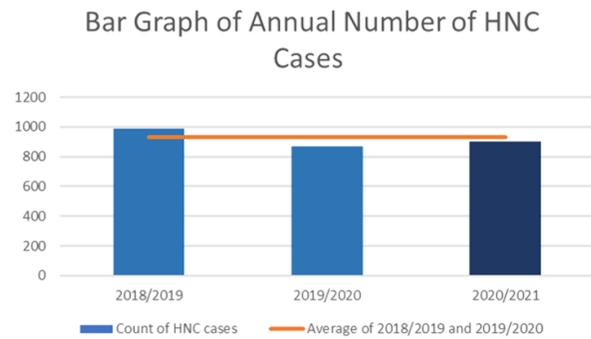


Figure 4 Number of HNC cases in 2020/2021 compared with average of preceding two years.

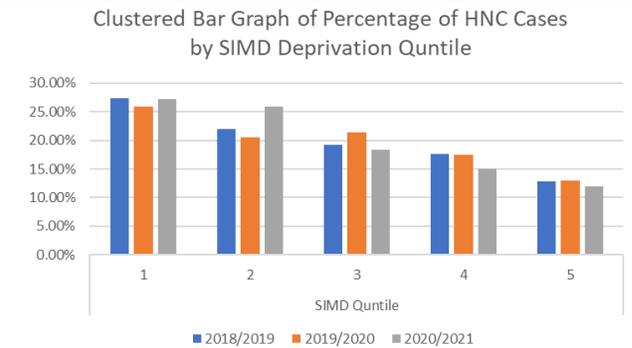


Figure 5 Percentage of HNC cases in each SIMD Quintile for between 2018-2021

Conclusion

These studies have shown that despite the large disruptive impact of the COVID-19 pandemic on HNC care resulting in an initial impact on stage at presentation, this did not result in a backlog of undiagnosed HNC cases causing a long-term upshifting of disease stage, as had been predicted. Whether the COVID-19 pandemic has resulted in adverse changes to HNC related morbidity and mortality will remain unclear for many years, but this preliminary data remains important as the indicators measured in these studies will inform further recovery of services.

References

- 1 NHS England and NHS Improvement. IMPORTANT AND URGENT – NEXT STEPS ON NHS RESPONSE TO COVID-19. 17 (<https://www.england.nhs.uk/coronavirus/publication/next-steps-on-nhs-response-to-covid-19-letter-from-simon-stevens-and-amanda-pritchard/>, 2020).
- 2 Pulse. GP urgent cancer referrals decline by more than 70% as 'fewer patients come forward', <<https://www.pulsetoday.co.uk/news/uncategorised/gp-urgent-cancer-referrals-decline-by-more-than-70-as-fewer-patients-come-forward/>> (2020).
- 3 Osborne, M. S., Bentley, E., Farrow, A., Chan, J. & Murphy, J. Impact of coronavirus disease 2019 on urgent referrals to secondary care otolaryngology: a prospective case series. *The Journal of Laryngology & Otology* 134, 957-960, doi:10.1017/S0022215120002091 (2020).
- 4 Søreide, K. et al. Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. *British Journal of Surgery* 107, 1250-1261, doi:10.1002/bjs.11670 (2020).
- 5 Ng, J., Stovezky, Y. R., Brenner, D. J., Formenti, S. C. & Shuryak, I. Development of a Model to Estimate the Association Between Delay in Cancer Treatment and Local Tumor Control and Risk of Metastases. *JAMA Network Open* 4, e2034065-e2034065, doi:10.1001/jamanetworkopen.2020.34065 (2021).
- 6 Sud, A. et al. Effect of delays in the 2-week-wait cancer referral pathway during the COVID-19 pandemic on cancer survival in the UK: a modelling study. *Lancet Oncol* 21, 1035-1044, doi:10.1016/s1470-2045(20)30392-2 (2020).
- 7 Schoonbeek, R. C. et al. Fewer head and neck cancer diagnoses and faster treatment initiation during COVID-19 in 2020: A nationwide population-based analysis: Impact of COVID-19 on head and neck cancer. *Radiotherapy and Oncology* 167, 42-48, doi:10.1016/j.radonc.2021.12.005 (2022).
- 8 Stevens, M. N. et al. Impact of COVID-19 on presentation, staging, and treatment of head and neck mucosal squamous cell carcinoma. *American Journal of Otolaryngology - Head and Neck Medicine and Surgery* 43, doi:10.1016/j.amjoto.2021.103263 (2022).

Acknowledgements

I would like to thank Prof Conway for giving me this opportunity and supervising my work. I would also like to thank Dr Alekh Thapa, Miss Gillian White, Dr Anna Cowell, Dr Claire Paterson, Miss Catriona Douglas and Dr McMahon for their advice, teaching, help, guidance and supervision, also Dr William Flynn who provided part of the database we analysed.