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BRIEF REPORT

Olfactory dysfunction in children and adults post-COVID-19 infection in Brooklyn, New York

Common symptoms of acute COVID-19 infection include fever, cough, headache, shortness of breath, and anosmia, i.e., partial, or complete loss of smell.[1] Prior literature reported that COVID-19 patients (50%) developed sudden-onset anosmia prior to respiratory symptoms, thus making this an important symptom.[2] The aim of this study sought to identify post-COVID-19 related olfactory dysfunction and recovery rates in children and adults in a community with a high incidence of COVID-19 infection.

A retrospective analysis of olfactory testing results was performed. Olfactory testing was offered to patients who wanted to participate in olfactory testing in an outpatient clinic in Southern Brooklyn, NY, September 2020-April 2021 (Snap and Sniff Odour Threshold Test; Sensonics International). The test comprises of 20 smell wands. Five contain no odours, the others contain half-log dilutions ranging from 10^{-2} (strongest) to 10^{-9} (weakest) vol/vol concentration of rose-like smell. When the operator's thumb pushes forward on a slide mechanism, the odorised tip is exposed for sampling and presented to the subject 1–2 inches under both nostrils for 5–10 s. Odorant wands are presented sequentially from low to high concentrations, often in half-log dilution steps, and the point of transition between no detection and detection is established. The threshold value scores were reported for each participant and compared with pre-set threshold standards defined (for adults) within the University of Pennsylvania Smell Identification Test (UPSIT) threshold administration manual. A normal hyposmia baseline score was defined as 6.0 (−6.0 log). Administration of the test took between 12–15 min. Previous COVID-19 infection was defined as having a positive COVID-19 test (RT-PCR or antigen test) or self-reported.

Demographic data collected included gender (female/male), age, respiratory problems, fatigue, history of COVID-19 infection, months post-COVID-19 infection, and smell test score. Statistical analyses were performed in SAS v9.4.3 (SAS Institute).

Fifty-three adults (age 18–74; median 28 years; 36 [67.9%] female) and 44 children (age 7–17; median 15 years; 33 [75.0%] female) were recruited, including 53 (54.6%) who reported having previous COVID-19 infection. Subjects reported mild to severe symptoms and were suitable for outpatient management; none required hospitalisation. Forty four subjects did not have previous COVID-19 infection but did report respiratory problems (29.6%) or fatigue (13.6%).

There were no significant differences in the proportion of participants with abnormal olfactory threshold test scores between those with vs. without previous COVID-19 infection overall (43.4% vs. 52.3%; Chi-square test, $p = 0.38$), as further verified by the Mann–Whitney U test ($p = 0.19$).

However, among those with previous COVID-19 infection, there were significant differences in olfactory threshold test scores between 0–3 (40.0%), 4–6 (66.7%) or ≥7 (28.6%) months post-infection (Fisher exact test, $p = 0.04$).

This study shows that people in this community had similar olfactory threshold test scores with or without previous COVID-19 infection. However, among those with previous COVID-19 infection, the period of greatest olfactory threshold changes was at 4–6 months post-infection, with least olfactory changes observed 7 months post-infection. These results are comparable to a study that reported cases with symptoms persisting more than 1 month (persistent anosmia), and up to 4–6 months.[3]

Renaud et al.[4] described the long-term prognosis for a cohort of patients with COVID-19 related to anosmia, most (96.1%) of whom had full olfactory recovery at 1 year. In those studies, olfactory function was accessed by psychophysical testing (the threshold and identification tests; Sniffin' Sticks Test; Burghardt).[4] However, Konstantinidis et al.[5] reported that chemosensory deficits associated with COVID-19 infection were frequent among patients with the mild or moderate disease who, in most cases, returned to normal within 4 weeks.

Limitations of this study include a small sample size, a single study centre and short-term duration (<1 year). Other viral respiratory infections such as Rhinovirus or Influenza may also cause smell dysfunction; however, smell loss is typically not persistent, and usually returns after virus clearance. It should be mentioned that six of 53 patients with previous COVID-19 infection also reported current respiratory symptoms, which may include allergies, that might have contributed to the observed smell loss.

Even though olfactory disturbance is greatest 4–6 months post-infection, the least changes were observed 7 months post-infection. These preliminary findings suggest that smell dysfunction consequences of COVID-19 are not permanent. However, in some people smell loss can be a long-lasting symptom, resulting from inflammation caused by SARS-CoV-2. Further investigations are warranted regarding long-term olfactory recovery post-COVID-19 infection.

KEYWORDS

Brooklyn, New York, children, COVID-19, smell loss

CONFLICT OF INTEREST

The authors have no conflict of interest to disclose.

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