Utilizing Neurodiverse Workplace Strategies to Support the Growing Population of Long COVID Cases in a Neuroinclusive Workplace: A Paradigm Shift for Neuroacquired Employees

Piper Hutson
*Lindenwood University, phutson@lindenwood.edu*

James Hutson
*Lindenwood University, jhutson@lindenwood.edu*

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Piper Hutson1, James Hutson1

1Lindenwood University, Saint Charles, USA

Corresponding Author: James Hutson, Lindenwood University, Saint Charles, USA,
Email: Jhutson@lindenwood.edu

ABSTRACT
The COVID-19 pandemic has led to the emergence of long COVID, a condition in which patients report persistent symptoms after recovering from acute SARS-CoV-2 infection. A review conducted by the National Institute for Health Research (NIHR) suggests that long COVID may actually consist of four different syndromes: post-intensive care syndrome, post-viral fatigue syndrome, and long-term COVID syndrome. The absence of a clear definition for this condition may lead to under-recognition and under-treatment of the symptoms experienced by those affected. Moreover, existing programs designed for neuro diverse individuals may be adapted to support the growing neuro acquired population. Communication strategies, such as providing processing time and visual aids, can be useful in workplace settings. Additionally, offering group communication assistance and using plain language and visual signposts can help minimize stress and increase understanding. Providing clear agendas, specific instructions, and feedback that is both direct and positive can also help individuals with long COVID to adjust and perform better in the workplace. Finally, taking into account communication preferences and the availability of virtual communication platforms can help alleviate anxiety for neuro diverse individuals. Understanding the nuances of long COVID and its impact on individuals and the workplace can help healthcare providers and employers provide the support and accommodations necessary for this growing population.


INTRODUCTION
Long COVID, also known as post-acute sequelae of SARS-CoV-2 infection (PASC), is a growing concern among healthcare professionals due to its long-term impact on cognitive, mental, and physical health (Copley et al., 2023). The incidence of long COVID is on the rise and is expected to become a significant public health issue in the coming years (Owais et al., 2023). One of the most significant challenges associated with long COVID is the lack of knowledge regarding its long-term impact on cognitive and mental health. Recent studies have suggested that long COVID can lead to a range of neurological symptoms, including “brain fog,” memory loss, and concentration difficulties, among others. Additionally, it is not yet clear whether the cognitive and mental health impacts of long COVID will be temporary or permanent (Chatys-Bogacka et al., 2023).

As more and more are diagnosed with long COVID, there is a growing need for ADA accommodations to be made in workplaces and public spaces. Firms in industry need to be aware of the Neuro acquired condition and the accommodations that will be required to support those who are affected. Just as stroke survivors require specific accommodations, people with long COVID may require similar accommodations to support their cognitive and mental health needs (Barciszewski, 2023). The term
"Neuro acquired" refers to neurological conditions or symptoms that are acquired or developed as a result of an underlying health condition, injury, or disease (Worlein et al., 2005). In the context of long COVID, the term is used to describe the neurological symptoms or conditions that develop as a result of the lingering effects of the virus on the brain and nervous system and is used to differentiate these neurological symptoms from pre-existing neurological conditions or developmental disabilities (Kaushik et al., 2016).

Furthermore, the rise in Neuro acquired conditions caused by the lingering effects of long COVID highlights the importance of recognizing and accommodating Neuro diverse populations. These populations, including those with autism, ADHD, and other neurological conditions, can serve as a model for how to respond to the rise in Neuro acquired conditions caused by long COVID. By adopting a Neuro diverse perspective, we can better understand the needs of people with long COVID and create inclusive accommodations that support their well-being and productivity (Szulc et al., 2021).

Therefore, the projected diagnoses for long COVID are expected to rise, and the long-term impact on cognition, mental, and physical health is still unknown. Firms in industry need to be aware of the Neuro acquired condition and the accommodations required to support those who are affected. Additionally, the rise in Neuro acquired conditions caused by long COVID highlights the importance of accommodating Neuro diverse populations and creating neuro inclusive environments that support the well-being of all individuals. However, firms do not need to do a needs assessment and create their own bespoke program to support those under review here. It is important to consider existing programs for Neuro diverse workers when supporting the growing Neuro acquired population. As this study highlights, the recommendations for supporting the growing population of Neuro diverse and Neuro acquired individuals include providing clear communication, accommodating sensory needs, offering personalized support, providing resources and training for employers and colleagues, and being mindful of individual communication preferences (Figure 1).

LITERATURE REVIEW

The phenomenon of "long covid" has emerged as a description of individuals who have either recovered from COVID-19 but still report lasting symptoms or have experienced symptoms for much longer than expected (Amenta et al., 2020). Many people, including healthcare professionals, have shared their experiences of prolonged symptoms through social media, traditional media, and patient groups (Rushforth et al., 2021). For instance, Professor Paul Garner, an infectious disease specialist, has shared his own experience with the virus, which lasted for seven weeks and included a long list of symptoms that left him feeling unable to function (Garner, 2020). The Royal College of General Practitioners has acknowledged the likelihood of an influx of patients with "extended COVID" and has called for a rapid review of the resources required to care for these individuals (de Lusignan et al., 2020). The college's chair, Martin Marshall, has emphasized the need for GPs to have the necessary support to manage both the physical and emotional aspects of long covid, helping patients to readjust to the aftermath of the illness. In the United States, the condition is expected to affect one in five adults and is expected to become a significant public health issue due to its long-term impact on cognitive, mental, and physical health (Bull-Ottersen et al., 2022). A recent study published in Health Affairs found that COVID long haulers were more likely to be older and female, with more chronic conditions than people in a comparison group who did not have diagnosed long COVID or any of the symptoms associated with it. High blood pressure, chronic lung disease, obesity, diabetes, and depression were identified as leading risk factors for long COVID (Song & Giuriato, 2023).

While the impact of the COVID-19 pandemic has been extensive, and while the full extent of the impact remains unknown, recognized research institutes have identified long Covid as a persistent condition where a range of symptoms can remain long after the acute SARS-CoV-2 infection. Studies have shown that "extended COVID" can affect individuals with Covid-19 from those with mild acute disease to severe forms, with symptoms involving multiple organs and systems, including the respiratory, cardiovascular, neurological, gastrointestinal, and musculoskeletal systems (Raveendran et al., 2021). As noted in these studies, the persistent symptoms of the condition can include fatigue, dyspnea, cognitive impairment, sleep disturbances, symptoms of PTSD, cardiac abnormalities, muscle pain, concentration problems, and headache (Crook et al., 2021). The following will summarize current research on the long-term effects of the pandemic in hospitalized and non-
hospitalized patients and outline the persistent symptoms they endure.

What first must be considered is that what is now recognized as long COVID is, in fact, a collection of different syndromes, according to a review conducted by the National Institute for Health Research (NIHR) in the UK (Pareek et al., 2020). The review was based on a thorough examination of current evidence and interviews with post-hospitalized and non-hospitalized patients who reported experiencing long-term effects of covid-19. The researchers found that long covid did not seem to fit as one unified syndrome, but instead appeared to be a collection of different conditions, including post-intensive care syndrome, post-viral fatigue syndrome, and long-term covid syndrome. Elaine Maxwell, one of the authors of the review and content lead for NIHR's Centre for Engagement and Dissemination, emphasized that these syndromes were only possibilities and not definitive categories (Maxwell, 2020).

This new understanding of the condition is crucial for providing effective care and treatment to patients experiencing long-term effects of COVID-19. It is estimated that up to 45% of patients hospitalized with COVID-19 may need ongoing support, and a significant number of non-hospitalized patients also report experiencing symptoms for an extended period of time (Kewan et al., 2020). Similar reviews also found that patients with long COVID experience a wide range of recurring symptoms, regardless of whether they were hospitalized or not. These symptoms can affect various systems in the body, including the respiratory, cardiovascular, neurological, gastrointestinal, renal, hepatic, and cutaneous systems. The symptoms range in intensity and duration, and do not necessarily present in a linear or sequential manner (Crook et al., 2021).

The absence of a clear definition for long COVID has made it difficult for healthcare services to recognize and treat these symptoms, which can have a further psychological impact on patients. Some patients have reported feeling that their experiences were not being properly recognized or taken seriously by healthcare professionals, which led to difficulties in receiving appropriate care and treatment (Ireson et al., 2022). Also, the researchers also conducted a focus group with members of a long covid Facebook group. The group emphasized that diagnostic uncertainty and conflicting messages from different health professionals led to confusion and frustration for patients. They expressed a preference for a transparent acknowledgment of the limitations of medical knowledge rather than misleading messages that create unrealistic expectations.

As the incidence of long COVID rises, there will be a corresponding growth in need for ADA accommodations in workplaces and public spaces. Therefore, the following proposes that firms in industry should be aware of the Neuro acquired condition and the accommodations that will be required to support these individuals. The importance of accommodating Neuro diverse populations and creating inclusive environments that support the well-being of all individuals shall be used to frame the discussion of inclusivity. The proposed creation of neuro inclusive workplaces will help ensure that accommodations are made for individuals with long COVID and other Neuro acquired conditions, allowing them to remain productive and engaged in the workplace.

**RECOMMENDATIONS**

It is first necessary to discuss the obligations of employers to accommodate their workers with diverse needs. For instance, ADA accommodations refer to changes or modifications made in the workplace or public space to allow individuals with disabilities to have equal access and participation in employment, programs, and services. The term "ADA" refers to the Americans with Disabilities Act, a federal law that prohibits discrimination against individuals with disabilities in various settings, including employment and public accommodations. ADA accommodations can include physical modifications to the workspace, such as wheelchair ramps or accessible restrooms, as well as changes to policies or practices to ensure equal access and participation, such as flexible work arrangements or assistive technology (Ferliger, 2022). These accommodations are intended to support individuals with disabilities in performing their jobs and participating in all aspects of society on an equal basis with their non-disabled peers.

**INTERNATIONAL PROGRAMS**

As the number of individuals diagnosed with long COVID continues to rise, it is important for employers to be aware of the potential need for ADA accommodations to support this population. Similarly, as the prevalence of Neuro acquired conditions grows, it is important to consider how to create a more inclusive workplace. Examples of successful programs supporting
neurodiversity can be found in the technology sector, but it is important to note that many of these programs originated outside of the United States. Such programs have included restructuring the interview process, supportive job services and job coaching, education on learning differences and manager training, and soft skills training. Additionally, some programs have been developed to foster staff-awareness training and better support for individual self-assessment.

Weber et al. (2022) noted that some programs were created to facilitate staff awareness training and enhance individual self-assessment. A prime example is the Danish consulting firm Specialisterne which developed such programming in 2004, driven by the founder’s motivation for his child’s diagnosis and the intersection of abilities that are aligned with software testing. For several years, the organization created and implemented alternative methods to traditional interviews to identify and evaluate Neuro diverse employees. These methods included offering safe and quiet spaces for candidates to communicate comfortably and exhibit their abilities. Following the interview stage, candidates were given an additional 2-6 weeks of evaluation and training (Garriga, 2022).

A leading example of Neuro diverse employment programs can be found at SAP, a German technology firm, which introduced its Autism at Work program in 2013 (Annamalai & Niranjan, 2022). This program is considered the largest of its kind, launched as a “resource effort seeking to quantify results of the cost benefit justification and even science of autism advantage in the workplace” (p.503). While initially intended as a form of corporate social responsibility with a focus on diversity and culture, recruitment initiatives evolved to emphasize the corporate economic value of employee diversity and its impact on the bottom line. The program was initially designed to focus on software testing placements, but it was discovered that Neuro diverse employees possess a broader range of skills applicable to fields such as product management, business analytics, cybersecurity, HR service, and technical support (Lechowski & Krzywdzinski, 2022). Motivations for such programs extend beyond the company and into the wider community. In Germany, the benefits of transitioning individuals from public assistance programs and into jobs are encouraged, as tax revenue can only be generated through a working populace. Therefore, public funding is available to train and support Neuro diverse employees, including SAP’s transferable skills module designed to help employees unfamiliar with working in offices (Gschwind et al., 2022). Furthermore, mentor programs and “buddy systems” have been developed to provide additional cognitive and emotional support to employees.

Government and nonprofit organizations are typically responsible for funding the programmatic support offered by companies like SAP, and regional employment regulations are taken into consideration (Stolman, 2022). These programs collect and suggest neurodivergent candidates and provide wraparound support from job searches to upskilling, assisting with prescreening, securing public funding for training (when available), occasionally administering such training in-house, and providing ongoing mentorship outside of office hours (Maslahati et al. 2022). One example of such a successful program is the DXC Dandelion Program, created by Hewlett Packard (HP) in 2014. The program was designed with the help of partnerships with the Cornell Institute of Disability and Employment at La Trobe University in Melbourne, Australia, using economic and statistical metrics (Bury et al. 2022). The program aims to hire Neuro diverse workers for software testing, data analytics, and cyber security. The largest number of workers are placed in a software testing pod, working collaboratively and contracted out to the Australian government’s Department of Human Services. According to Nick Wilson, Director of HPE South Pacific, the program has resulted in productivity gains, quality improvement, boosts in innovation capabilities, and broad increases in employee engagement, and no other program in the firm provided so many benefits in all three biopsychosocial arenas. One of the most notable differences in management style where there now exists, through training and education, greater sensitivities to Neuro diverse needs in the workplace (ARE Consultants, 2021).

DOMESTIC PROGRAMS

In recent years, inclusion programs have expanded beyond the technology sector into other industries such as finance and defense, with examples such as SAP, Virgin, and Microsoft leading the way (Fabritius, 2022). For instance, Microsoft has implemented multiday, hands-on training sessions for staff to identify Neuro diverse individuals and interact with them appropriately. These trainings include instruction on identifying core deficits such as limited eye contact, repetitive gestures and
movements, and difficulty with non-direct or non-literal language (Haller & Carroll, 2022). To facilitate these trainings, some companies have chosen to partner with nonprofits or governmental agencies charged with career support for individuals with disabilities. For example, Freddie Mac has partnered with the Autistic Self-Advocacy Network (ASAN) to provide support for Neuro diverse individuals (Patton, 2022). Ford Motor Company has also created a program called Ford Inclusive Works (now called FordWorks) in partnership with the Autism Alliance of Michigan.

Improved employee retention is a key feature of some neurodiversity programs, as demonstrated by Wells Fargo's 100% retention rate in their Neurodiversity Program. The program focuses on creating accessible and inclusive hiring practices, providing education, and professional support to establish meaningful employment opportunities. The finance firm aims to transform its culture through various support services, such as hiring manager selection and education, new hire onboarding, buddy programs, career coaching, and community enrichment. To ensure a low-stress experience, the firm augments the interview process and de-prioritizes typical portfolio requirements to focus on hiring based on skills instead of social strengths in interviewing. New employees receive three full weeks of concierge services during the onboarding process, which include orientation, technical set-up support, accommodation processes, and role-based training through AGILE. Additionally, new workers are paired with a mentor and/or a peer through a buddy program, provided with career coaching and community enrichment. The program also provides leadership opportunities, enabling employees to lead an advisory council overseeing disability definitions and considerations for cognitive accommodations, including evaluating the work environment (Kristofik & Johnson, 2022).

**COMMUNICATION PREFERENCES**

The programs that support Neuro diverse workers place a great emphasis on communication. This includes training hiring managers to understand the diverse communication styles among employees. In order to develop effective communication practices, it is important to take a person-centered approach. This means that the best way to understand communication preferences for direct reports or colleagues is to directly ask. While this applies to all employees, management should be especially aware of the working conditions that suit Neuro diverse employees best and communicate expectations, deadlines, and outcomes clearly. Many Neuro diverse individuals prefer to learn through hands-on experience and require a step-by-step breakdown of work processes. Uncertainty can be confusing and lead to increased anxiety. Communication is often difficult for Neuro diverse individuals due to the vast wealth of socially attained knowledge that is not innately understood. Many non-verbal cues and subtleties are not easily detected during oral exchanges. As a result, written communication is often preferred by many, given the differences in spoken communication processing (Elsherif et al., 2022).

The recommendations discussed above for supporting Neuro diverse workers can also be applied to support Neuro acquired workers with long COVID. Neuro acquired conditions like long COVID can affect a person's cognitive abilities, including memory, attention, and decision-making skills, as well as communication and social skills. Therefore, accommodating these individuals' unique needs can help them perform their job duties successfully. One way to support Neuro acquired workers with long COVID is by providing ADA accommodations. Accommodations can range from job restructuring, flexible work schedules, and providing assistive technologies, to altering the physical work environment to reduce distractions or sensory overload. Accommodations can also include communication support, such as providing written instructions and using clear and direct language in oral communication.

Moreover, training programs can be designed to support Neuro acquired workers with long COVID. These training programs should consider the specific cognitive and communication needs of these workers and include hands-on training, visual aids, and step-by-step instructions. Additionally, manager training can help managers understand and support the unique needs of these workers. Finally, person-centered communication design is essential when communicating with Neuro acquired workers with long COVID. Managers and colleagues should be aware of the cognitive and communication difficulties these individuals may face and should be mindful of their communication styles. Asking direct reports or colleagues about their preferred communication style and providing written communication when possible can facilitate effective communication.
One strategy to support effective communication in the workplace for Neuro diverse workers is to provide processing time and visual aids. Communication partners should allow for intermittent pauses to facilitate the processing of information, particularly in large meetings or conversations (Annabi & Locke, 2019). Additionally, small talk should be kept brief, and exit strategies for conversations can be provided to avoid overwhelming Neuro diverse individuals. Neurotypical workers may use workplace chat to build mutual trust and understanding, but this may not be effective for Neuro diverse workers, who may find it tiring or difficult to follow if the topic seems out of context or irrelevant. One strategy is to relate the topic to the current discussion and engage the communication partner’s interests to keep them involved (Annabi & Locke, 2019).

Assistance with group communication can also be helpful, including interpreting nonverbal or social cues for individuals in an empathetic and non-patronizing way. Using plain language and visual aids can benefit not only Neuro diverse individuals but also other workers who may struggle with navigating work, popularity, and global culture. Visual signposts such as bullet points or numbering important items can help prioritize information and maintain focus on the meeting agenda. Sending out agendas ahead of time and providing advanced notice for meetings that require social interaction can also reduce anxiety for Neuro diverse individuals (Fabritius, 2022).

To support Neuro diverse and Neuro acquired individuals in the workplace, it is important to provide clear agendas ahead of time to regulate their mental and emotional state and maintain a set schedule during meetings. It is also crucial to give highly specific instructions and avoid assuming that something may be obvious, especially during socially oriented tasks, and to limit abstract or ambiguous terms. Providing specific deadlines and accurate time phrases is also necessary to ensure success (Herrick et al., 2022). In addition, attention switching can take time for Neuro diverse individuals, but providing context for the work requested via a supervisor or colleague can facilitate this process. While most individuals with ASD have difficulty adjusting to change, clear timelines and instructions can help them adapt. When corrective action is required, feedback should be direct but measured, and positive reinforcement should be provided regularly due to the impact of Rejection Sensitive Dysphoria (RSD) on the emotional and mental health of individuals who are already self-critical. Feedback that is sensitive, direct, and includes measurable examples can limit confusion and emotional inference on job performance (Whittenburg et al., 2022).

To create a positive work environment and reduce stress, it is important to consider communication preferences. Due to the pandemic of 2019, virtual communication through platforms like Microsoft Teams and Zoom has become more prevalent. For individuals with social anxiety, virtual meetings provide an alternative to engaging verbally, allowing participation via comments and instant messaging (Dewi, 2022). While in-person meetings offer the opportunity to socialize before and after, virtual meetings offer greater predictability and structure. However, the requirement for cameras to be turned on during virtual meetings can increase anxiety for Neuro diverse individuals. To accommodate individual preferences, it is important to ask if there is a preference for cameras on or off and to provide prior notification of the meeting organizer’s preference. Additionally, taking breaks during or between calls can be helpful in regulating the difficulty of remaining seated and still for prolonged periods (Dewi, 2022).
<table>
<thead>
<tr>
<th>Strategies</th>
<th>Description</th>
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<tbody>
<tr>
<td>Clear Agendas</td>
<td>Provide clear agendas ahead of time to maintain a preset schedule during meetings and allow for mental and emotional regulation.</td>
</tr>
<tr>
<td>Specific Instructions</td>
<td>When disseminating information, provide highly specific instructions to avoid assumptions and limit abstract or ambiguous terms.</td>
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<tr>
<td>Specific Deadlines and Time Phrases</td>
<td>Provide specific deadlines and accurate time phrases to ensure understanding and minimize confusion.</td>
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<tr>
<td>Contextualization</td>
<td>Provide context for the work being requested via the supervisor or colleague to facilitate attention switching.</td>
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<tr>
<td>Direct Feedback with Measurable Examples</td>
<td>Feedback should be direct, but measured with measurable examples to limit confusion and emotional inference on job performance.</td>
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<tr>
<td>Communication Preferences</td>
<td>Be mindful of communication preferences, including virtual communication through platforms such as Microsoft Teams and Zoom. Consider providing the option to turn off cameras during virtual meetings and taking breaks to regulate during prolonged periods of sitting.</td>
</tr>
<tr>
<td>Processing Time and Visual Aids</td>
<td>Provide processing time and visual aids, such as bullet points or numbering, during group communication. Help interpret nonverbal or social cues for individuals in an empathetic and non-patronizing fashion.</td>
</tr>
<tr>
<td>Buddy Programs and Mentorship</td>
<td>Offer buddy programs and mentorship to provide further cognitive and emotional support.</td>
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</tbody>
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**FIGURE 1- Recommended Strategies for Supporting Neuro diverse and Neuro acquired Audiences in the Workplace**

**CONCLUSION**

As the understanding of long COVID and other Neuro acquired conditions continues to evolve, it is important for workplaces to create a neuro inclusive environment that supports both Neuro diverse and Neuro acquired employees. The recommendations discussed in this article, including clear communication strategies, providing processing time, and using visual aids, can help create an inclusive workplace that meets the needs of diverse individuals. Additionally, existing programs for Neuro diverse workers should be considered to support the growing Neuro acquired population. While research in this area is still emerging, it is clear that the impact of long COVID and other Neuro acquired conditions on the workforce is significant, and further research is needed to develop effective interventions and strategies for supporting employees. As more is learned about these conditions, it will be important for workplaces to remain flexible and responsive in order to support the needs of all employees. By creating a supportive environment that meets the needs of Neuro diverse and Neuro acquired workers, workplaces can benefit from the unique strengths and perspectives of these individuals while promoting inclusivity and enhancing productivity.

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