Personal Resources, Well-Being, and Long-COVID Symptoms among Recovered Teachers: A Cross-Sectional Study

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Abstract

Background: Long-term symptoms can greatly affect the lives and employment of people who have had COVID-19. Although studies exist on COVID-19's long-term symptoms, an investigation of these symptoms specifically among recovered teachers has been overlooked. There is a lack of empirical evidence on the impact of personal resources in mitigating symptom severity and aiding teachers' successful reintegration into schools.

Objective: To evaluate the association of personal resources with teachers' well-being and severity of long-term symptoms following COVID-19 recovery.

Methods: A cross-sectional design, using an online survey questionnaire, from January-February 2022. Participants were COVID-19 survivor teachers from Israel (N = 117). Of them, 57.3% contracted COVID-19 in the six months prior to the study, while 42.7% contracted COVID-19 six-twelve months prior to the study. Statistical analyses included chi-square, factor analysis, Pearson correlations, and a linear regression analysis.

Results: A positive correlation was found between mental well-being and personal resources (i.e., optimism, social support, willingness to seek mental help, and attitude towards physical activity). Blood pressure (high/low), numbness, hot flashes, and dry eyes were negatively associated with optimism, social support, and willingness to seek mental help. The regression models to predict mental well-being yielded significant results [$F_{(4,112)} = 19.55$, $p < .001$], explaining 19.55% of the variance. The symptoms: numbness, dry eyes, low/high blood pressure were associated with time since recovery [$chi^2(1) = 3.28$, $p < .05$].

Conclusion: Comprehensive follow-up care for teachers with long COVID should be prioritized to support their return to schools. Certain measures could improve their physical and mental health and overall well-being.

Keywords: *Recovered Teachers; Personal Resources; Social Support; Well-Being; Long COVID; Post-COVID Symptoms*

Introduction

Long COVID has been identified as a condition distinguished by a comprehensive inflammatory response, resulting in a myriad of symptoms lasting for 12 weeks to a year [1,2]. This pathological state is particularly typified by the prolonged duration of symptoms that transpire concurrently or subsequent to the primary COVID-19 infection [3,4].

There have been numerous studies in which persistent COVID-19 symptoms among patients have been catalogued, with the core body of research directed toward those admitted to hospitals or released to outpatient care [5,6]. In a meta-analysis encompassing one-year follow-up data from 8,591 survivors of COVID-19, fatigue/weakness (28%), dyspnea (18%), arthromyalgia (26%), depression (23%), anxiety (22%), memory loss (19%), difficulties with concentration (18%), and insomnia (12%) were recorded as the most common symptoms [7]. According to a recent article examining long COVID symptoms among recovered teachers in Israel, fatigue, weakness, and difficulty sleeping were the main long-term symptoms that significantly affected their functioning and mental well-being [8].

The symptom-related impact of long COVID on employees, particularly those within the educational sector, have been scrutinized in a few studies. Identified challenges have included specific pain-related hurdles, the capacity to meet work obligations, the ramifications for workplace relationships, and apprehensions concerning disclosure [3,9]. A longitudinal cohort investigation conducted in Belgium revealed that 60% of those who had been employed pre-COVID reported an inability to work. Among these respondents, over a third (38%) had not yet recommenced work, or returned with reduced hours (26%), at the time of the survey [9].

The ramifications of symptoms for educators who must maintain in-person interactions with students are significant. A recent study investigated how long-COVID symptoms affected the occupational status of teachers following their recovery. The study evaluated the resources that could facilitate teachers' reintegration into the workplace and are associated with their wellbeing [8]. The findings supported previous research indicating that social support enhances individuals' confidence, sense of belonging, and ability to cope with stressful situations [10]. The importance of providing social support is becoming increasingly evident as repeated reports of long-term symptoms in COVID-19 survivors emerge [7,11,12]. Turning to a professional for emotional assistance is effective for people coping with emotional distress and difficulties [13]. Nevertheless, it has been found that many refuse to do so for various reasons including cultural barriers, self-stigma, stigmatized views of seeking therapy, and the negative attitudes of those around them [14,15]. Social support may reduce the likelihood that a person will choose to seek mental help. At the same time, it sometimes serves as a catalyst for seeking professional treatment [16-18]. Many teachers found themselves suffering from severe COVID-19 symptoms while ill and then subsequently suffering from various physical and mental health consequences after recovery [8,19]. Researchers have found that resources can be resilience factors and predict healthy behaviors, as well as predict the quality of recovery and return to routine. For example, optimism was revealed to be a resource in its effects on coping with illness, recovery, and adaptation to life after a crisis or stressful event [20]. Healthy behaviors such as exercise have also been found to promote health and well-being [21].

Investigations on long-term COVID symptoms among recovered teachers are lacking [8]. Specifically, there is a lack of empirical evidence on the impact of personal resources, such as social support and optimism, in mitigating symptom severity and aiding teachers' successful reintegration into educational settings [22]. Existing studies have primarily focused on teachers' ability to work and on workplace relationships, rather than the role of personal resources in their well-being [23].

Objective of the Study

The main objective of the current study was to fill this gap in the literature by evaluating the association of personal resources - namely, social support, willingness to seek mental help, optimism, and attitude toward physical activity - with teachers' emotional well-being and severity of long-term symptoms following COVID-19 recovery. This study could provide insights into effective strategies for supporting recovered teachers' return to work and enhance their overall well-being (Figure 1).
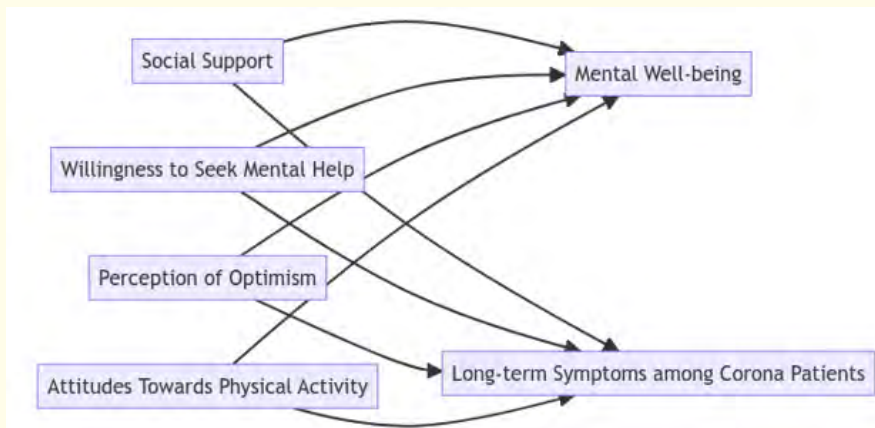
We hypothesized as follows:

Figure 1: The proposed study model.

1. Social support, willingness to seek mental help, optimism, and attitude toward physical activity would be positively associated with mental well-being among teachers who had recovered from COVID-19.

2. Social support, willingness to seek mental help, optimism, and attitude toward physical activity would be negatively associated with symptoms among teachers who had recovered from COVID-19.

3. Social support, willingness to seek mental help, optimism, and attitude toward physical activity would predict mental well-being and symptoms among teachers who had recovered from COVID-19.

4. A difference would be found in the intensity of symptoms (between 1 - 6 months and 6 - 12 months) among teachers who had recovered from COVID-19.

Materials and Methods

A cross-sectional design was employed for the current study. To collect data, an online survey questionnaire comprising validated measures was developed. Prior to data collection, the study received approval from the ethics committee of the authors' university. A non-probability sampling method was used to recruit participants. The survey was distributed and the study population identified through social media networks during the period of January to February 2022. Inclusion criteria for participation were teachers above the age of 18 and employed in Israel's education system, with a history of contracting COVID-19 within the past year. Exclusion criteria were substitute teachers, teaching interns, and those employed on a less than one-third time basis.

Research tools

Independent variables

Social support: The Multidimensional Scale of Perceived Social Support (MSPSS) [24], was employed to assess participants' subjective perceptions of social support from their environment. The MSPSS comprises 12 items, rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example item assessing family support is, "My family really tries to help me". The internal reliability of the MSPSS in the current study as measured by Cronbach's alpha was $\alpha = .92$.

Attitudes regarding willingness to seek mental help: The attitudes regarding willingness to seek mental health assistance questionnaire [25] was used in this study to assess participants' attitudes toward seeking mental health assistance. This questionnaire comprises 10 items, graded on a 4-point Likert scale ranging from 1 (disagree) to 4 (agree). An example item is, "I would want to get psychological help if I were worried or upset for a long period of time." The overall score of the questionnaire was calculated by averaging the responses. The internal reliability as measured by Cronbach's alpha, was $\alpha = .86$.

Optimism: The optimism tendency questionnaire (Life Orientation Test, LOT-R) [26] assesses an individual's general optimism and consists of seven items. Participants rate each item on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). For instance, an example question is, "I am always optimistic about the future." After filling out the questionnaire, an average is calculated and a high score reflects a high level of optimism. Cronbach's alpha reliability found in the current study was $\alpha = 0.71$.

Attitude toward physical activity: The Physical Activity Attitudes Questionnaire (PAAQ) [27] consists of an eight-item self-report measure to assess participants' attitudes and beliefs about the benefits of engaging in physical activity. All items followed the stem, "If I were to be physically active on most days…", and participants rated their attitudes toward completions of this stem (e.g. "it would help me cope with stress"), on a 5-point scale ranging from 1 (disagree a lot) to 5 (agree a lot). Cronbach's alpha reliability found in the current study was $\alpha = 0.88$.

Demographic data: A demographic data questionnaire was developed specifically for this study to collect the following demographic data from the participating teachers: age, gender, marital status, educational background, teaching experience, type of school (elementary/ middle school/high school), and the duration of time that had passed since their recovery from COVID-19.

Dependent variables

Mental well-being: The Mental Well-Being Questionnaire (Mental Health Continuum-Short Form, MHC-SF) [29] measures an individual's mental well-being. The questionnaire comprises 14 items relating to aspects of emotional well-being, social well-being, and psychological well-being. Participants rate each item on a 6-point Likert scale, indicating the frequency with which they've experienced aspects of well-being over the past month, ranging from 1 (not at all) to 6 (every day). Examples of statements include, "I felt happy and satisfied with my life". Higher scores indicated a higher level of mental well-being. Cronbach's alpha internal reliability found in the current study was $\alpha = .89$.

Long-term symptoms: The Long COVID-19 Symptom and Impact Tools (Long COVID-19 ST and IT) [30] assess the extent of long-term symptoms experienced by participants. The abbreviated questionnaire comprised 19 items, capturing various symptom domains. Participants rated each item on a 5-point Likert scale, ranging from 1 (not at all noticeable) to 5 (very high sense of the symptom). Examples of items included "difficulty concentrating or remembering" and "loss of sense of taste." The overall score of the questionnaire was calculated as the average of the responses. Cronbach's alpha internal reliability found in the current study was $\alpha = .89$.

Data analysis

Data analysis was conducted using SPSS version 27 software. Descriptive statistics, including reliabilities, standard deviations, and means, were computed for the study variables. To examine the relationships between the research variables and demographic variables, a Pearson's correlation test was employed. Additionally, a t-test was used to test the hypothesis for differences between demographic variables, while a linear regression analysis was performed as a predictive test.

Results

The study included 117 COVID-19 survivor teachers from around the country. Of the participants, 57.3% had contracted COVID-19 in the six months prior to the study, while 42.7% had contracted COVID-19 six months to a year prior to the study. In addition, 20.5% of the study participants were men and 79.5% women. Most (83.8%) were married and had a master's degree (62.4%). The average age of the

teachers was 39.63, and their average teaching seniority was 14.93 years. The study included teachers who taught in elementary schools (56 teachers, 47.9%), middle schools (31 teachers, 26.5%), and high schools (30 teachers, 25.6%).

		F	%
Sex	Men	24	20.5
	Women	93	79.5
Marital Status	Not-married	7	6.0
	Married	98	83.8
	Divorced	9	7.7
	Widowed	3	2.5
Education	Teaching Certificate	6	5.1
	Bachelor's degree	38	32.5
	Master's degree	73	62.4
Type of School	Elementary	56	47.9
	Middle School	31	26.5
	High School	30	25.6
Recovery Time	0-6 Months	67	57.3
	6-12 Months	50	42.7
		M	SD
Age (years)		39.63	8.81
Number of Children		2.47	1.30
Teaching Seniority (in years)		14.93	10.89

Table 1: *Participants' demographic characteristics (n = 117).*

The distribution of the study variables demonstrates an above-average level of optimism, social support, willingness to seek mental help, attitude toward physical activity, and mental well-being (Table 2).

	M	SD	Range
Optimism	3.72	.56	1-5
Social Support	4.40	.64	1-5
Willingness to Seek Mental Help	3.01	.55	1-4
Attitude toward Physical Activity	5.62	1.10	1-7
Mental Well-being	4.98	.71	1-6

Table 2: *Descriptive statistics of study's variables (N = 117).*

Table 3 presents a factor analysis of the long-term symptoms questionnaire. After analyzing factors using the Varimax method, five factors were found. In addition to examining the contents of the items according to teachers' claims, five factors were determined (Table 3).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Lack of appetite	.61				
Tiredness	.40				
Changes in mood	.76				
Headaches	.76				
Difficulty concentrating or remembering	.57				
Body or muscle pain	.45				
Loss of sense of taste		.87			
Loss of sense of smell		.87			
Abdominal pain		.70			
Hot flashes			.57		
Numbness			.67		
Dry eyes			.78		
Low/high blood pressure			.66		
Sore throat				.51	
Ear pain				.75	
Clogged nose				.56	
Shortness of breath or persistent cough				.87	
Hair loss					.82
Rash or dry skin					.72

***Table 3:** Factor analysis (Varimax rotation) of long-term symptoms.*

To examine the factors on the 7-point Likert scale, the variable was converted to a dichotomous measure according to the median scale. An average of 1-3.99 was categorized as asymptomatic, while 4-7 was updated as having a symptom. Table 4 presents descriptive statistics of the long-term symptoms questionnaire.

	f (%)	
	No	**Yes**
Factor 1	41 (35%)	76 (65%)
Factor 2	75 (64.1%)	42 (35.9%)
Factor 3	85 (72.6%)	32 (27.4%)
Factor 4	65 (55.6%)	52 (44.4%)
Factor 5	65 (55.6%)	65 (44.4%)

***Table 4:** Descriptive statistics of symptom factors (N = 117).*

To test the first research hypothesis, a Pearson's correlation was performed. A significant positive correlation was found between mental well-being and optimism ($r = .39$, $p < .001$), social support ($r = .51$, $p < .001$), willingness to seek therapy ($r = .24$, $p < .05$), and attitude toward physical activity ($r = .51$, $p < .001$). High levels of mental well-being were associated with high levels of optimism, social support, willingness to seek therapy, and attitude toward physical activity. The first hypothesis was confirmed (Table 5).

There was also a negative significant correlation between Factor 3 in symptoms (hot flashes, numbness, dry eyes, and low/high blood pressure) and social support ($r = -.19$, $p < .05$), as well as a negative correlation between Factor 3 and optimism ($r = -.17$, $p < .05$) and willingness to seek mental help ($r = -.17$, $p < .05$). The second hypothesis was partially confirmed, as some of the symptoms, such as blood pressure, numbness, hot flashes, and dry eyes, were negatively associated with most of the resources. Additionally, a negative significant correlation was found between Factor 4 in symptoms (sore throat, ear pain, clogged nose, and shortness of breath or persistent cough) and mental well-being ($r = -.11$, $p < .05$) (Table 5).

	1	2	3	4	5	6	7	8	9	10
1. Optimism	-									
2. Social Support	.29**	-								
3. Willingness to seek mental help	.36***	.26**	-							
4. Attitude toward Physical Activity	.28**	.40***	.23*	-						
5. Mental Well- being	.39***	.51***	.24*	.51***	-					
6. Factor 1	-.12	-.02	-.06	-.17	.00	-				
7. Factor 2	-.03	.01	-.05	.13	-.04	.32***	-			
8. Factor 3	-.17*	-.19*	-.17*	.00	-.15	.33***	.42***	-		
9. Factor 4	-.09	-.06	.02	.16	-.11*	.22*	.37***	.41***	-	
10. Factor 5	-.09	-.05	.04	.00	-.02	.44***	.22*	.33***	.30**	-

Table 5: *Pearson correlations for the study variables (N = 117).*

To test the third hypothesis, a linear regression model was conducted to predict mental well-being. The regression models yielded significant results, providing support for Hypothesis 3, $F_{(4,112)} = 19.55$, $p < .001$. The significance in the results stems from the positive influence of all three study variables: (a) optimism ($t = 2.52$, $p < .05$), (b) social support ($t = 3.88***$, $p < .001$), and (c) attitude toward physical activity ($t = 3.97***$, $p < .001$), indicating that individuals with higher levels of total optimism, social support, and attitude toward physical activity exhibited greater mental well-being. The third hypothesis was confirmed (Table 6).

	B	SE	Beta	t	F
1. Optimism	.25	.10	.20	2.52*	19.55***
2. Social Support	.35	.09	.31	3.88***	
3. Willingness to Seek Mental Help	.01	.10	.01	.18	
4. Attitude toward Physical Activity	.20	.05	.32	3.97***	

Table 6: *Linear regression analysis for prediction of mental well-being (N = 117).*

To examine the fourth hypothesis regarding differences in symptom intensity, table 7 presents a chi-squared test to investigate the independence between the five types of long-term symptoms and the duration of time elapsed since recovery.

		f (% within the factor)		
		1 - 6 months	6 - 12 months	
Factor 1	No	26 (63.4%)	15 (36.6%)	.97
	Yes	41 (53.9%)	35 (46.1%)	
Factor 2	No	42 (56.0%)	33 (44.0%)	.13
	Yes	25 (59.5%)	17 (40.5%)	
Factor 3	No	53 (62.4%)	32 (37.6%)	3.28*
	Yes	14 (43.8%)	18 (56.2%)	
Factor 4	No	38 (58.5%)	27 (41.5%)	.08
	Yes	29 (55.8%)	23 (44.2%)	
Factor 5	No	39 (60.0%)	26 (40.0%)	.44
	Yes	28 (53.8%)	24 (46.2%)	

***Table 7:** Chi-square for dependence of the symptom factor on duration of time elapsed since recovery (N = 117).*

The analysis revealed that only factor 3 (numbness, dry eyes, low/high blood pressure) demonstrated a significant association with the duration of time elapsed since recovery [$chi^2(1) = 3.28$, $p < .05$]. The test suggests that only the symptoms of numbness, dry eyes, and low/high blood pressure depended on time since recovery, whereas the rest of the symptoms showed no difference in this regard (i.e. in terms of being dependent on time since recovery). The fourth hypothesis was partially confirmed.

Discussion and Conclusion

The aim of the study was to evaluate the associations between personal resources (i.e. social support, willingness to seek mental help, optimism, and attitudes toward physical activity) and teachers' emotional well-being and long-term symptom severity post-COVID-19 recovery. The results showed that high levels of mental well-being were associated with high levels of optimism, social support, willingness to seek mental help, and attitude toward physical activity. These findings are supported by findings from previous studies suggesting that coping resources may be protective factors in times of stress and may help promote individuals' psychological health [8,23,31-34].

Furthermore, some of the symptoms, such as blood pressure, numbness, hot flashes, and dry eyes, were negatively associated with most resources. Additionally, a negative significant correlation was found between the variables in Factor 4 symptoms (sore throat, ear pain, clogged nose, and shortness of breath or persistent cough) and mental well-being. These results align with findings in the literature that have delineated the numerous challenges confronted by those recovering from COVID-19 [35]. Two meta-analyses on COVID-19 survivors identified the most prevalent post-infection symptoms as fatigue/weakness, dyspnea, arthromyalgia, depression, anxiety, and insomnia [7,36,37]. These findings highlight that a substantial number of COVID-19 survivors experience prolonged symptoms that have negative effects on their mental and physical health. This indicates that long COVID is a substantial concern for many COVID-19 survivors, as they contend with enduring symptoms that impair their quality of life and ability to work [9]. It should be noted that our participant cohort, predominantly composed of teachers with an overall average age of 39.63, and with minimal to no pre-existing chronic conditions, may experience further exacerbations of their health as a result of the infection, as has been elucidated by qualitative research in the field. According to one study, 83% of workers reported their self-assessed health as moderate to poor even after recovering and returning to work [38]. In another study, nearly half of the workers mentioned experiencing functional impairments, which had a negative effect on their ability to fulfill their work-related responsibilities [3]. These impairments can lead to a decrease in work productivity and potentially worsen financial and economic difficulties. The study indicated that around a quarter of these patients experienced a compromised quality of life. These data suggest that the consequences of the illness go beyond physical limitations and have a significant impact on the mental and emotional well-being of teachers [39].

Further, the study results point to an inverse correlation between mental well-being and the manifestation of persistent COVID-19 symptoms, commonly referred to as long COVID. Multiple international studies have documented a deterioration in well-being among individuals post-COVID [35,40,41]. A longitudinal study spanning two years revealed diminished well-being, reduced exercise capacity, elevated mental health issues, and augmented healthcare utilization following discharge. Individuals with symptoms of discomfort or pain and anxiety or depression were included, and were compared to individuals without persistent COVID-19 symptoms [42]. In China, stigmatization, negative societal judgments, anxiety, and fear of social interactions were found to reduce the well-being of COVID-19 survivors [43]. This outcome corroborates the findings of another study suggesting a perceived decrease in the well-being of COVID-19 survivors for up to six months following recovery [44]. Physical symptoms including fatigue, cognitive deficits, pain, insomnia, anxiety, and depression have generally been identified as contributors to the decline in quality of life among individuals post-COVID [40,41,44]. Hence, based on the findings of the current study, it can be deduced that numerous factors significantly impact the well-being of COVID-19 survivors who exhibit long COVID symptoms.

The findings underscore the crucial role of social support in the trajectory of long-term symptoms. This conclusion aligns with prior research that identified a relationship between social support and optimal convalescence from the novel coronavirus [45]. Such studies have illuminated the importance of the sustenance provided by friends and family during the recovery phase, as such support has the potential to mitigate persistent symptoms [46,47]. Moreover, another study determined that social support, along with demographic determinants such as gender, age, profession, and educational attainment, was associated with quality of life among COVID-19 recoveries. Importantly, social support has been identified as the most significant predictor of quality of life enhancement [22,48,49]. This highlights the indispensable role of familial and community structures in the recovery trajectory. We, too, in the current study discerned a positive correlation between social support and the long-term symptoms of the disease. Specifically, recuperated individuals who reported robust social support exhibited enhanced levels of mental well-being and fewer physical symptoms, whereas convalescents devoid of social support manifested more intense symptoms of the disease [48]. These insights emphasize the significance of social support in managing persistent symptoms of the disease and suggest that healthcare providers should incorporate social support into their treatment protocols for COVID-19 patients [9]. Collectively, the outcomes of numerous studies underscore the pivotal role of social support in facilitating recovery and enhancing quality of life among COVID-19 patients [45,50,51].

Finally, the results provide evidence of a partial association between the duration of time elapsed after recovery from COVID-19 and variations in the severity of long-term symptoms. In other words, some symptoms persist, regardless of how long it has been since recovery, while others lessen or disappear. This corroborates a previous finding related the relationship between the resources that could facilitate teachers' reintegration into the workplace, teachers' emotional well-being, and their reports of long-term post-COVID symptoms [8]. A difference in symptom severity was found only in factor 3 symptoms (numbness, dry eyes, low/high blood pressure). These symptoms (i.e. numbness, dry eyes, and low/high blood pressure) were the only symptoms whose severity was dependent on time since recovery, whereas the rest of the symptoms did not demonstrate any significant changes in severity based on length of time since recovery. It is possible that these specific symptoms stood out in the current study because they interfered with teachers' daily activity and functioning both at home and at school. However, as the current study was cross-sectional, it is difficult to indicate any causality. Further research is needed to examine the persistence of the abovementioned symptoms over a longer period. Future studies could also focus on a wider pool of participants and larger organizations. These findings underscore the difficulty in providing therapy for patients, as discussed in a recent review on the outcomes of long-term COVID-19 sequelae. Such long-term symptoms cannot be viewed as a single clinical entity; rather, an integrated multidisciplinary approach, precisely targeted to the nature and intensity of symptoms, is needed [4].

Limitations of the Study

The present research had multiple constraints. First, we used a convenience sample, potentially compromising the study's validity and generalizability to the broader teacher population in Israel. Further, the data were collected at a single point in time, and participants'

prior health conditions were not taken into consideration. Additionally, there was a significant overrepresentation of female participants, reflecting the gender disparity in the education sector. The lack of a comparative group served as another constraint. Lastly, longitudinal data could have been instrumental in understanding the sustained health impact of long COVID on participants.

Conflicts of Interest

No conflicts of interest.

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