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Vocational Rehabilitation and Long COVID-19: Utilizing a Matrix for Multi-Level Interventions

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Long COVID-19 is a general term for a new chronic health condition that results from acute COVID-19 infection. Several unbounded, disabling physical and/or psychiatric symptoms manifest in very individualized ways. Vocational rehabilitation clients with Long COVID can face a variety of barriers to employment, like other individuals with disabilities, and as a result of the presence of an unfamiliar and new condition. The Rehabilitation Research Matrix (RRM) is a sociological framework that identifies micro, meso, and macro level actors in rehabilitation service provision as intersecting entities, with the power to influence actors in the other levels. The author describes how the RRM can be used as an empowering, collaborative tool in program evaluation, research, policy development, and treatment planning for vocational rehabilitation clients with Long COVID.

Keywords: Long COVID, vocational rehabilitation, disability, rehabilitation research matrix

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Coronavirus Disease 2019 (COVID-19) is an acute, infectious disease with a potential aftermath consisting of various long-lasting symptoms and related chronic health conditions, which researchers and clinicians are still working to uncover. Classified as "Long COVID," post-COVID conditions, Post-Acute Sequelae of SARS CoV-2 infection (PASC), or Long Haul COVID, these symptoms vary in severity, type, length of time, and complexity. But they persist for at least 4 weeks past initial infection (Adler et al., 2022; Garg et al., 2021). Factors influencing these variations can include age, weight, and pre-existing health conditions. Rehabilitation professionals and researchers, in a variety of treatment and academic settings, must be prepared to address the ways that Long COVID can manifest itself in the lives of patients – not only medically, but also psychologically and vocationally. At the writing of this paper, there is an on-going study by the Centers for Disease Control and Prevention to assess the prevalence of Long COVID, but early estimates indicate that around 20% of Americans are experiencing a form of the condition (CDC, 2023; Smith-Schoenwalder, 2022).

The author will discuss Long COVID-19 and approaches to vocational rehabilitation service provision, through the framework of the Rehabilitation Research Matrix (Solvang et al., 2017). The matrix helps to illustrate the micro, meso, and macro-level mechanisms of rehabilitation interventions. The Rehabilitation Research Matrix also considers the intersection of sociocultural, clinical, academic, and legislative needs and responsibilities in the rehabilitation process.

Medical and Psychological Implications

When SARS CoV-2 enters the human body, it multiplies and solicits an immune response. This virus enters into particular cells via angiotensin-converting enzyme 2 receptors (Crook et al., 2021). These receptors can be found in multiple tissues and organs, such as the lungs, mucosa, and within the cardiovascular, gastrointestinal, and central nervous systems (e.g. heart, kidneys, brain). The infection leads to an inflammatory response that now has the ability to involve multiple organ systems and lead to various acute manifestations.

For some individuals who contract COVID, the systemic, acute symptoms can lead to chronic symptoms. Researchers have comprised a few theories as to why, although they are not definitive. According to University of California Television (2021), the following are three theories as to why COVID may persist in some individuals: 1) direct viral toxicity that has caused long-lasting cellular damage; 2) immune system dysregulation where COVID has triggered a chronic autoimmune response; and 3) persistent viral reservoirs where pockets of virus remain in the body undetected.

As a possible result of these theories, Long COVID-19 expresses itself as various non-contagious symptoms and related chronic, multi-organ health conditions lasting 2 months or more (Wong et al., 2022). It's important to note that individuals who experienced COVID-19 infection without symptoms are also susceptible to Long COVID (Adler et al., 2022; Doykov et al., 2021; India Education News Desk, 2022). Individual experiences with Long COVID will vary, but can include fatigue, shortness of breath or difficulty breathing, persistent cough, chest pain, muscle aches, and loss of smell or taste. COVID-19 infection can lead to various brain conditions, such as encephalopathy, dementia, and injuries due to hypoxia (stroke) (Crook et al., 2021). Greater susceptibility for Long COVID lies with females, individuals who are overweight or obese, those with symptomatic acute COVID, and people whose acute COVID experiences included symptoms that never subsided (Adler et al., 2022).

When the brain is involved in the acute inflammatory response stage of COVID infection, psychological symptoms can present with the physiological symptoms, such as cognitive decline, brain fog, depression, and anxiety. With Long COVID, these conditions can also be chronic. Research has documented an increase in depression and fatigue with increased inflammation in the immune system (Lee & Giuliani, 2019). Depressive disorders can be experienced as low-grade to extreme sadness, suicidal ideation or attempt, changes in appetite, insomnia or hypersomnia, lack of concentration, memory problems, and the inability to make decisions (Garg et al., 2021; Manyibe et al., 2021; World Health Organization, 2023). Anxiety disorders can include unexplained nervousness, post-traumatic stress disorder, panic disorder, coronaphobia, and anticipatory grief (Asmundson & Taylor, 2020).

Coronaphobia, or an excessive fear of contracting COVID-19, is currently being mediated – particularly now that vaccines and viable treatments for COVID-19 are available. But it may be more prevalent among health care workers, individuals with compromised immune systems, and those who are pregnant (Can et al., 2022; Fronda & Labrague, 2022; Korkut, 2022; Turan et al., 2022). Anticipatory grief explains the pre-death emotions related to a loss, prior to the loss actually occurring (Majid & Akande, 2022). These can include helplessness, fear of being alone, stress related to future caregiving duties, and subsequent guilt. When faced with a global pandemic, one might perseverate on the possibilities that the infection of COVID might bring – to oneself or a loved one (Akande, 2020; Akande & Rajapaksa, 2022). While anxiety and depression are the most common mental health conditions related to Long COVID, there is a concern about the potential of others. Babies born to mothers who were infected during the flu pandemic of 1918-1919 experienced higher rates of schizophrenia (Collier, 2021). Similar and more recent studies involving influenza report the same findings, along with other neurological disorders (Cheslack-Postava & Brown, 2022; Lopez-Gimenez, 2017; Oseghale et al., 2022; Pugliese et al., 2019). These studies support the need for more research into the specific role of COVID-19 in the development and progression of neurological disorders.

Long COVID Across Cultures

Members of ethnic minority groups can experience anxiety and depression, as a result of Long COVID and to greater degrees than Whites (Manyibe et al., 2021; Nguyen, 2022). For instance, grief and anticipatory grief symptoms directly related to COVID-19 induced feelings of loss are more prevalent among Blacks and Hispanics in the U.S., than Whites. Similarly, uncertainties about prognosis and treatment, language barriers, and fear of deportation can cause and exacerbate anxiety disorders in immigrants in the U.S. seeking health services for COVID-19 (Akande & Rajapaksa, 2022). Members of minority groups were disproportionately exposed to COVID-19 infection under a variety of circumstances (i.e., ethnic minorities, individuals from low socioeconomic backgrounds, those experiencing vaccine hesitancy, groups with a history of racialized healthcare in the U.S.) and experienced limited access to treatment and poorer health outcomes. This is due in part to the fact that ethnic minorities are less likely to receive diagnoses and have access to treatment for their mental health conditions (Alegría et al., 2018; Cook et al., 2019). With COVID-19 variants and periodic upticks in infections still occurring, rehabilitation professionals should engage in efforts that will support the prevention of COVID-19 and Long COVID, and the promotion of whole health.

In order to engage in a holistic approach to rehabilitation with clients and patients with Long COVID, a systems approach to treatment can be useful. Engagement of clients at multiple levels within their immediate and distant environments can facilitate recovery, improved quality of life, and optimal independence. Active engagement with stakeholders is empowering and educational for all who are involved and collaboratively supports the physical, mental, cultural, and sociopolitical factors that influence the rehabilitation process and employment outcomes.

The Rehabilitation Research Matrix and Vocational Rehabilitation

The rehabilitation research matrix (RRM) is a sociological framework with which to design rehabilitation interventions and research. It embraces the interdisciplinary nature of rehabilitation work and the multisystem needs that underly effective and sustainable rehabilitation efforts. According to the theory's designers (Solvang et al.), the pursuit of clinical rehabilitation goals should be based on certain principles to ensure the effective navigation of complex health systems in the United States (2017). These principles include 1) the acknowledgement that rehabilitation practice involves the cooperation of individuals working at various organizational and socio-political levels; and 2) the awareness that clients who receive rehabilitation services are actually engaged in symbiotic relationships, concurrently receiving services and influencing service provision procedures.

The individual actors at play in the RRM exist in three intersecting systems – the micro, meso, and macro levels, representing the client, rehabilitation services professionals, and government officials, respectively (Solvang et al., 2017). Micro, meso, and macro are three levels of analysis in social psychology that describe the relationships and behaviors between individuals and others in society. In the rehabilitation field, micro, meso, and macro levels are representative of degrees of separation between a client, the members of their social networks and clinical teams, and the stakeholders that have an indirect influence over the individual's rehabilitation journey (Jaspal et al., 2016). The micro level is representative of the individual client, patient, or consumer of rehabilitation services. The individual presents with specific life experiences, cultural perspectives, and personal characteristics that serve as both protective and risk factors in rehabilitation. The meso level consists of people and entities that the client has direct interactions with and are influenced by. In this case, we are referring to family, cultural groups, neighborhoods, schools, and rehabilitation services providers. Macro level actors include institutional and organizational stakeholders, the government and law, the influence of systemic ideologies, and economic structures (van Wijk et al., 2019).

According to the RRM, the relationships between the people in these three levels are actually dynamic and reciprocal, presenting an innovative perspective with which to view micro, meso, and macro-level relationships. Instead of individual clients acting solely at the micro level, they can also be actors at the meso and macro levels. Likewise, rehabilitation professionals are actors at the micro and macro levels,

and government officials should play active and direct roles within the micro and meso levels. Solvang et al. (2017) provided an illustrative example, "...we identify individuals with disabilities as agents not only at the micro level as patients, but also at the meso level as user representatives on hospital boards and as represented by NGOs lobbying at the policy forming macro level" (p. 1984). In rehabilitation practice, clients and practitioners are typically removed from or disengaged from policy issues. But this is detrimental to the field (Akande, 2013; Akande & Rajapaksa, 2022; Buys et al. 2015; Leahy & Hartley, 2018). These interactions are necessary for advocacy, research-to-policy efforts, and enhanced resources at the micro and meso levels – which ultimately support obtaining and maintaining rehabilitation goals, and the sustainability of rehabilitation programs.

Members of each of the levels work within them and can also aspire to work as representatives outside of them – leading to more effective outcomes. It is an empowering combination of advocacy and self-advocacy for micro-level actors, and an enhanced degree of advocacy for actors in the meso and macro levels. To understand the perspectives, necessary actions, and priorities of vocational rehabilitation clients with Long COVID-19, the rehabilitation research matrix can be useful by identifying potential roles and interrelated actions of stakeholders at all levels. An individual matrix design will be dependent upon specific needs and goals of the client. It can be used as an assessment tool to determine existing resources, to develop actionable tasks, and to identify gaps that need to be addressed. Or the RRM can be created as a hypothetical set of goals that various actors can pursue. See Table 1 for an example matrix.

Table 1
The RRM for VR & Long COVID

	Clients	Rehab Counselors	Government Entities
Micro	Individual with Long COVID accessing VR services	Professional providing individual vocational rehabilitation services	Government promoting individualized health & employment initiatives for people with Long COVID
	Unit 1	Unit 2	Unit 3
Meso	Individual with Long COVID serving a vocational rehabilitation organization or community group	Professional coordinating vocational rehabilitation services among clinical team members & various agencies	Government providing state/local funding & mandates for rehabilitation service provision related to Long COVID
	Unit 4	Unit 5	Unit 6
Macro	Individual with Long COVID serving a national or international advocacy organization to raise awareness	Professional influencing disability & health policy through research or activities within professional organizations	Government establishing sweeping laws to support people with Long COVID in health and employment
	Unit 7	Unit 8	Unit 9

Adapted from the rehabilitation research matrix by Solveng et al. (2017).

At the micro level, the individual vocational rehabilitation client is the center of focus (unit 1), the person with Long COVID, the "person" in person-centered clinical approaches, and the most marginalized actor. They are responsible for the individual decisions that can impact their own health and employment trajectories (e.g., getting seasonal vaccinations, applying for jobs, seeking

health services). The second unit represents rehabilitation counselor engagement practices with which we are most familiar – service providers taking on the role of supporting their clients toward optimal functioning, independence, and stability in their whole health and socioeconomic status. And the third unit captures government activities that target individual outcomes. For instance, the very nature of Long COVID as a diagnosis is highly individualized, with many ways that it can be experienced. One treatment regimen or medication cannot treat nor prevent all Long COVID cases. In April of 2022, the Biden Administration expanded the actions of the Presidential COVID-19 Health Equity Task Force to include "Delivering high quality care for individuals experiencing Long COVID" (The White House, 2022). These initiatives were also set to include guidance from the Equal Employment Opportunity Commission (EEOC) to support equitable employment and customized accommodations for workers with Long COVID.

Unit 4 represents the individual client indirectly advocating for themselves, while acting as a representative of or advocate for others with similar rehabilitation needs. At the meso level, the sphere of influence is greater and extends from the individual to larger groups. An example could include a person with Long COVID serving on the board of directors of a hospital or working professionally in the rehabilitation field. Organizational relations, clinical teams, referral systems, and established agreements between health entities encompass the fifth unit. This approach is also quite common in the vocational rehabilitation field that is comprised of non-centralized professionals, with highly specialized training and specific scopes of practice. In unit 6, government entities regulate organizations and provide financial support for public health initiatives at local levels. COVID-19 vaccines, masks, behavioral health, and state vocational rehabilitation programs fit into this section.

At the macro level, individuals with disabilities in unit 7 have similar roles to those in unit 4, but with a greater level of influence. Unit 7 also includes the establishment of local, national, and international disability organizations that directly influence politics. Perhaps the future will reveal a broad array of ways in which individual players will impact the trajectory of Long COVID and employment.

Interest groups and professional organizations work within unit 8 to inform health policy and political funding streams. An example of this is the Research-to-Policy Collaboration (RPC). It is a cooperative of researchers and policy experts who compile research to share with congressional offices, with the hopes of supporting evidence-based policy development in a non-partisan manner (RPC, 2023). Lastly, unit 9 captures the typical functions of the government and its influence on the rehabilitation field, with service and resource provision through the law. The Biden administration has recognized Long COVID-19 as a chronic health condition, now protected by the Americans with Disabilities Act (ADA) (Stephenson, 2021). The ADA protects people with disabilities against discrimination in a variety of settings and entitles them to reasonable accommodations to access public services and engage in employment activities. Another example within unit 9 is the increased access to telehealth counseling services by the expansion of coverage by the Centers for Medicare & Medicaid Services – a direct result of the COVID-19 pandemic and the subsequent rise in rates of mental health crises (Vaidya, 2021).

The structure of the Rehabilitation Research Matrix allows for any entity within units one through nine to use the RRM as a tool to support program evaluation, research, policy development, treatment planning, and self-reflection. It can serve as a needs assessment instrument and also highlight existing strengths and resources. Needs can be the result of a lack of funding, limited training or personnel, insufficient legislation, or the result of discrimination and marginalization.

Case Example

A rehabilitation counselor (RC) has recently begun providing services to clients with Long COVID. The RC has been facing difficulties while attempting to support their clients in reaching their respective employment goals. The first issue is the growing confusion that the RC experiences as a result of trying to figure out what Long COVID is. When one client expressed symptoms related to a persistent cough and a loss of taste and smell, it made sense because those symptoms were known to be consistent with acute COVID-19 infection. However, two more of her clients, and several clients of some of

her colleagues, have reported symptoms that include difficulty concentrating, depression, muscle pain, chest pain, gastrointestinal distress, and fatigue. The RC wonders: Isn't COVID a respiratory condition? How long will Long-COVID last? When will the symptoms be considered stable for the purposes of employment? The second issue faced by this RC is that the majority of the clients with Long COVID at her agency are ethnic minorities. The RC wonders: Does ethnicity play a significant role in Long COVID experiences?

In this example, we have a rehabilitation professional active in unit 2, providing services. The questions presented indicate a possibility for decreased effectiveness as a practitioner and here is where the RRM can highlight additional actions that the RC can take to mitigate that. By also engaging in unit 5, the RC collaborates and brainstorms with other RCs who have clients with Long COVID. The RC also communicates with medical professionals and specialists who can meet the various clinical needs presented by their clients. This transaction is supportive of the client but also educational for the rehabilitation counselor. Learning how and why COVID can lead to non-respiratory conditions fulfills ethical obligations related to continuing education and empowers the RC by improving their effectiveness. The expression of empathy by the RC, in the act of seeking answers to their questions, can also be the foundation for rapport-building with clients. Unit 5 could also include the RC raising the issue of a need for professional development at the agency where they work.

Unit 8 actions on the part of this RC could involve the presentation of their anecdotal experiences at a rehabilitation conference, collaborating with rehabilitation researchers who are investigating Long COVID, and voting in support of legislation that expands coverages and resources for people with Long COVID. By design, the more units of the RRM that can be employed to address a rehabilitation matter, the better the odds for favorable outcomes. The rehabilitation counselor can only ensure their own actions (units 2, 5, and 8). But collaborating with other actors can encourage them to engage as well.

The RC can ask their clients with Long COVID if they would be interested in speaking on a panel at a community health fair (unit 4), sharing their experiences with symptoms and treatment. Further exploration with clients could reveal a level of mistrust among members of the local immigrant community, that led to lower vaccination rates and less involvement with healthcare systems. The identification of a cultural broker, or community-based liaison of trust, could help to bridge the gap (units 2 and 4). Lastly, the RC can participate in joint grant writing efforts, where their and neighboring agencies' statistical data can provide evidence in support of their pursuit of local government funding (units 3, 5, & 6). Case examples from a client or a state legislator would result in a different set of presented issues, questions, actions, and spheres of influence. Ideally, multiple actors working together and identifying their respective roles in the RRM could provide the most comprehensive outcomes.

Future Implications

As a new chronic health condition, the implications of Long COVID in its various forms on activities of daily living are not fully understood (Wong et al., 2022). Continued research into the intersection of Long COVID and vocational rehabilitation is needed. The rehabilitation research matrix offers a comprehensive, systems approach to problem-solving that is empowering, supportive of client autonomy, engaging, and acknowledges the inextricable role of legislative advocacy in vocational rehabilitation work.

The rehabilitation research matrix encourages the development of comprehensive approaches to rehabilitation goal acquisition, that are thorough and sustainable. The approach addresses needs and bi-directional responsibilities at the micro, meso, and macro levels of service provision. Long COVID is one example of a disabling condition affecting vocational rehabilitation clients, for which many questions and concerns remain. The following is a non-exhaustive list of related resources and interventions, in the context of the units of the RRM:

- Create educational and outreach programs to increase COVID-19 vaccine confidence among clients (units 2 & 3)

- Assess for symptoms of impaired health specifically related to Long COVID (units 1 & 2)
- Support health equity in service provision through anti-racist treatment philosophies and practices (units 2-9)
- Integrate Trauma-Informed Care approaches into rehabilitation services (units 2, 5, & 8)
- Engage cultural brokers to support interactions with immigrant clients (units 2, 4, 5, & 8)
- Provide telehealth rehabilitation services (units 2, 3, 5, 6, 8, & 9)
- Avoid empathy fatigue by actively engaging in self-care practices (units 2, 4, 5, 7, & 8)
- Engage in and support continuing education (all units)

Rehabilitation counselors have ethical obligations to their clients to uphold legislation in support of clients and to advocate for legislation that will meet client needs (Commission on Rehabilitation Counselor Certification, 2023). Active civic engagement, the use of research to inform policy, and communication with local legislators about client experiences are inherently necessary in the work that rehabilitation counselors do to support the most marginalized group – people with disabilities. Using the RRM can assist practitioners in painting fuller pictures, for the purposes of clinical planning, research, and training. Vocational rehabilitation counseling is a field that was established by the federal government, through the Soldier's Rehabilitation Act of 1918 (Rehabilitation Continuing Education Program, 2004), and continues to be supported through the Rehabilitation Services Administration. Academic programs include coursework that covers various disability, health, and human rights legislation. Professional continuing education on these topics can be quite effective in directly and indirectly supporting clinical work through advocacy.

Conclusion

A Long COVID diagnosis presents a variety of possibilities related to unpredictable health trajectories, the involvement of multiple body systems, mental health strain, and employment instability. Continued exploration into these topics is necessary for effective vocational rehabilitation service provision with long-lasting, sustainable outcomes for clients. The Rehabilitation Research Matrix is a potentially useful framework that allows individuals, clinicians, and government officials a method of acknowledging and enhancing the voices of all actors with a unique systems approach to assessing needs.

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