

Is 2020 the golden year of Otolaryngology research? The impact of COVID-19 on the Italian academic production

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Abstract. *Background and aim:* The aim of this research was to review the articles published by the Ear, Nose and Throat (ENT) departments of the Italian University Hospitals in 2019 and in 2020 to analyze the impact of the COVID-19 pandemic on the academic production. *Methods:* PubMed and Scopus were searched for the articles published by the ENT departments of the Italian Universities in 2019 and in 2020. The main eligibility criteria were English-language articles, while there were no exclusion criteria related to topic. The articles were classified into seven domains corresponding to the main ENT subspecialties. *Results:* There was an overall increase in the number of articles by the 42.2% in 2020. Publications pertaining Rhinology and Laryngology increased more significantly in 2020, respectively by the 50.5% and 72.2%. Additionally, there was an increase in the number of articles concerning topics of general interest, by the 95.2% in 2020. Also, the citation trends of the articles published by the Italian University Hospitals increased remarkably in 2020. *Conclusions:* These results evidenced an overall increase in the number of ENT articles. Although 2020 is going to be remembered as a year to forget, it should be acknowledged for being the “golden year of research”. However, the scientific community needs quality more than quantity and it is now more important than ever to provide optimal medical indications and clear answers to patients’ questions. (www.actabiomedica.it)

Key words: Coronavirus disease, 2019 Novel Coronavirus Disease, otolaryngology, research.

Introduction

The Coronavirus disease 2019 (COVID-19) pandemic caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has profoundly impacted the healthcare, the economy, and the entire society worldwide (1). Consequently, 2020 has been a remarkably difficult year characterized by many fundamental and unpredictable changes. On the other side, this unprecedented situation has posed new challenges to researchers and the whole scientific community which are working non-stop to defeat COVID-19.

Undoubtedly, Otolaryngologists have been among the specialist physicians at highest risk (2) and have been playing a role of primary importance in the treatment of the symptoms of the upper respiratory tract due to SARS-CoV-2 [i.e., smell and taste dysfunction (3,4)], and in the execution of life-saving procedures in COVID-19 patients [i.e., tracheostomies (5)]. According to the Guidelines released by the international Ear, Nose and Throat (ENT) societies, a wide reorganization involved the Head and Neck Departments in many Italian hospitals. Especially during the first wave of the COVID-19 pandemic, oncological and emergency surgical procedures and outpatients’ visits were

prioritized to limit the spread of the infection among patients and healthcare workers (6,7). Due to the cancellation of elective activities and to the decrease of ENT consultations (8), many Otolaryngologists were called to serve as frontline workers in COVID-19 wards or assigned to perform nasopharyngeal swabs (9). In this unprecedented scenario, also the ENT residency training had to be reorganized and wide space was given to virtual didactic education to overcome the reduction of clinical and surgical activities (10).

Given these premises, Otolaryngologists-Head and Neck Surgeons had the chance to collect valuable data for a better understanding of the disease and to provide their experience in the execution of invasive examinations/aerosol-generating procedures (AGPs) in COVID-19 patients (11). In a relatively short time, scientific journals released an enormous quantity of articles pertaining the ENT field and, apparently, there was a renewed interest for the specialty during the pandemic. Also, Italy was one of the European countries on the frontlines of COVID-19 research, being the first one to experience a large-scale outbreak. Therefore, the aim of this research was to systematically review the articles published by the ENT departments of the Italian University Hospitals in 2019 and in 2020 to analyze the impact of the COVID-19 pandemic on the academic production.

Materials and methods

Search strategy and inclusion criteria

The National Library of Medicine through *PubMed* and *Scopus* database were searched for scientific papers published by the ENT departments of the Italian University Hospitals respectively in 2019 and in 2020. The Universities with accredited residency programs were included in this research: *Bari, Bologna, Brescia, Cagliari, "Campus Biomedico" University of Rome, Catania, Catholic University of the Sacred Heart, Ferrara, Firenze, Foggia, Genova, Humanitas University, Varese Insubria, Milan, Modena and Reggio Emilia, Padova, Palermo, Pavia, Perugia, Piemonte Orientale, Pisa, Rome "La Sapienza", Rome "Tor Vergata", Siena, Turin, Trieste, Verona, "Vita-Salute San Raffaele" University.*

The main eligibility criteria were English-language articles published in peer reviewed scientific journals at any time in 2019 and in 2020, while there were no exclusion criteria related to topic, type of paper or study design. Papers published on preprint platforms were not included in this review. Moreover, the number of citations obtained in 2018, 2019 and 2020 was collected by using *Scopus* and *Web of Science* databases.

Data extraction

Two authors (E.M.C.T., and P.G.M.) independently screened the full-text version of each publication and conducted data extraction. Articles were grouped according to the year and University Hospital. Additionally, articles published in 2020 were classified into "*COVID-19 articles*" and "*Non COVID-19 articles*" and subclassified into seven domains corresponding to the main ENT subspecialties: rhinology, otology, laryngology, pediatric otolaryngology, sleep medicine, head and neck surgery and miscellaneous. When agreement could not be reached, the senior authors (M.G., M.C., and F.L.) were consulted.

Results

The ENT Departments of the Italian University Hospitals released 312 and 540 articles respectively in 2019 and in 2020. Therefore, there was an overall increase in the number of published articles by the 42.2% during the year of pandemic. Out of the articles published in 2020, 116 (21.5%) dealt with COVID-19 and ENT related topics, while 424 (78.5%) were non-COVID-19 articles. The most debated ENT fields were head and neck surgery, rhinology and otology both in 2019 and in 2020 (Table 1). However, publications pertaining Rhinology and Laryngology increased more significantly in 2020, respectively by the 50.5% and 72.2%. Additionally, there was an increase in the number of miscellaneous articles, which concerned topics of general interest (i.e., department organization, guidelines, telemedicine and residency training), by the 95.2% in 2020. Otology and Head and Neck articles increased respectively by the 32.9% and 32.5%,

Table 1. Topics of the Ear, Nose and Throat (ENT) articles published by the Italian University Hospitals in 2020 and in 2019, respectively during and before the COVID-19 pandemic.

TOPIC	Rhinology	Otology	Laryngology	Pediatric Otolaryngology	Head and neck	Sleep medicine	Miscellaneous
Articles published in 2020	109	101	54	14	200	20	42
Articles published in 2019	54	76	15	11	135	19	2

while the categories of pediatric otolaryngology and sleep medicine remained relatively stable. Also, the citation trends of the articles published by the Italian University Hospitals in 2018, 2019 and 2020 increased remarkably, respectively by the 13.8% from 2018 to 2019 and by the 22.5% from 2019 to 2020 (Figure 1).

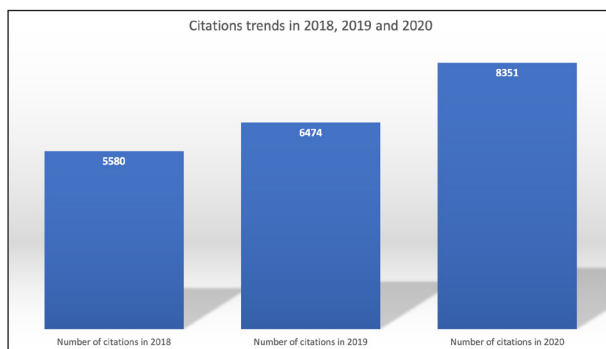
Discussion

Although 2020 is going to be remembered as a year to forget from multiple points of view, it should be acknowledged for being the “golden year of research”. Paradoxically, the COVID-19 pandemic led to a global mobilization of scientific and human resources across countries and culminated in the development of several vaccines in less than one year (12). Also, the Italian ENT researchers were deeply invested in this scientific mission and gave their valuable contribution to the fight against COVID-19. In fact, our results evidenced that there was an overall increase in the number of articles published by the ENT Departments of the Italian University Hospitals during the COVID-19 pandemic. Additionally, the increase in the scientific production

was in proportion to the increase in the number of citations compared to the previous two years (Figure 1). Moreover, it is worth noticing that a considerable percentage (21.5%) of the ENT articles published in 2020 focused on COVID-19. Surely, SARS-CoV-2 infection has been a topic of great interest, but it should also be considered that clinical trials going on before the pandemic have been negatively impacted by the current global crisis.

A possible explanation for the recent surge of interest for the ENT specialty might be given by the central role played by Otolaryngologists in treating the upper airways symptoms of SARS-CoV-2 infection (13) and in performing life-saving procedures (i.e., tracheostomies) in COVID-19 patients (5,14). Additionally, Head and Neck Departments all over Italy were characterized by a reduction in the number of elective activities and a reallocation of the personnel (15–17) and could consequently dedicate more time to research. Another explanation for the impulse to the ENT academic production can be given by the reorganization of the residents training which were redirected to didactic and scientific activities, especially during the first wave of pandemic (10).

Moreover, a fundamental contribution to COVID-19 research was given by the societies of young Otolaryngologists (i.e., Young Otolaryngologists of the International Federation of Otolaryngology Societies [Yo-IFOS], Italian Society of Otolaryngology-Head and Neck Surgery [SIOeChCF]) who produced a considerable number of high-quality scientific papers involving researchers from several Italian Universities (18–22). Interestingly, with 659 citations, the first multi-center European study about chemosensory dysfunction in COVID-19 patients promoted by the YO-IFOS (18) was the most cited ENT COVID-19 article. A com-

**Figure 1.** Citations trends in the articles published by the Italian University Hospitals in 2018, 2019 and 2020.

mon feature of the articles released by the societies of young Otolaryngologists is the use of web surveys that allowed to collect a huge quantity of data in a relatively short time and to connect different communities of researchers. Although a criticism made by some Authors to COVID-19 literature is given by the redundancy of publications which often lack of rigorous data analysis and solid scientific evidence (11), the use of online platforms, social media, and mobile applications (23) can be very useful to collect pilot data in the era of 'social distancing'. Efforts should be put by the international Societies worldwide to validate these instruments and to understand how to improve the quality of research.

The scientific contributions published by the Italian University Hospitals in 2020 covered several topics concerning all the ENT subspecialties. However, the most remarkable increase compared to 2019 was in the number of Rhinology and Laryngology articles.

The great interest for Rhinology can be easily explained by olfactory and gustatory dysfunctions as key symptoms of SARS-CoV-2 infection (3,4,24,25). In fact, the higher number of patients affected by chemosensory impairments seeking medical assistance induced Otolaryngologists to investigate smell and taste further to provide the best care options. A survey of UK-based consultants in 2007 revealed that only the 12% of Otolaryngologists routinely test for chemosensory disorder (26). Therefore, "every cloud has a silver lining" and after 13 years we can say that the COVID-19 pandemic is having the merit to lead both clinicians and researchers to a major awareness of these diseases.

The topic of major interest in the Laryngology literature was that of tracheostomies in COVID-19 patients. First, tracheostomy is an AGP that pose a high risk of contagion to surgeons; therefore, the development of guidelines and safety measures has been very important for the scientific community (27). Indications and timing of tracheostomy in COVID-19 acute respiratory distress syndrome (ARDS) remain another controversial issue and many articles have been discussing it (5,14). Finally, laryngological sequelae (i.e., granulomas, tracheomalacia, fistulae etc.) and airway stenosis due to prolonged intubation and high rate of tracheostomies in COVID-19 patients are one of the main worries for the future and one of the most debated topics in the current literature (28–30).

However, the category that evidenced the highest increase in the number of articles in 2020 was that of miscellaneous articles, which included new and emerging topics that became of global interest with the COVID-19 outbreak. Telehealth systems have become increasingly popular during the COVID-19 pandemic as they provide care to patients while minimizing the risk of SARS-CoV-2 infection among patients and personnel (31). Given the decrease in the number of ENT consultations (32), other topics of great interest were the presentation of strategies to reorganize the ENT department (33), to minimize the risk management (34) and new solutions to improve the residency training during the COVID-19 pandemic (10). Lastly, other articles presented novel aerosol mitigation devices to limit the droplets diffusion during AGPs (35).

Also, articles pertaining Otology and Head and Neck surgery increased remarkably, although less than the other subspecialties previously mentioned. The treatment of head and neck cancer patients is not deferrable and surgical oncology treatments have never been cancelled even during the COVID-19 pandemic. Therefore, scientific journals gave special attention to articles that evidenced the importance of head and neck counselling and contained instructions on how to avoid delays in the diagnosis and treatment of head and neck tumors (6,7). Besides the release of guidelines to provide otologic and neurotologic care during the COVID-19 pandemic (36), another research area of interest was that of the difficulties experienced by patients affected by hearing impairment in understanding and communicating with other individuals wearing facemasks in the era of social distancing (37,38). Lastly, the relationship between sudden sensorineural hearing loss and SARS-CoV-2 infection is still being investigated and remains a controversial issue (39).

Limitations

The choice to include only the ENT departments of the Italian University Hospitals with accredited residency programs considerably limited the value of this review, because in Italy there are also ENT departments of non-University Hospitals and Research Institutes which annually give an important contribution to the scientific production. However, given the high number and the heterogeneity of these hospitals, it would have been difficult to meet strict criteria and systematically

review their work. Additionally, this study assessed only the ENT literature, while many other specialties were on the frontlines of scientific research and should deserve further evaluation, as well.

Conclusions

The ENT academic production at the time of COVID-19 is emblematic of the potentialities endowed by the ENT researchers and the interest that the scientific community has for the ENT specialty. At the same time, it evidenced the necessity of a better organization of the academic research at the Italian Universities, which was probably limited by the clinical and surgical activities in the pre-COVID-19 era and should deserve more space both in the department workload and residency training. Also, the COVID-19 pandemic revealed the necessity to discuss more emerging topics and to provide new solutions to a society in constant evolution and that is not going to be the same in the post-COVID-19 world. Finally, the massive release of scientific articles has not always been correlated with standards of excellence in research. However, the scientific community needs quality more than quantity and it is now more important than ever to provide optimal medical indications and clear answers to patients' questions.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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