



Impact of COVID-19 pandemic on the worldwide burden of tinnitus

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Tinnitus is a frequent condition in the general population that, in its various forms and intensity, could be associated with a considerable burden of disability. Recent evidence has emerged that coronavirus disease 2019 (COVID-19) may trigger auditory-vestibular system problems by directly injuring structures or functions of inner ear, or by blunting the immune system, with newly developed tinnitus reported in around 10% of COVID-19 patients [1], whilst clinical worsening of this pre-existing symptom has been reported in three-third of already affected individuals [2]. We have hence conducted an infodemiological analysis to define whether the worldwide burden of tinnitus may have increased during the ongoing COVID-19 pandemic.

We conducted an electronic search in Google Trends (Google Inc. Mountain View, CA, US), using the term tinnitus as “medical topic” (thus overcoming possible linguistic differences), setting the geographical area to “worldwide”, within a search period comprising the past 5 years (i.e., from August 2017 to August 2022). The weekly Google Trends score for the term tinnitus, which was found to reliably reflect the impact of this condition in the general population [3], was primarily separated in two periods, i.e., “pre-COVID-19” (between August 2017 and February 2020) and “COVID-19” (between March 2020 and August 2022), for demarcating the initiation of the COVID-19 pandemic, but was then also clustered within specific period of

prevalence of different SARS-CoV-2 variants (i.e., ancestral: March 2020–January 2021; Alpha: February 2021–June 2021; Delta: July 2021–December 2021; Omicron: January 2022–August 2022), as described elsewhere [4]. The median number (and interquartile range; IQR) of weekly Google searches for “tinnitus” was then compared with Mann–Whitney test (Analyse-it Software Ltd, Leeds, UK). This analysis was based on electronic searches in open and publicly available repositories, such that no informed consent or Ethical Committee approval were necessary.

The main results of our analysis are summarized in Fig. 1. A significant increase has been observed in the median worldwide burden of searches for tinnitus by comparing the volume after (median 64; IQR 60–69) versus before (58; IQR 52–61; $p < 0.001$; + 10.3%) the initiation of the COVID-19 pandemic. Although such trend was consistent over time irrespective of the virus variants, with values of Google searches always higher than the pre-COVID period (all $p < 0.001$), higher weekly Google Trends searches were noted during prevalence of Delta and Omicron lineages (Fig. 1).

Taken together, the results of this brief infodemiological analysis confirm earlier findings [1, 2], thus suggesting that the worldwide burden of tinnitus may have significantly increased during the ongoing COVID-19 pandemic. As concerns the possible causes, a direct viral injury to the ear may be certainly a reasonable explanation, though the remarkably increased burden of anxiety and stress observed during the COVID-19 pandemic [5], which are well-known triggering or amplifying factors of tinnitus, may have contributed to significantly worsen or boost the spread of this severely disabling condition.

The evidence of an increasing burden of tinnitus in the general worldwide population paves the way to planning specific interventions aimed to support the larger number of patients that may seek healthcare consultation and/or may need to be treated for this invalidating symptom.

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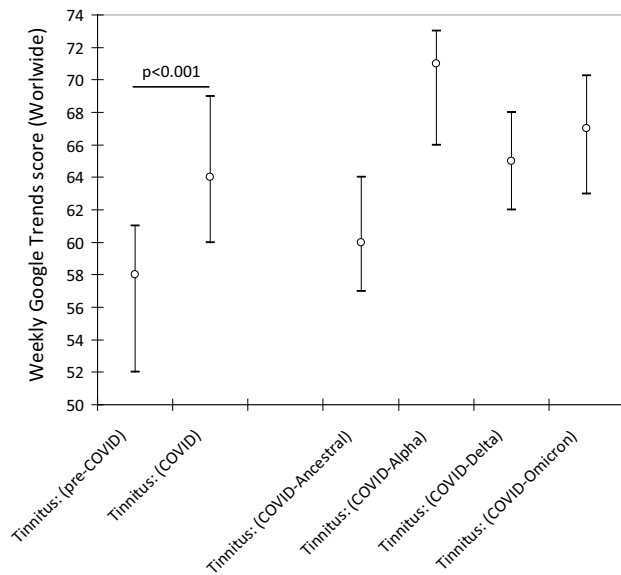


Fig. 1 Worldwide weekly Google Trends score for the search term tinnitus before and after emergence of the coronavirus disease 2019 (COVID-19) pandemic. Results are shown as median and interquartile range (IQR) of weekly Google Trends scores

Human and animals rights Not applicable.

Informed consent Not applicable.

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Declarations

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