The growing burden of long COVID in the United Kingdom - insights from the UK Coronavirus Infection Survey

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Introduction

“Long COVID” is defined as symptoms that persist 12 weeks beyond the acute phase of coronavirus (COVID-19) infection and is estimated to affect 3.0-11.7% of the UK population. Symptoms include headache, myalgia, fatigue and loss of taste and smell. Parosmia can persist for months after initial infection alongside brain fog and memory loss.

The UK Office for National Statistics (ONS) Coronavirus Infection Survey (CIS) measures the number of people in England, Wales, Northern Ireland, and Scotland who test positive for a COVID-19 to provide national data to help government decision making and inform the public and media. The aim of this study was to report the prevalence of ENT related symptoms of long COVID and the population groups at greatest risk of long COVID from the CIS.

Methods

Data was drawn from the ongoing UK CIS which involves longitudinal follow-up of patients identified through repeated cross-sectional national surveys. The primary objectives are to estimate prevalence of symptomatic and asymptomatic COVID-19 infection in the general population, and the prevalence of long COVID.

Participants were volunteers aged 2 years or older (no upper age limit), resident in private households randomly selected from national address lists. Parents and carers responded for children <12 years old. An analysis of responses from 6th March 2022 to 3rd April 2022 was performed. COVID-19 positivity was identified through nose and throat swabs and blood samples. Participants who identified themselves as suffering from long COVID were asked about the presence of 23 individual symptoms and the impact of long COVID on their day-to-day activities. Self-reported long COVID was defined as symptoms persisting for >four weeks after the first suspected coronavirus infection but not explained by another condition.
UK population estimates were derived using a Bayesian multi-level regression post-stratification model with adjustments for age, sex, and region.

Results

Over 362,771 responses were received, of which 10,431 participants self-reported long COVID (an estimated 8 million people or 2.8% of the population). A total of 7,464 (72%) respondents with long COVID had a previous positive COVID test and the remainder were self-reported. Almost twelve percent of respondents were aged <17 and 58.0% >50 years. 46.2% were male and 92.9% were of ‘white’ ethnicity. An estimated 1.3 million people (73%) reported long COVID symptoms >12 weeks after COVID infection.

The duration of symptoms from confirmed or suspected COVID infection was categorised as: 21.3% <12 weeks, 18.0% 12 to <26 weeks, 9.3% 26 to <39 weeks, 1.4% 39 to <52 weeks, 18.9% 52 to <78 weeks, 12.0% 78 to <104 weeks, 13.1% >=104 weeks, 5.8% unknown duration. Of the estimated people with long COVID, 556,000 (31%) first reported confirmed or suspected COVID prior to the Alpha variant, 249,000 (14%) in the Alpha period, 446,000 (25%) in the Delta period, and 438,000 (24%) in the Omicron period.

Table 1 illustrates the prevalence of long COVID symptoms. Fatigue was the most common, whilst ENT-related symptoms included dyspnoea, loss of smell, loss of taste, vertigo, sore throat, wheezing, rhinorrhea and sneezing. UK population estimates for the presence of long COVID are demonstrated in Figure 1. Adults aged 35-49 years had the highest estimated prevalence of self-reported long COVID (4.13% [95% CI 3.96-4.30]). The estimated percentage of women with long COVID (3.20% [95% CI 3.11-3.30]) was higher than men (2.34% [95% CI 2.25-2.42]).

Those of White ethnic origin had higher estimated prevalence rates of long COVID (2.85% [95% CI 2.78-2.92]) compared to those of Asian (2.03% [95% CI 1.74-2.33]) or Black
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(1·59% [95% CI 1·09-2·08]) ethnicity. Those in the most deprived Index of Multiple Deprivation quintile group experienced the highest estimated prevalence of long COVID (3·58 [95% CI 3·35-3·80]). Individuals who had pre-existing health conditions and disabilities which limit their activity by a little (5·97% [95% CI 5·60-6·34]) or by a lot (6·85% [95% CI 6·41-7·29]) had a higher estimated prevalence of long COVID compared to those with no other health conditions (2·25% [95% CI 2·19-2·32]).

Discussion

This study identifies ENT related long COVID symptoms including dyspnoea, anosmia, ageusia, vertigo, and sore throat. Groups at increased risk of long COVID include women, those aged 35-49, of ‘white’ ethnic origin or with disabilities.

The analysis is strengthened by a large, weighted sample with longitudinal follow-up of participants. However, results can be confounded by non-response or drop-out relating to the presence or absence of long COVID. The majority of respondents were of ‘white’ ethnicity which limits the generalisability of results to other population groups.

The inclusion of symptoms at four weeks following COVID infection may overestimate the prevalence of post COVID syndrome. This study therefore reports separate data for symptom prevalence at >12 weeks and >4 weeks onset. Furthermore, the survey relies on self-reporting despite a known mismatch between subjective reporting and psychophysical testing of symptoms. Finally, the presence of symptoms such as rhinorrhea, sneezing and wheezing could relate to individual variants of COVID but specific data on this was not available.

This study confirms previous findings on long COVID symptoms including that individuals with disabilities are at higher risk. Future policies should focus on assisting the most vulnerable groups by widening access to chemosensory disorder and long COVID clinics in the UK. A recent James Lind Alliance Priority Setting Partnership has confirmed that there is still demand...
for high quality clinical trials in the management of chemosensory disorders and long COVID.\textsuperscript{10}

Future researchers should draw upon data in this study to identify the most affected population groups.

Acknowledgements

N/A

Data Access, Responsibility, and Analysis

SG had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Data was drawn from the publicly available UK CIS.

Patient and Public Involvement statement

This report was prepared following consultation with patient groups including the charity ‘Fifth Sense’ for people affected by smell and taste disorders. Advice from members of the charity was taken at all stages and guided the reported outcomes to extend beyond purely anosmia to other chemosensory symptoms.

Data sharing statement

All data used in this article is publicly available from the UK CIS (https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/prevalenceofongoingsymptomsfollowingcoronaviruscovid19infectionintheu k/6may2022#main-points).
References


Table 1: Prevalence of symptoms of long COVID

<table>
<thead>
<tr>
<th>Long COVID symptom</th>
<th>Prevalence (%,[95% CI]) after &gt;12 weeks COVID</th>
<th>Prevalence (%,[95% CI]) after &gt;4 weeks COVID†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakness or tiredness (fatigue)</td>
<td>50.3 [48.4 - 52.3]</td>
<td>51.2 [49.5 - 52.9]</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>33.5 [31.9 - 35.0]</td>
<td>32.9 [31.6 - 34.3]</td>
</tr>
<tr>
<td>Loss of smell</td>
<td>31.4 [29.8 - 33.0]</td>
<td>26.4 [25.2 - 27.6]</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>25.2 [23.9 - 26.5]</td>
<td>23.4 [22.3 - 24.5]</td>
</tr>
<tr>
<td>Muscle ache</td>
<td>23.8 [22.5 - 25.0]</td>
<td>22.7 [21.6 - 23.8]</td>
</tr>
<tr>
<td>Headache</td>
<td>21.6 [20.3 - 22.9]</td>
<td>21.7 [20.7 - 22.8]</td>
</tr>
<tr>
<td>Cough</td>
<td>17.4 [16.2 - 18.4]</td>
<td>20.7 [19.6 - 21.7]</td>
</tr>
<tr>
<td>Loss of taste</td>
<td>23.8 [22.5 - 25.2]</td>
<td>20.6 [19.4 - 21.6]</td>
</tr>
<tr>
<td>Memory loss or confusion</td>
<td>20.1 [18.9 - 21.3]</td>
<td>18.7 [17.7 - 19.6]</td>
</tr>
<tr>
<td>Trouble sleeping</td>
<td>18.5 [17.4 - 19.6]</td>
<td>17.5 [16.5 - 18.4]</td>
</tr>
<tr>
<td>Worry or anxiety</td>
<td>17.2 [16.1 - 18.3]</td>
<td>16.0 [15.1 - 17.0]</td>
</tr>
<tr>
<td>Low mood</td>
<td>16.9 [15.8 - 18.0]</td>
<td>15.9 [15.0 - 16.8]</td>
</tr>
<tr>
<td>Runny nose or sneezing</td>
<td>10.6 [9.7 - 11.5]</td>
<td>11.1 [10.4 - 11.9]</td>
</tr>
<tr>
<td>Noisy breathing (wheezy)</td>
<td>10.8 [9.9 - 11.6]</td>
<td>10.8 [10.0 - 11.5]</td>
</tr>
<tr>
<td>Palpitations</td>
<td>10.4 [9.6 - 11.3]</td>
<td>9.6 [8.9 - 10.4]</td>
</tr>
<tr>
<td>Sore throat</td>
<td>9.3 [8.4 - 10.2]</td>
<td>9.6 [8.9 - 10.3]</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>8.4 [7.6 - 9.2]</td>
<td>8.0 [7.4 - 8.7]</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>7.3 [6.5 - 8.0]</td>
<td>6.6 [6.0 - 7.2]</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>5.4 [4.7 - 6.0]</td>
<td>5.5 [4.9 - 6.1]</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>4.4 [3.7 - 4.9]</td>
<td>4.3 [3.8 - 4.8]</td>
</tr>
<tr>
<td>Fever</td>
<td>2.8 [2.3 - 3.2]</td>
<td>2.6 [2.3 - 3.0]</td>
</tr>
</tbody>
</table>

† also includes respondents with unknown duration from COVID infection (5.8%).
Figure 1: Estimated percentage of people living in private households with self-reported long COVID of any duration

UK CIS: four-week period ending 3 April 2022.\textsuperscript{5}