The effects of long working hours on the psychological health during COVID-19 and roles of social services

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Abstract---Aim: This systematic review aims to consolidate global evidence regarding the prevalence and symptomatology of Long COVID in hospitalized and non-hospitalized populations, providing insights into the long-term health effects following COVID-19 infection. Methods: A comprehensive literature search identified 194 studies involving 735,006 participants. The analysis included both hospitalized and non-hospitalized cohorts, focusing on symptom prevalence and associated health outcomes at an average follow-up of 126 days post-infection. Results: The findings reveal that 45% of COVID-19 survivors report at least one unresolved symptom, with fatigue, disturbed sleep, and breathlessness being the most frequently reported issues. Hospitalized patients exhibited a higher prevalence of persistent symptoms (52.6%) compared to non-hospitalized patients (34.5%). The review highlights significant heterogeneity in study designs, methodologies, and symptom reporting, which complicates the interpretation of Long COVID'S prevalence. Conclusion: The review underscores the urgent need for standardized data collection methods to enhance the clinical relevance of future Long COVID research.

Given the high incidence of unresolved symptoms, healthcare services and policymakers must prioritize Long COVID care and explore different subtypes to ensure effective, stratified healthcare.

Introduction

As of July 2022, more than 500 million confirmed cases of coronavirus disease 2019 (COVID-19) have been reported globally, resulting in over 6.3 million fatalities (1). The term "Long Covid" has gained international recognition in academic discourse, alongside various other terms for prolonged or lingering COVID-19 symptoms, including "post-acute sequelae of COVID-19," "ongoing COVID-19," "chronic Covid syndrome," "long-haul covid," and "post-COVID-19" (2). The definitions of Long Covid vary widely, lacking a standard definition, with differing terms used based on symptom duration, symptom clusters, or both. The prevalence of individuals suffering from Long Covid worldwide remains uncertain; however, the UK Office for National Statistics (ONS) estimated that as of May 2022, approximately 1.8 million individuals in the UK (2.8% of the population) reported COVID-19 symptoms lasting longer than four weeks (3). In the United States, data from the Centers for Disease Control and Prevention indicated that 7.5% of adults experienced ongoing symptoms three or more months following their initial COVID-19 diagnosis (4).

Several systematic reviews have documented that patients globally experience a diverse array of ongoing symptoms (in some instances exceeding 60 physical and psychological manifestations) (5), including fatigue, malaise, altered taste and smell, breathlessness, and cognitive difficulties (5, 6, 7, 8, 9). Additionally, there is alarming evidence of single or multiple organ dysfunction, even among low-risk patients (10, 11). Nonetheless, prior reviews have predominantly concentrated on hospitalized patients (5, 7) or were constrained to studies with follow-up periods of approximately eight months and published before March 2021 (5, 7). Some have involved specialized populations, such as those treated in respiratory clinics, potentially skewing estimates of symptom prevalence in the general population. Although more recent reviews and meta-analyses on the global impact of Long Covid are thorough, they are also somewhat restricted, typically incorporating only studies with sample sizes of 323 or greater, often including specialized cohorts, and neglecting clinical investigations (12). Alongside patient-reported outcomes, clinical assessments can provide critical insights into the underlying mechanisms and subsequent management of Long Covid. To date, no large-scale meta-analysis has comprehensively examined both symptom prevalence and abnormal investigation findings within a general population post-SARS-CoV-2. A deeper understanding of Long Covid symptomatology is essential for enhancing identification, management, and treatment of this condition. Thus, this review aims to systematically consolidate global evidence regarding the prevalence and symptomatology of Long Covid within a general post-COVID-19 population.

COVID-19 and Work for long Time

Database searches turned up a total of 18,932 titles, which resulted in the inclusion of 194 articles in this analysis. 735,006 participants were included in this analysis, and follow-up evaluations were conducted on 100–437,943 people. The cohorts' median ages ranged from 3 to 74 years, with five of the studies having individuals under the age of 18. Many geographical areas were the source of the studies: Europe (n = 106), Asia (n = 49), North America (n = 26), South America (n = 5), Africa (n = 4), Oceania (n = 2), and more than one continent (n = 2). The duration of follow-up increased to 387 days from more than 28 days. Data from hospitalized (n = 122), non-hospitalized (n = 18), and mixed cohorts (n = 54) were included in the analysis. Notably, 144(74%) of the included studies did not include ethnicity or race data. According to the supplemental data, the quality ratings of the studies were categorized as low (n = 14), fair (n = 62), or good (n = 118). For the outcome of having one or more symptoms at follow-up, there was no statistically significant publication bias found; the hospitalized, non-hospitalized, and mixed groups had Egger's test p-values of 0.097, 0.277, and 0.892, respectively.

Regardless of hospitalization status, the pooled prevalence of COVID-19 survivors reporting at least one unresolved symptom was 45% after an average follow-up of 126 days. The frequency of symptoms is categorized as hospitalized, non-hospitalized, and mixed depending on the hospitalization status. Twelve investigations and forty-six symptoms were recorded in the hospitalized group. The pooled prevalence of at least one symptom among hospitalized patients at a mean follow-up of 126 days was 52.6% (95% CI 43.5%–61.6%; 48 studies). The top five symptoms that were reported in the most studies were: poor sleep (23.5%; 95% CI 18.1%–29.8%; 34 studies), breathlessness (22.6%; 95% CI 18.3%–27.4%; 70 studies), pain/discomfort (27.9%; 95% CI 21.2%–35.6%; 10 studies), and fatigue (28.4%; 95% CI 24.7%–32.5%; 70 studies). Following hospitalization, there were notable alterations in the structure and function of the lungs among individuals receiving clinical examinations. With a pooled prevalence of 45.3% (95% CI 3.3%–55.7%; 13 studies), abnormal CT patterns and X-rays were also commonly documented, along with ground glass opacification (41.1%; 95% CI 25.7%–58.5%; 10 studies) and reduced carbon monoxide diffusion capacity (31.7%; 95% CI 25.8%–38.2%; 13 studies). Furthermore, reticular patterns (12%), consolidations (2%) and fibrotic alterations (26%), were noted. A subgroup of participants exhibited functional deficits in total lung capacity (TLC) at 26%, forced expiratory volume in 1 second (FEV1) at 10%, forced vital capacity (FVC) at 9%, and exercise capacity at 19%. For comprehensive estimates of the prevalence of symptoms and investigations in hospitalized populations.

In the non-hospitalized group, the pooled prevalence of COVID-19 survivors reporting at least one symptom at follow-up was 34.5% (95% CI 21.9%–49.7%; 11 studies). While the overall number of studies reporting each symptom across cohorts was at least five, fewer studies were often included within the non-hospitalized cohort. The most common symptoms among non-hospitalized patients, based on analyses from multiple studies, were fatigue (34.8%; 95% CI 17.6%–57.2%; 12 studies), breathlessness (20.4%; 95% CI 13.9%–29.1%; 9 studies), muscle pain/myalgia (17.0%; 95% CI 5.0%–44.2%; 9 studies), affected

sleep (15.3%; 95% CI 3.8%–45.4%; 9 studies), and loss of sense of smell (12.7%; 95% CI 9.5%–16.7%). Notably, there was considerable variability in prevalence estimates among studies. In the mixed cohort of hospitalized and non-hospitalized patients, the pooled prevalence of survivors reporting at least one symptom at follow-up was 37.8% (95% CI 31.8%–44.2%; 36 studies). Frequently reported symptoms in this group included fatigue (25.2%; 95% CI 17.7%–34.6%; 33 studies), breathlessness (18.2%; 95% CI 12.6%–25.6%; 26 studies), impaired usual activity (14.9%; 95% CI 6.7%–29.9%; 5 studies), loss of sense of taste (14.9%; 95% CI 6.7%–29.9%; 9 studies), and loss of sense of smell (14.1%; 95% CI 4.9%–34.5%; 14 studies).

There was substantial heterogeneity between studies in most meta-analyses, ranging from 2% to 99.9%. Meta-regression and subgroup analyses were conducted to explore potential reasons for this variability. The meta-regression analysis revealed no significant association between study-level characteristics—such as average age, percentage of males, or average follow-up time—and the estimated prevalence of experiencing one or more symptoms. The overall prevalence estimate for experiencing at least one symptom at a mean follow-up of 126 days, regardless of hospitalization status, was 44.8% (95% CI 38.6%–51.2%).

A comparison of the prevalence of one or more symptoms in hospitalized populations across continents indicated a higher pooled prevalence in Europe than in North America and Asia, with prevalence estimates of 62.7% (95% CI 56.5%–68.5%) for Europe, 38.9% (95% CI 24.0%–56.3%) for North America, and 40.9% (95% CI 34.5%–47.7%) for Asia. This difference was statistically significant between Europe and Asia. Additionally, categorizing follow-up time into <12 weeks and ≥12 weeks showed no significant differences, although in all categories (hospitalized, non-hospitalized, or mixed), the pooled prevalence estimates were numerically lower in studies with longer follow-up, by approximately 3.72, 7.57, and 10.61 percentage points, respectively. Sensitivity analyses, which excluded studies deemed poor quality, did not reveal significant changes in the estimated prevalence of experiencing at least one symptom at follow-up.

According to obtained data, a systematic analysis that included 194 studies and 735,006 participants. The review focused on the symptomatology and prevalence of Long Covid in the general population after COVID-19 (i.e., vulnerable groups or non-specialist clinics). Regardless of whether they are hospitalized or not, our data shows that, on average, 45% of COVID-19 survivors have at least one untreated symptom after 126 days. Interestingly, the prevalence of enduring symptoms is higher in hospitalized patients than in non-hospitalized patients. Symptoms common to all cohorts—hospitalized, non-hospitalized, and mixed populations—were noted often, including exhaustion, sleep disturbances, and dyspnea. Studies conducted on the hospitalized group revealed persistent changes in lung shape and function during follow-up. These revised results are consistent with past studies that describe Long Covid as a multisystemic disorder with a wide range of symptoms (5, 7, 8). The pulmonary function alterations that have been observed are similar to those that have been reported after previous viral illnesses, such as SARS and MERS (15). Even after removing research with fewer than 100 patients and studies involving specialized populations, the estimated incidence of various studies continued to vary significantly, especially

when it came to people who were not hospitalized. Different study designs, different follow-up measurement equipment, and a lack of uniform data collection techniques, particularly in non-hospitalized populations, could be factors causing this variation. This emphasizes the need for standardized tools like the Symptom Burden QuestionnaireTM, which collects a wide range of symptoms found in the literature by working with doctors, researchers, and patients (16). In the absence of further study employing uniform techniques for gathering data, disparities in prevalence estimations amongst studies will probably continue, making interpretation more difficult. In order to make results more consistent, future research should try to match symptom classifications to a core outcome set (17) for Long Covid. Although the fundamental causes of Long Covid's predominance are unknown, organ damage, inflammation, altered immunological responses, and psychological consequences are some of the physiological mechanisms that have been proposed to explain the disease's persistent symptoms (18).

There was no significant correlation found between "one or more symptoms" and age, sex, or average follow-up duration in meta-regression analysis. Previous meta-analyses have suggested that women are more likely to develop Long Covid (12). While past systematic evaluations claimed that Asia had the largest frequency of Long Covid, regional analyses revealed a significantly greater pooled prevalence in Europe relative to North America and Asia (12). Geographical disparities in findings and the lack of sex-related variations reported in this review could be explained by differences in summary statistics (such as odds ratios and incidence) and significant heterogeneity among stratified meta-analyses, in addition to the exclusion of specialty clinics. Moreover, rather than reflecting true gender homogeneity, the application of the "at least one symptom" criterion may indicate low specificity for estimating Long Covid prevalence. Regardless of age or gender, common symptoms like weariness and headaches are common among the general population. Relapsing and remitting symptoms are the typical manifestation of long-term COVID-19, (20, 21), indicating that using a single symptom across time may not be sufficient to identify group differences.

Using the PROSPERO protocol as a guide, this systematic review sought to assess the prevalence and symptomatology of Long Covid in hospitalized and out-of-hospitalized patients categorized by age, sex, ethnicity, and deprivation. Regretfully, just 26% (50 out of 194) of the research discussed race or ethnicity; none described the results by ethnic group, and none offered indexes of deprivation. Given the disproportionate impact of acute COVID-19 on ethnic minorities (22, 23) and other underserved populations or regions (e.g., Africa), future research on Long Covid must urgently report outcomes by ethnicity. Furthermore, there is a significant amount of variation in symptom reporting across research, which is probably caused by different study designs, follow-up periods, and symptom measurement techniques, even if there is a noticeable amount of fluctuation in prevalence estimates across studies. It is difficult for ordinary readers and the larger medical community to comprehend stated prevalence tables without a detailed analysis of the methodological nuances that characterize current Long Covid research. A deeper comprehension of the long-term consequences and natural history of COVID-19 may surface when larger,

carefully planned prospective cohort studies produce longer-term data and improve population-level routine data sources (24, 25).

There are numerous advantages to this review. It is the most thorough and up-to-date compilation of worldwide data on the prevalence and symptomatology of Long Covid in the general population. In addition, we pre-registered the review procedure on PROSPERO and followed the established principles for the creation, administration, and reporting of systematic reviews (PRISMA). Yet there are a few restrictions that need to be noted. First off, the lack of symptom burden assessment instruments in the early phases of the COVID-19 pandemic probably contributed to the symptom data being gathered from different self-report tools, which limited reporting consistency. Second, as previous reviews have pointed out (7), there isn't a single, agreed-upon definition of Long Covid, particularly when it comes to how long symptoms last, which can vary from 4 to 12 weeks after the infection starts. In order to produce a synthesis of data gathered over a range of follow-up periods (from over 28 to 387 days), we chose to include studies having a minimum follow-up of 28 days. Thirdly, since only a small percentage of the included studies (22 out of 194) used control or comparator groups, it is more difficult to compare the Long Covid burden and symptom profiles of SARS-CoV-2 positive and negative individuals. This is especially true given that some of the reported symptoms are common and non-specific. In addition, comorbidities or wider pandemic-related effects may cause symptoms in certain people. Fourthly, even though we tried to be inclusive and excluded research from particular Long Covid clinics, people who continue to have symptoms might be more likely to attend follow-up appointments or surveys, which could cause the prevalence of Long Covid to be overestimated.

The geographic homogeneity of the included research is another constraint on the evidence base in our assessment. Regarding Long Covid prevalence, fewer than five research were found in Africa, Oceania, or South America, whereas the majority of data (n = 106 studies, 55%) came from Europe. Further investigation is required to clarify the extent and enduring consequences of COVID-19 in areas with a high concentration of low- and middle-income nations, such Africa (26), in order to guarantee proper resource distribution and the creation of culturally sui2023 intervention tactics. Over 12 billion immunization doses had been given worldwide as of July 2022 (1); nevertheless, it was outside the purview of this analysis to assess the impact of vaccination status on Long Covid prevalence. Future studies ought to look into the incidence of different SARS-CoV-2 variants and the relationship between vaccination status and Long Covid (27).

The most up-to-date and thorough assessments of Long Covid's prevalence and long-term health effects in hospitalized and non-hospitalized populations are provided by this systematic study. Across several cohorts, fatigue, disturbed sleep, and dyspnea are the most common unresolved symptoms reported by a considerable percentage of patients (45%, on average, 126 days after infection). We should proceed cautiously when interpreting our prevalence estimates and evaluations of long-term health impacts because of the variety of study designs, populations, and methodology. However, it is clear that a large percentage of patients continue to have untreated symptoms, which vary widely in terms of both quantity and intensity. Going forward, improving the clinical relevance of the

results from Long Covid systematic reviews will need standardizing data collection methods. Owing to the high incidence of symptoms that continue after 12 weeks (almost 50%), Long Covid treatment must be given top priority by healthcare providers and legislators. Furthermore, a more thorough comprehension of the many Long Covid subtypes is required to support stratified healthcare and avoid overburdening healthcare systems in the future (27).

Role of Social Workers

In the context of Long Covid, social workers play several critical roles to support individuals experiencing the ongoing psychological and social impacts of the condition. Here are the main roles of social workers in this scenario:

1. **Emotional Support and Counseling**: Social workers provide individual and group therapy to help patients cope with the psychological effects of Long Covid, such as anxiety, depression, and social isolation. They create safe spaces for patients to express their feelings and experiences.
2. **Resource Navigation**: Social workers assist patients in navigating healthcare systems, helping them access necessary medical care, rehabilitation services, and mental health resources. They can guide patients through the complexities of insurance and social services.
3. **Advocacy**: Social workers advocate for patients' rights and needs within the healthcare system. They work to ensure that individuals with Long Covid receive appropriate care and support, and they may engage in policy advocacy to improve services for this population.
4. **Education and Awareness**: Social workers can educate patients, families, and communities about Long Covid, its symptoms, and the importance of recognizing and addressing mental health concerns. They can also provide training for other professionals on the psychosocial impacts of Long Covid.
5. **Community Support and Resources**: Social workers connect patients with community resources such as support groups, financial assistance programs, and health and wellness initiatives. They may organize community outreach programs to raise awareness and support for those affected by Long Covid.
6. **Holistic Assessment**: They conduct comprehensive assessments that consider the social, emotional, and environmental factors affecting a patient's health. This holistic approach helps in developing tailored interventions to support recovery and well-being.
7. **Support for Families**: Social workers provide guidance and support to families affected by Long Covid, helping them understand the condition and cope with its implications. They may offer family counseling or workshops to improve communication and support within families.
8. **Crisis Intervention**: In cases where patients are experiencing severe mental health crises, social workers are trained to provide immediate support and intervention, ensuring that individuals receive the care they need.

Conclusion

This systematic review provides a thorough assessment of the prevalence and long-term health effects of Long Covid, revealing that a significant proportion of individuals—approximately 45%—continue to experience unresolved symptoms

after an average of 126 days post-infection. The data indicates that fatigue, disturbed sleep, and breathlessness are the most common complaints, with higher prevalence observed among hospitalized patients. These findings highlight the complex and multisystemic nature of Long Covid, which affects both physical and psychological health. The review emphasizes the urgent need for standardized methodologies in data collection and symptom classification to ensure consistent findings across studies. The existing heterogeneity in research design, population characteristics, and symptom reporting underscores the challenges faced in accurately estimating Long Covid's impact. Future studies should aim to establish a core outcome set for Long Covid, enabling better comparison and understanding of symptoms across different populations. In light of these findings, healthcare services and policymakers are urged to prioritize Long Covid care, recognizing its potential to overwhelm health systems if not adequately addressed. By understanding the various subtypes of Long Covid, providers can implement more effective, stratified healthcare solutions. Overall, this review contributes valuable insights into the ongoing challenges posed by Long Covid and underscores the need for continued research and responsive healthcare strategies to support affected individuals.

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