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Original Research

Association between COVID-19 symptoms, COVID-19 vaccine, and somatization among a sample of the Lebanese adults

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Abstract

Objectives: Long COVID syndrome, the poorly defined illness, has been increasingly mentioned in recent studies yet is still poorly understood especially when it comes to precipitating and modulating factors, the high prevalence of mental health problems associated with the COVID-19 pandemic has brought to light the hypothesis of the existence of a psychological component associated with the persistence of symptoms and if vaccination may serve as a modulating factor. This study aims to examine the prevalence of somatization disorders and association between persistent COVID-19 symptoms and COVID-19 vaccine with somatization among a sample of the Lebanese general population. **Methods:** A cross-sectional study was carried out between September and October 2021. The snowball sampling technique was picked to choose a sample that addressed all Lebanese Mohafazat. Patient Health Questionnaire-15 (PHQ-15) was used to assess somatization. **Results:** A total of 403 participants was enrolled in this study, with a mean age of 32.76 ± 13.24 years, 108 (26.8%) had medium somatization symptoms (PHQ-15 scores ≥10). Having persistent COVID symptoms (β=2.15) was significantly associated with more somatization, whereas the intake of COVID vaccine (β=-1.17) was significantly associated with less somatization. **Conclusion:** Long lasting COVID-19 symptoms were closely related to somatization, although the administration of the COVID-19 vaccine was associated with less somatization. However, further studies are needed to provide a better understanding of the relationship between long COVID and somatization, on one hand, and the modulating factors on the other hand.

Keywords: COVID persistent symptoms; somatoform disorders; somatization; COVID 19; vaccine; Lebanon

BACKGROUND

Somatization is defined as a tendency to experience and communicate somatic distress and symptoms unexplained by pathological findings, to attribute them to physical illness, and to seek medical help for them.[1] It is a relatively common observation in clinical practice; it accounts for approximately 20% of new consultations in primary care, 52% of new referrals in secondary care and 20%–25% of all frequent attenders at medical clinics.[2] A wide scope of putative etiologic elements has been proposed to represent somatization; among those, we have the predisposing elements: personality traits, genetic and sociocultural factors. Those precipitating elements can be contracted from life occasions that are perceived as personally stressful and the maintaining elements which promote the persistence of the somatization disorder.[1,3] In particular, anxiety, depression,[4] stress[5] and comorbidities[6] were the most associated with somatization, with PTSD being the best predictor of somatization in female patients.[7] Symptoms of somatization fluctuate as per sociocultural factors and can allude to any body part or organ system yet pain, asthenia, apprehension and sleeping disorder are the most widely recognized symptoms.[1,8]

The coronavirus disease, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus strain, has caused one of the deadliest pandemics in the modern history. Globally, by March 28th, 2022, there have been 480,170,572 confirmed cases of COVID-19, including 6,124,396 deaths reported to the World Health Organization (WHO).[9] The clinical presentation of COVID-19 vary from asymptomatic to severe illness that require hospitalization with fever, cough, dyspnea, sore throat, fatigue, loss of taste and smell being the most common symptoms that appears 2-14 days after the exposure to the virus.[1] A study that assessed the persistence of COVID symptoms 12-21 days after a positive SARS-CoV-2, real-time reverse transcription–polymerase chain reaction (RT-PCR) test showed that fever and chills were resolved in the majority of the participants while cough, fatigue and dyspnea were among the least likely symptoms that have resolved.[11] Another study showed that a post-acute COVID-19 syndrome was detected in

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half of COVID-19 survivors 10-14 weeks after disease onset.[12] All those persistent symptoms can be compared to the post viral asthenia syndrome during which patients complain of severe fatigue, recurrent muscle aches, depression, insomnia and such patients may not only be misdiagnosed as somatizers but could also develop somatization in response to persistent yet diagnostically ambiguous symptoms.[1]

In December 2020, Pfizer/BioNTech was the first vaccine to be approved by the WHO and as of 28 March 2022, a total number of 11,054,362,790 vaccine doses have been administered[9] but not all the population had the same thoughts and acceptance of the vaccine; many refused to take it in fear of side effects, rapidity of approval, national origin and the technology used, whereas others were excited about the vaccine due to its effect in reducing mortality and transmission of the disease. In addition, there is a regional variability in the attitudes toward the vaccine: Countries with the highest rates of vaccine acceptance were Nepal and Vietnam (97%), Ethiopia (92%), and Canada (91), while the lowest rates were reported in Iraq (13%), Bahrain (17%), Algeria and Lebanon (21%).[13]

This rapidly expanding pandemic has required governments to implement unusual preventive methods; in Lebanon, nationwide lockdowns have been implemented, social gatherings were banned, social distancing was encouraged, and people were obliged to wear facemasks in public.[14] All these measures enforced millions of peoples to rapidly change their lifestyle and habits, which resulted in severe psychological effects in both infected and non-infected individuals: higher levels of anxiety, stress and depression were described.[15] On top of the pandemic, on the 4th of August 2020 the Lebanese population faced a new stressor; the Beirut port explosion that killed somewhere around 200 individuals, harmed more than 6500, left 300 000 homeless of whom 80 000 are kids.[16] Therefore, could PTSD from the COVID-19 pandemic or the Beirut Blast be associated with higher somatization?

The persistent COVID symptoms and the high prevalence of mental health problems associated with this life changing event has brought to light the hypothesis of the existence of a psychological component associated with these symptoms and if the vaccination has a beneficial effect on the mental health and the incidence of the somatization disorder by providing a certain kind of relief and protection from such a deadly disease. Understanding the etiology behind long COVID symptoms will help in the implementation of the appropriate treatment strategy without delay. It is important to test such hypotheses particularly in Lebanon where mental health is not a priority and facing major difficulties ranging from financial problems to the lack of adequate mental health training for healthcare workers[17] and where mental illnesses are underestimated and stigmatized.[18] Besides that, Lebanon is among the countries with the lowest vaccine acceptance rate[13] and positive results may encourage people to get vaccinated. This study aims to examine the prevalence of somatization disorders and association between persistent COVID-19 symptoms and COVID-19 vaccine with somatization among a sample of the Lebanese general population.

METHODS

Ethical approval

The study was approved by the Ethics Committee at the Psychiatric Hospital of the Cross. All participants gave their informed written consent when submitting the online form.

Study design

This cross-sectional study was carried out between September and October 2021. A total of 403 participants were recruited. During this period, the Coronavirus cases were going down, and the vaccination process was at its peak because of the broadly spread pro-vaccination campaigns. The snowball sampling strategy was picked to choose a sample that addressed all the five Lebanese Mohafazat (North Lebanon, Mount Lebanon, Beirut, South Lebanon, and Beqaa). Individuals above 18 years old and residents of Lebanon were qualified as possible participants.

Sample size calculation

Considering an effect size f^2=2%, a type I error of 5%, a type II error of 20%, and 10 variables to be included in the final model, the G-power software estimated a minimal sample of 395.

Questionnaire

The anonymous questionnaire used in this study was in Arabic. The initial part evaluated the sociodemographic qualities (age, sex, self-reported height and weight to calculate the Body Mass Index, marital status, educational level, and household crowding index). The household crowding index, reflecting the socioeconomic status of the family, was calculated by dividing the number of persons in the house by the number of rooms in the house excluding the bathrooms and kitchen.[19] In addition, participants were asked whether they were infected by the coronavirus, if they still suffer from a certain symptom, their vaccination status, the location they were at during the Beirut blast and history of medical illnesses. The second piece of the questionnaire consist of different scales to assess each variable:

Patient Health Questionnaire-15 (PHQ-15)

PHQ-15 is a self-administered questionnaire used to assess if participants had experienced physical symptoms such as chest pain, gastrointestinal disturbance and trouble sleeping during the last month. It is composed of 15 items each scored using a Likert scale with 0 “not bothered at all”, 1 “bothered a little”, 2 “bothered a lot”.[20] Higher scores are associated with more severe somatization, Cutoff points of 5, 10 and 15 represent mild, moderate, and severe symptom levels.[21]

Patient Health Questionnaire 9 (PHQ-9)

PHQ-9, validated in Lebanon,[22] is a commonly used scale to assess depression. It is a self-administered questionnaire that includes questions about sleeping, energy and appetite status, validated in Lebanon,[22] consisting of nine items and each item is scored on a 4-point Likert scale ranging from 0 “not at all” to 3 “nearly every day”.[23] Higher scores are associated with more depression.

Beirut distress scale 10 (BDS-10)

To assess stress levels, we used a ten items questionnaire scored

on a 4-point Likert scale ranging from 0 (never) to 4 (always); thus, higher scores indicate higher psychological distress. This scale was developed and validated in Lebanon.[24]

PTSD Checklist – Civilian Version (PCL-C)

The PTSD Checklist (PCL-C) is another self-report rating scale, comprises of 17 items for evaluating post-traumatic stress disorders (PTSD). Examinees are told to show the amount they have been troubled by every manifestation such as memories, concentration and physical reactions in the previous month utilizing a 5-point (1-5) scale.[25]

Lebanese anxiety scale (LAS-10)

A scale developed in Lebanon to measure anxiety levels in a population using a 10-item questionnaire. Higher scores are associated with greater anxiety.[26,27]

Translation procedure

For the PHQ-15 and PCL-C, two survey independent translators were involved, the first made a translation from English into Arabic, and the second made the back-translation. The translators reviewed the two versions to identify irregularities and contrasts were settled with comprehension. All other scales had Arabic versions validated in Lebanon. A pilot study was done on 15 people to see if all questions were well understood; no changes were done afterwards.

Statistical analysis

The SPSS v.22 was used for the data analysis. The somatization score followed a normal distribution as verified by the skewness and kurtosis values that varied between -2 and +2.[28] Pearson correlation was used to correlate the somatization score and all continuous variables. A linear regression was conducted to evaluate the association between the somatization score and the persistence of COVID-19 symptoms or the intake of COVID-19 vaccine, before (crude results) and after adjustment over all other variables (age, sex, body mass index, household crowding index, number of comorbidities, education level, marital status, anxiety, depression, PTSD from the Beirut Blast, PTSD from the COVID-19 pandemic).

RESULTS

In this study, the Cronbach's alpha values were as follows: 0.87 for PHQ-15, 0.92 for PHQ-9, 0.90 for BDS-10, 0.96 for PTSD from coronavirus and 0.94 for PTSD from the Beirut blast and 0.89 for LAS-10.

Sociodemographic characteristics of the participants

A total of 403 enrolled in this study, with a mean age of 32.76 ± 13.24 years and 65.5% females. Other details are found in Table 1. The results showed that 108 (26.8%) have medium somatization symptoms (PHQ-15 scores ≥10).

Bivariate analysis

Higher number of comorbidities, PTSD for the Beirut blast or COVID pandemic, anxiety, stress and depression were significantly associated with more somatization (Table 2).

Table 1. Sociodemographic characteristics of the participants (N=403)

Variable	**N (%)**
Sex	
Males	139 (34.5%)
Females	264 (65.5%)
Marital status	
Single / divorced / widowed	266 (66.0%)
Married	137 (34.0%)
Education level	
Secondary or less	68 (16.9%)
University	335 (83.1%)
Persistent COVID symptoms	
No	376 (93.3%)
Yes	27 (6.7%)
COVID vaccine intake	
No	95 (23.6%)
Yes	308 (76.4%)
	Mean ± SD
Age (in years)	32.76 ± 13.24
Body Mass Index (Kg/m^2)	24.30 ± 4.42
Household crowding index	1.05 ± 0.51

Table 2. Bivariate analysis of continuous variables associated with the somatization score

Variable	**Pearson correlation coefficient**	**P**
Age	0.007	0.886
Body Mass Index	-0.025	0.619
Household crowding index	0.043	0.393
Number of comorbidities	0.300	**<0.001**
PTSD Beirut Blast	0.359	**<0.001**
PTSD COVID pandemic	0.378	**<0.001**
Anxiety score	0.376	**<0.001**
Stress	0.472	**<0.001**
Depression	0.484	**<0.001**

Numbers in bold indicate significant p-values.

Multivariable analysis

Having persistent COVID symptoms (Beta=2.15) was significantly associated with more somatization, whereas the intake of COVID vaccine (Beta=-1.17) was significantly associated with less somatization (Table 3).

When selecting the group that did not receive the COVID vaccine, the results showed that having persistent COVID-19 symptoms was significantly associated with more somatization (Beta=4.41; p=0.022; 95% CI 0.65-8.17). However, this association did not show significance in participants who received the COVID-19 vaccine (Beta=1.71; p=0.075; 95% CI -0.17-3.59).

Table 3. Multivariable analysis: Linear regression taking the somatization score as the dependent variable

	Crude results				Adjusted results			
	Beta	**B**	***P***	**95% CI**	**Beta**	**β**	***p***	**95% CI**
Persistent COVID symptoms (yes vs no*)	4.10	0.20	<0.001	6.27-7.30	2.15	0.10	0.010	0.52-3.78
COVID vaccine (yes vs no*)	-1.37	-0.11	0.025	-2.57- -0.17	-1.17	-0.10	0.018	-2.14- -0.20

*Reference group; Covariates entered in the adjusted model: age, sex, body mass index, household crowding index, number of comorbidities, education level, marital status, anxiety, depression, PTSD from Beirut Blast, PTSD from COVID Pandemic; Nagelkerke R^2=41%

DISCUSSION

This study showed that individuals complaining from persistent symptoms after getting infected by the SARS-CoV-2 virus, a situation that can be termed as long COVID[29] suffered from more somatization. Such results can affirm our hypothesis regarding the existence of a psychological component associated with this condition, especially that somatic symptoms, chronic fatigue in particular had been shown to persist up to 4 years in the severe acute respiratory syndrome (SARS) outbreak.[30] Moreover, a systemic review showed that fatigue persisted as many as 40 months in one-third of Middle East Respiratory Syndrome (MERS) patients.[31] A previous study came up with a similar result and suggested a role of psychological factors in the persistence of symptoms but none of its participants met the criteria for a somatization disorder.[32] In spite of that, there is very few data analyzing the long COVID – somatization relationship and our study draw attention to this association and provide a starting point for future investigations.

Vaccination against COVID-19 is in its early stages in many countries and what influence would it have on the persistent symptoms also known as long COVID is still unknown. A retrospective cohort study in the United States studied the effect of vaccination for COVID-19 before or after infection on the development of long COVID in individuals who tested positive for COVID-19 between January 2020 and May 2021.[33] Of the 240,648 cases who met the inclusion criteria, 220,460 had not received any anti-COVID vaccine prior to 12-weeks after their COVID-19 diagnosis, 17,796 took the vaccine within 12 weeks after diagnosis and 2,392 received one dose before diagnosis. This study found that patients who were vaccinated before being infected were significantly less prone to have any forms of long COVID somewhere in the range of 12 and 20 weeks after diagnosis than cases who were unvaccinated up to 12 weeks after their diagnosis. In addition, a prospective cohort study performed in the United Kingdom on health care workers who are experiencing long COVID symptoms assessed if vaccination changed their long COVID symptoms.[34] Out of 67 healthcare workers who were included in this study, several weeks after vaccination, 14 participants reported an improvement in 1 or more of their symptoms, 8 participants reported a worsening in symptoms, and 45 participants reported no change in their symptoms.

On the opposite side, a retrospective cohort study performed on Indian adults, examined the effect of the vaccination before diagnosis on self-reported long COVID symptoms[35] came up with data suggesting that fully vaccinated participants were more likely to have long COVID symptoms 4 weeks from the date of diagnosis than unvaccinated participants.

Furthermore, a rapid review, organized by the UK health security agency[36] concluded that vaccinated people were less likely to develop long COVID symptoms particularly fatigue, dyspnea, headache and muscle pain and unvaccinated individuals suffering from long COVID showed an improvement with their symptoms after vaccination. However, the exact mechanism behind all these findings is not fully understood[37] and the dissimilarities found in these studies indicate that further, more specific studies must be done. Our study results are confirmatory to most previous findings that highlighted the beneficial effect of the vaccination in the reduction of COVID symptoms persistence and this is probably associated with a better sense of security, relief, less stress and anxiety what was confirmed by the decreased somatization levels in vaccinated individuals in our study.

Thus, based on the previously mentioned studies a psychiatric component behind the persistence of symptoms particularly somatization must be suspected and not overlooked especially that somatization is one of the most common issues in health care services that are associated with functional impairment and responsible for a large proportion of disability in the workforce[38] as well as health care utilization. Also, somatization and psychiatric illnesses in general have a totally different treatment than organic causes and a delayed treatment plan can lead to regrettable[39] complications ranging from social and professional impairment to depression and even suicide.

Our findings come along with another study has highlighted the necessity of integrating psychiatrists in the management of COVID-19 to differentiate organic from psychiatric etiologies in persistent symptoms which will prevent delaying appropriate treatments.[40] In the end, our study shed light to the importance of the vaccination against COVID-19 and its potential role in preventing and treating the long COVID syndrome. However further studies assessing each symptom individually and the hospitalization status or a more vulnerable population are needed to provide a better understanding of the risk factors. Moreover, a case control study design may be more suitable in this newly emerging condition and may allow us to study more than one possible etiology simultaneously.

CLINICAL IMPLICATIONS

Our findings emphasized the necessity of integrating mental health professionals in the management of COVID-19. Moreover, this study highlighted the importance of the vaccine as a protective measure against somatization and vaccination should be encouraged not only to prevent the infection but also its complications.

further studies are needed to provide a better understanding of the relationship between long COVID and somatization, on one hand, and the modulating factors on the other hand.

DECLARATIONS

Ethics Approval and Consent to Participate: The study was approved by the Ethics Committee at the Psychiatric Hospital of the Cross (HPC-040-2021). All participants gave their informed written consent when submitting the online form.

Consent for publication: not applicable.

Availability of data and materials: The authors do not have the right to share any data information as per their institutions' policies.

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Authors' contributions: AN, SH and GH conceived and designed the survey. SH was involved in the statistical analysis and data interpretation. AN wrote the manuscript and involved in the data collection. SO reviewed the manuscript. All authors read the manuscript, critically revised it for intellectual content, and approved the final version.

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