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The Association between Self-Reported Long COVID Symptoms and COVID-19 Conspiracy Theories in Jordan and Kuwait

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Abstract: Long COVID comprises persistent symptoms that extend beyond four weeks post-SARS-CoV-2 infection. The potential association between long COVID and the endorsement of COVID-19 conspiracy theories has not been explored, particularly in Arab countries, where high endorsement of these theories has been reported. This study aimed to explore the association between endorsing COVID-19 conspiracy theories and the prevalence of self-reported long COVID symptoms among adults in Jordan and Kuwait in addition to other Arab countries. The study employed a cross-sectional design using Computer-Assisted Web Interviewing (CAWI), conducted in Arabic. Recruitment utilized convenience-based snowball sampling via social media and the survey was distributed in July 2024. Long COVID manifestations were assessed across ten recognized symptoms, and belief in conspiracy theories was measured using a five-point Likert scale across five items. The final study sample comprised 755 respondents, the majority of whom self-reported a history of confirmed COVID-19 diagnosis at least once (n = 493, 65.2%). The results indicated a neutral average attitude towards COVID-19 conspiracy theories (mean score = 15.18 ± 4.64 out of 30.00). Participants with high COVID-19 conspiracy theories scores were more likely to report high (aOR = 6.85, $p < 0.001$) or middle long COVID symptoms (aOR = 2.82, $p = 0.008$) compared to those with lower scores. Additional predictors of higher long COVID reporting included female sex, lower household income, frequent COVID-19 infections, and hospitalizations. The study results revealed a significant correlation between the endorsement of COVID-19 conspiracy theories and a higher frequency and magnitude of long COVID symptom reporting. The findings also highlighted the influence of sociodemographic factors and COVID-19 infection history on long COVID reporting, which suggests that public health strategies should address these factors to mitigate long COVID challenges effectively.

Keywords: SARS-CoV-2; long COVID; post-COVID condition; long-haul COVID; PASC; post-acute sequelae of COVID-19; COVID-19 conspiracy theories; health communication

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1. Introduction

The COVID-19 pandemic continues to impact daily life despite effective containment strategies [1]. COVID-19 consequences remain substantial due to the emergence of variants of concern, waning immunity over time, and the existence of unvaccinated demographic groups [2]. Additionally, COVID-19 has profoundly affected economic stability and psychosocial dynamics worldwide [3,4].

A significant consequence of the COVID-19 pandemic is the emergence of "long COVID", which is a condition characterized by persistent symptoms that linger beyond the acute phase of SARS-CoV-2 infection [5–8]. This phenomenon presents a complex challenge for ongoing public health initiatives and healthcare management, complicated by its broadly defined symptoms and variable duration [7,9–14]. For example, a correlation between long COVID and unemployment in Hawaii was reported by Bonham et al., highlighting the profound economic impact and the implications for public health, business equality, and academia for this condition [15].

Long COVID, also known as post-acute sequelae of SARS-CoV-2 infection (PASC), refers to a range of symptoms that persist for more than four weeks following the initial SARS-CoV-2 infection [16–19]. These symptoms can affect various organ systems and include fatigue, dyspnea, chest pain, cognitive dysfunction, muscle pain, joint pain, headaches, among other manifestations [20–26]. The World Health Organization (WHO) defines "long COVID" as the continuation or development of new symptoms three months post-infection, lasting for at least two months, and not explained by alternative diagnoses [27,28].

Studies have estimated that the prevalence of long COVID in general practice has been variable depending on the measure used [29–32]. Common occurrence of long COVID was reported in different studies with rates that can reach up to 78% [33–40]. The risk factors for developing long COVID include female sex, older age, higher body mass index (BMI), smoking, pre-existing comorbidities, and previous hospitalization or intensive care unit (ICU) admission [31,41–44].

On a separate note, the COVID-19 pandemic witnessed a surge in conspiracy theories related to the origin of the virus, its vaccination, and the public health control measures [45–51]. These COVID-19 conspiracies negatively impacted public perceptions and behaviors toward preventive measures, including vaccination hesitancy and lower compliance to non-pharmaceutical intervention (NPI) measures [48,52–56].

COVID-19 conspiracy theories are unsubstantiated beliefs that propose alternative explanations for the origin, spread, and impact of COVID-19 [48,57–59]. These theories reject scientific consensus regarding natural SARS-CoV-2 origin and suggest that powerful groups manipulated or fabricated information on the pandemic for nefarious purposes [60–62]. Common conspiracy theories include beliefs that the virus was deliberately constructed as a bioweapon, that the pandemic is a hoax, or that COVID-19 vaccines are harmful and part of a global control agenda [54,63–65].

Conspiracy theories can undermine public health efforts by promoting vaccine hesitancy, reducing adherence to NPI measures (e.g., mask-wearing, social distancing), and causing mistrust in health authorities [66–68]. In the Middle East, several studies showed that individuals who believe in conspiracy theories were less likely to engage in positive health behaviors that mitigate the spread of different viruses [69–73]. Cultural factors were reported to play a discernible role in shaping how conspiracy theories are adopted beside its role in shaping health beliefs and behavior [74–77]. In Arab countries, including Jordan and Kuwait, perceptions of emerging infections including COVID-19 have been reported to be influenced by social norms, religious beliefs, and the level of trust in healthcare systems [69,72,73,78,79]. These factors, compounded by psychological distress and cognitive biases, may lead to an increased perception of the detrimental consequences of COVID-19 including the reporting of long COVID [80,81].

Cognitive biases can play a significant role in the formation and maintenance of conspiracy beliefs [82–84]. Confirmation bias entails that individuals seek out information that confirms their pre-existing views and dismiss evidence that contradicts them [85,86]. The uncertainty and anxiety generated by the COVID-19 pandemic can heighten susceptibility to these cognitive biases, as people look for explanations that provide a sense of control and understanding [87,88]. This phenomenon is supported by recent research, which indicates that individuals who endorsed COVID-19 conspiracy theories reported experiencing more side effects following COVID-19 vaccine uptake [89,90].

Psychological issues including anxiety and depression were widely prevalent during the COVID-19 pandemic and can influence the reporting and perception of physical symptoms [91–94]. Thereby, psychological issues can lead to psychosomatic phenomena where mental and emotional factors manifest as physical symptoms, which was evident during the COVID-19 pandemic [95,96]. Recent evidence suggests that individuals experiencing high levels of stress and anxiety are more likely to report somatic symptoms, which can overlap with those of long COVID [81,97–99]. Therefore, exploring the hypothesis that a belief in conspiracy theories—which are frequently linked to elevated psychological distress—may correlate with increased reporting of long COVID manifestations appears as a promising area for research investigation.

Several studies investigated the correlation between conspiracy beliefs and health behaviors during the COVID-19 pandemic [66,100–102]. The results of various studies indicated that individuals who endorse COVID-19 conspiracy theories are more likely to report negative health outcomes and display mistrust in medical interventions including vaccination [103–110]. However, there is a general lack of studies that assess the potential association between conspiracy beliefs and self-reported long COVID symptoms.

The potential relationship between conspiracy theory endorsement and the reporting of long COVID symptoms can be understood within the framework of psychosomatic theory, which postulates that psychological factors, including belief systems, can significantly influence the perception, interpretation, and manifestation of physical symptoms [111–113]. Specifically, individuals who endorse conspiracy theories, particularly those related to health, often exhibit cognitive biases such as heightened symptom vigilance, misattribution of normal bodily sensations, or misperception of illness symptoms [114,115]. Additionally, healthcare distrust, which is often heightened by conspiracy beliefs, may serve as an additional psychosomatic factor that amplifies symptom reporting [116]. Individuals who harbor distrust toward healthcare systems may be more likely to interpret bodily sensations as symptoms of serious illness, particularly when their experiences with healthcare are unsatisfactory or when their symptoms persist despite medical interventions [48]. Furthermore, conspiracy theories often arise in response to feelings of anxiety and stress during uncertain or threatening situations, which can further amplify the psychological impact on how individuals perceive and report their physical symptoms [117,118]. This dynamic suggests that both the endorsement of conspiracy theories and the psychological distress in stressful circumstances may together play a role in shaping the subjective experience of long COVID.

In the long COVID context, conspiracy beliefs may function as psychological stressors that heighten the perception of long COVID symptoms, leading individuals to report them even without objective clinical evidence. Research on persistent physical symptoms indicated that individuals could develop negative health expectations, resistant to change, through "cognitive immunization"—a process where strong beliefs override minor bodily sensations [119,120]. Similarly, conspiracy beliefs could intensify these maladaptive expectations, causing individuals to misinterpret or exaggerate post-COVID symptoms. The current study hypothesized that the endorsement of conspiracy theories may act as a psychological mechanism that could influence the subjective reporting of long COVID symptoms. It is crucial to note that while conspiracy beliefs are not suggested to cause long COVID symptoms, these beliefs may magnify or distort the perception of symptoms that exist due to the disease itself.

Thus, the current study hypothesis posited that individuals endorsing conspiracy theories may exhibit psychological distress, cognitive biases, or health anxiety, potentially leading to an increased reporting of long COVID symptoms. Consequently, this study aimed to explore the association between self-reported long COVID manifestations and the belief in COVID-19 conspiracy theories in Jordan and Kuwait, where specific conspiratorial ideas regarding infectious diseases were notably prevalent [72,73].

2. Materials and Methods

2.1. Study Design and Ethical Approval

This study was based on a cross-sectional Computer-Assisted Web Interviewing (CAWI) approach. The CAWI aimed to gather data on the beliefs in COVID-19 conspiracy theories and the prevalence of self-reported long COVID symptoms among a sample of individuals previously diagnosed with COVID-19 residing in Arab countries with a focus on two Arab countries, namely Jordan and Kuwait, based on the nationality of the authors (M.S., R.J.O., and M.B. are Jordanians while K.A.-M., M.A.A., M.A., F.A., N.A., and S.A. are Kuwaiti).

The inclusion criteria were as follows: (1) being an adult aged 18 years or older; (2) having a self-reported, confirmed history of COVID-19 infection; (3) self-reporting "very good" proficiency in reading and writing Arabic, which was assessed through participants' ability to comprehend the survey questions and provide informed consent; and (4) providing electronic consent to participate in the study.

The required sample size was determined using G*Power software (version 3.1.9.7) [121,122], predicated on an anticipated small to medium effect size of 0.3, with an alpha set at 0.050, and aiming for a power of 95.0% as follows. Based on these parameters, the recruitment of 147 participants was required to achieve sufficient statistical power to detect significant associations between conspiracy beliefs and long COVID symptoms.

This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (IRB) at the School of Pharmacy—Applied Science Private University (approval number: 2024-PHA-27).

2.2. Recruitment and Data Collection

Recruitment of participants was conducted using a combination of convenience and snowball sampling methods. Initially, convenience sampling was employed, where the authors (three Jordanians and six Kuwaitis, including eight females and a single male) directly contacted potential participants through social media platforms (WhatsApp, Instagram, Facebook, Snapchat, and Messenger). Following this, snowball sampling was utilized as participants were encouraged to share the survey link within their respective networks to ensure a broad community engagement.

The survey was administered electronically via Google Forms, without collecting participant identifiers to ensure anonymity and confidentiality of all participant responses. Prior to participation, electronic informed consent was obtained from all participants, adhering to ethical standards of permission. The survey distribution took place in July 2024 and the participants were not offered any incentives for participation. The survey language was Arabic.

2.3. Survey Instrument

Following the introductory section—which highlighted the aims of the study and indicated the assessment of long COVID symptoms that persisted for at least 2 months following recovery from COVID-19—the informed consent item was presented, and the first survey section assessed participant demographics as follows: (1) age as a scale variable, later trichotomized into 3 groups (18–39 years vs. 40–59 years vs. 60 years or older); (2) sex (male vs. female); (3) educational level (high school or less vs. undergraduate vs. postgraduate); (4) self-reported financial status of household (low-income vs. middle-income vs. high-income); (5) history of chronic disease (yes vs. no); (6) self-reported weight and height (to measure BMI, which comprised four categories— <18.5 vs. 18.5–24.9 vs. 25.0–29.9 vs. ≥ 30); and (7) history of tobacco consumption including cigarettes, narghile, vaping, or any other form of smoking (current vs. ex-smoker vs. never smoked).

The second section inquired about the history of COVID-19 and its vaccination as follows: (1) How many times did you get a confirmed diagnosis of COVID-19? (zero vs. one vs. two vs. three or more); (2) if infected, did you get hospitalized for COVID-19? (yes vs. no); and (3) how many COVID-19 vaccine doses did you receive? (zero vs. one dose vs. two doses vs. three or more doses).

The third section assessed self-reported long COVID symptoms as follows based on the WHO definition of long COVID [27], with a selection of the most commonly prevalent list of long COVID manifestations based on an extensive literature review and assessment of content validity by the first and senior authors [20–26,38,43,123–128]. The long COVID symptoms were assessed by asking the participants: On a scale from 0 (not at all), to 1 (rarely), to 2 (often), to 3 (always), how often did you experience these symptoms following your COVID-19 diagnosis compared to the period before your diagnosis? (1) Unusually tired or fatigued; (2) shortness of breath or difficulty in breathing; (3) chest pain or discomfort; (4) difficulty concentrating or memory problems; (5) muscle or joint pain; (6) trouble in sleeping or poor sleep quality; (7) loss or change in your sense of taste or smell; (8) headaches; (9) feeling of rapid or irregular heartbeat; and (10) feeling anxious or depressed. Then, the "long COVID score" was calculated by summing the scores for each individual item.

The final section assessed the endorsement of COVID-19 conspiracy theories using the following five items (measured on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree)), which were constructed based on [69,73,78,90]: (1) Coronavirus was created purposefully by hidden powerful groups to control the global population; (2) COVID-19 dangers were exaggerated by the media and governments to cause fear among the public; (3) the COVID-19 pandemic was a hoax and the virus does not exist; (4) COVID-19 vaccines were a scheme by big pharma companies to make money and control the public; and (5) governments used the COVID-19 pandemic as an excuse to impose restrictions and monitor people closely.

2.4. Statistical and Data Analysis

We implemented a categorization approach to analyze long COVID scores (low = 0–9, middle = 10–19, and high = 20–30) and conspiracy scores (low = 5–11, middle = 12–18, and high = 19–25). The internal consistency of the long COVID score and the COVID-19 conspiracy theories index was assessed using Cronbach's α, a measure to verify that the index items reliably assessed the same underlying concept, confirming the internal consistency of this novel construct.

To examine associations between categorical variables, we utilized the Chi-Square (χ^2) test. To ensure that the scale variables were appropriately distributed for further parametric analysis, we conducted normality testing using the Kolmogorov–Smirnov test. Given the non-normal distribution of the two scale variables (long COVID score and the COVID-19 conspiracy theories index), the Mann–Whitney *U* (M-W) and Kruskal–Wallis (K-W) non-parametric tests were selected. Additionally, we utilized an Analysis of Variance (ANOVA) to assess differences in long COVID scores across various sub-groups, employing Eta squared (η^2) to quantify the effect size and the proportion of variance explained by these differences. Eta squared values were interpreted as follows: η^2 values from 0 to 0.01 indicated a negligible effect; 0.01 to 0.06 represented a small effect with limited but discernible differences; 0.06 to 0.14 suggested a moderate effect, where group differences accounted for a notable portion of outcome variance; 0.14 to 0.26 indicated a strong effect, with substantial variance explained by group differences; and values of 0.26 and above represented an extremely strong effect, where group differences accounted for the majority of outcome variance based on Maher et al. [129].

Multinomial logistic regression was employed to assess the associations between multiple independent variables and a categorical dependent variable (long COVID score categories). This regression model was particularly selected due to its efficacy in handling categorical outcomes with more than two categories. We included variables in this model that demonstrated potential significance ($p < 0.100$) in the univariate analyses, suggesting their predictive relevance. The regression model effectiveness was evaluated using Nagelkerke R^2, which adjusts the Cox and Snell R^2 to a range between 0 and 1, measuring the explained variance by the model comprehensively. Furthermore, to avoid the pitfalls of multicollinearity, which can skew regression analysis results, we tested for multicollinearity using the Variance Inflation Factor (VIF). Our criterion for statistical significance was set at a p value of <0.050.

All statistical analyses were conducted using IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY, USA: IBM Corp.

3. Results

3.1. Study Sample Characteristics

A total of 755 responses were received. A majority of the study respondents were young adults aged 18–39 years (n = 460, 60.9%), females (n = 533, 70.6%), undergraduates (n = 464, 61.5%), reported a middle household income (n = 512, 67.8%), and were either from Jordan (n = 438, 58.0%) or Kuwait (n = 245, 32.5%) as illustrated in Table 1. More than a quarter of the study participants reported a history of chronic disease (n = 193, 25.6%), more than a third of the study participants had a BMI in the range of 25.0–29.9 indicating healthy weight (n = 272, 36.0%), and a majority of the participants were non-smokers (n = 496, 65.7%). The majority of participants self-reported a history of confirmed COVID-19 diagnosis either once (n = 297, 39.3%), twice (n = 125, 16.6%), or three times or more (n = 71, 9.4%). For the self-reported history of COVID-19 vaccine uptake, two-thirds of the study participants reported completing the primary vaccination series (n = 329, 66.7%), while 106 participants reported the uptake of booster vaccine doses (21.5%, Table 1).

Table 1. General characteristics of the study sample (N = 755).

Variable	Category	Count (%)
Age category	18–39 years	460 (60.9)
	40–59 years	263 (34.8)
	60 years or older	32 (4.2)
Sex	Male	222 (29.4)
	Female	533 (70.6)
Country	Jordan	438 (58.0)
	Kuwait	245 (32.5)
	Others [2]	72 (9.5)
Education	High school or less	163 (21.6)
	Undergraduate	464 (61.5)
	Postgraduate	128 (17.0)
Self-reported income of household	Low	139 (18.4)
	Middle	512 (67.8)
	High	104 (13.8)
Self-reported history of chronic disease	Yes	193 (25.6)
	No	562 (74.4)
Body mass index (BMI)	Underweight	14 (1.9)
	Healthy weight	272 (36.0)
	Overweight	255 (33.8)
	Obesity	214 (28.3)
Smoking	Non-smoker	496 (65.7)
	Ex-smoker	58 (7.7)
	Current smoker	201 (26.6)
Confirmed COVID-19 [1]	0	262 (34.7)
	1	297 (39.3)

Table 1. *Cont.*

Variable	Category	Count (%)
	2	125 (16.6)
	3 or more	71 (9.4)
Hospitalized due to COVID-19	Yes	39 (7.9)
	No	454 (92.1)
COVID-19 vaccine doses received	0	30 (6.1)
	1	28 (5.7)
	2	329 (66.7)
	3 or more	106 (21.5)

[1] COVID-19: Coronavirus disease 2019; [2] Others comprised the following countries—Iraq (*n* = 15), Saudi Arabia (*n* = 11), Egypt (*n* = 11), Oman (*n* = 9), Qatar (*n* = 8), Bahrain (*n* = 7), other Arab countries (*n* = 6), The United Arab Emirates (UAE) (*n* = 3), Syria (*n* = 1), and Palestine (*n* = 1).

3.2. The Prevalence of Long COVID among Respondents Who Had Confirmed COVID-19 Diagnosis

The distribution of self-reported long COVID symptoms by the participants with a history of confirmed COVID-19 diagnosis is illustrated in Figure 1.

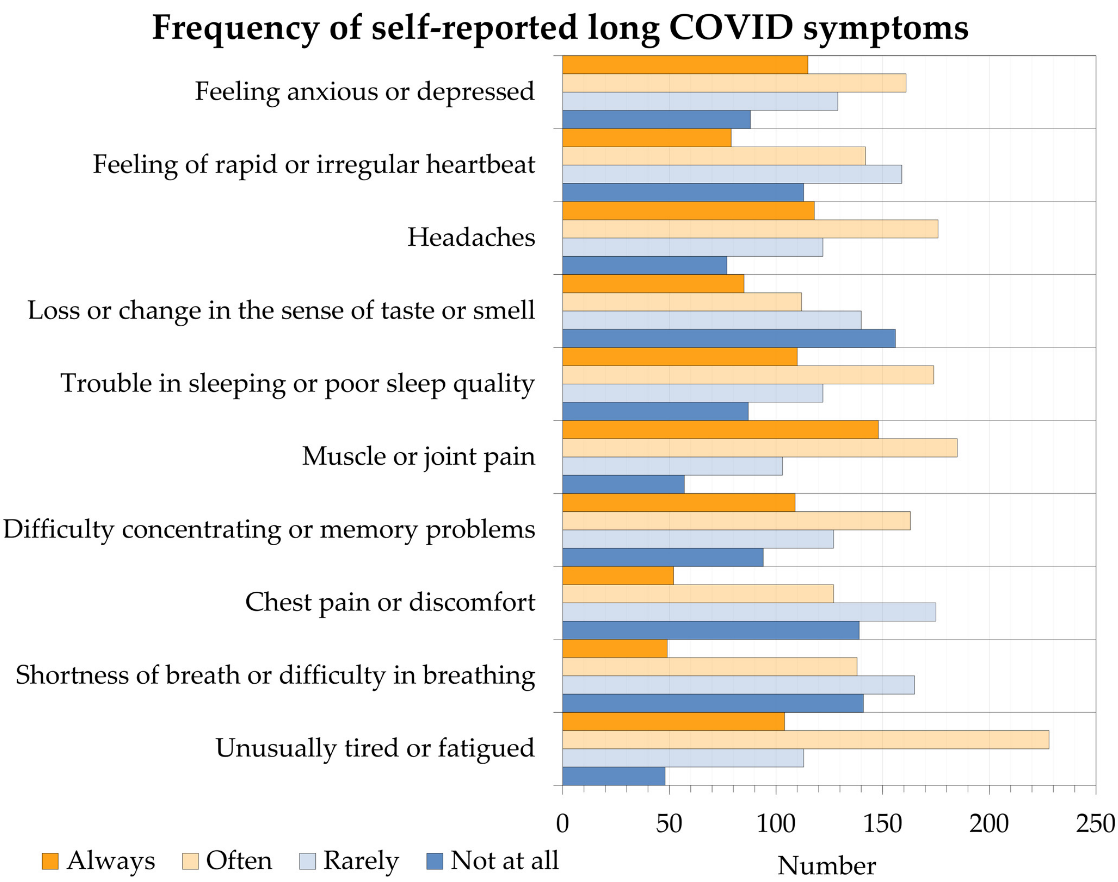

Figure 1. The frequency of long COVID symptoms as reported by the participants with a confirmed history of COVID-19 diagnosis (*n* = 493).

The long COVID-19 scale showed a high internal consistency as evidenced by a Cronbach's α value of 0.907. For the ten long COVID signs/symptoms, the highest average score was reported for muscle or joint pain (mean = 1.86 ± 0.977), followed by feeling unusually tired or fatigued (mean = 1.79 ± 0.886), headaches (mean = 1.68 ± 1.005), trouble in sleeping or poor sleep quality (mean = 1.62 ± 1.018), feeling anxious or depressed (mean = 1.61 ± 1.031), difficulty concentrating or memory problems (mean = 1.58 ± 1.034), feeling of rapid or irregular heartbeat (mean = 1.38 ± 1.008), loss or change in the sense of taste or smell (mean = 1.26 ± 1.082), while the lowest average scores were observed for shortness of breath or difficulty in breathing (mean = 1.19 ± 0.963) and chest pain or discomfort (mean = 1.19 ± 0.964).

For the overall long COVID score in the study sample and in a range from 0 to 30, the mean score was 15.2 ± 7.365. The distribution of the long COVID score showed non-normality as evidenced by the Kolmogorov–Smirnov test ($p < 0.001$). The following variables were significantly associated with higher long COVID scores as shown in Figure 2. Being a young adult aged 18–39 years as opposed to being middle-aged or elderly (mean long COVID scores of 15.61 vs. 14.78 vs. 10.50, $p = 0.018$, K-W; $\eta^2 = 0.017$); being female (mean long COVID scores of 16.37 vs. 12.02, $p < 0.001$, M-W; $\eta^2 = 0.075$); having a self-reported low income of household compared to middle and high incomes (mean long COVID scores of 16.27 vs. 15.39 vs. 12.80, $p = 0.011$, K-W; $\eta^2 = 0.020$); having a history of chronic disease (mean long COVID scores of 16.64 vs. 14.64, $p = 0.007$, M-W; $\eta^2 = 0.014$); having a confirmed history of COVID-19 diagnosis for three times or more compared to having the diagnosis twice or once (mean long COVID scores of 18.89 vs. 17.43 vs. 13.31, $p < 0.001$, K-W; $\eta^2 = 0.110$); a history of hospitalization due to COVID-19 (mean long COVID scores of 17.79 vs. 14.93, $p = 0.021$, M-W; $\eta^2 = 0.011$); and high endorsement of COVID-19 conspiracy theories as opposed to middle and low levels of embracing these theories (mean long COVID scores of 17.89 vs. 14.92 vs. 12.42, $p < 0.001$, K-W; $\eta^2 = 0.066$, Figure 2).

By categorizing the long COVID score into three categories, the following variables were associated with a higher probability of having long COVID symptoms: younger age of 18–39 years, female sex, low monthly income of household, higher frequency of previous diagnosis of COVID-19, and higher embrace of COVID-19 conspiracy theories (Table 2).

Table 2. The association between long COVID and different study variables in univariate analyses.

Variable	Category	Long COVID Score			p Value, χ^2
		Low (0–9)	Middle (10–19)	High (20–30)	
		Count (%)	Count (%)	Count (%)	
Age category	18–39 years	64 (20.8)	143 (46.4)	101 (32.8)	0.026, 11.047
	40–59 years	38 (22.5)	89 (52.7)	42 (24.9)	
	60 years or older	8 (50.0)	6 (37.5)	2 (12.5)	
Sex	Male	49 (35.8)	66 (48.2)	22 (16.1)	<0.001, 26.894
	Female	61 (17.1)	172 (48.3)	123 (34.6)	
Country	Jordan	62 (20.5)	154 (50.8)	87 (28.7)	0.216, 5.786
	Kuwait	38 (25.9)	60 (40.8)	49 (33.3)	
	Others [2]	10 (23.3)	24 (55.8)	9 (20.9)	
Education	High school or less	21 (24.7)	39 (45.9)	25 (29.4)	0.724, 2.064
	Undergraduate	67 (21.4)	158 (50.5)	88 (28.1)	
	Postgraduate	22 (23.2)	41 (43.2)	32 (33.7)	
Self-reported income of household	Low	12 (15.0)	42 (52.5)	26 (32.5)	<0.001, 23.387
	Middle	67 (19.6)	174 (50.9)	101 (29.5)	
	High	31 (43.7)	22 (31.0)	18 (25.4)	
Self-reported history of chronic disease	Yes	24 (18.6)	58 (45.0)	47 (36.4)	0.111, 4.403
	No	86 (23.6)	180 (49.5)	98 (26.9)	
Body mass index (BMI)	Underweight	3 (37.5)	2 (25.0)	3 (37.5)	0.123, 10.033
	Healthy weight	46 (25.7)	92 (51.4)	41 (22.9)	
	Overweight	31 (19.6)	80 (50.6)	47 (29.7)	
	Obesity	30 (20.3)	64 (43.2)	54 (36.5)	

Table 2. *Cont.*

Variable	Category	Long COVID Score			p Value, χ^2
		Low (0–9)	Middle (10–19)	High (20–30)	
		Count (%)	Count (%)	Count (%)	
Smoking	Non-smoker	72 (21.6)	157 (47.0)	105 (31.4)	0.558, 3.000
	Ex-smoker	7 (18.4)	20 (52.6)	11 (28.9)	
	Current smoker	31 (25.6)	61 (50.4)	29 (24.0)	
Confirmed COVID-19	1	91 (30.6)	141 (47.5)	65 (21.9)	<0.001, 38.147
	2	13 (10.4)	63 (50.4)	49 (39.2)	
	3	6 (8.5)	34 (47.9)	31 (43.7)	
Hospitalized due to COVID-19	Yes	5 (12.8)	17 (43.6)	17 (43.6)	0.091, 4.797
	No	105 (23.1)	221 (48.7)	128 (28.2)	
COVID-19 vaccine doses received	0	9 (30.0)	11 (36.7)	10 (33.3)	0.256, 7.758
	1	4 (14.3)	14 (50.0)	10 (35.7)	
	2	67 (20.4)	160 (48.6)	102 (31.0)	
	3	30 (28.3)	53 (50.0)	23 (21.7)	
COVID-19 conspiracy score [1]	Low (5–11)	38 (38.8)	40 (40.8)	20 (20.4)	<0.001, 34.989
	Middle (12–18)	55 (20.1)	148 (54.2)	70 (25.6)	
	High (19–25)	17 (13.9)	50 (41.0)	55 (45.1)	

[1] COVID-19 conspiracy score: calculated based on five items assessed using a 5-point Likert scale; [2] Others comprised the following countries—Iraq (n = 15), Saudi Arabia (n = 11), Egypt (n = 11), Oman (n = 9), Qatar (n = 8), Bahrain (n = 7), other Arab countries (n = 6), The United Arab Emirates (UAE) (n = 3), Syria (n = 1), and Palestine (n = 1).

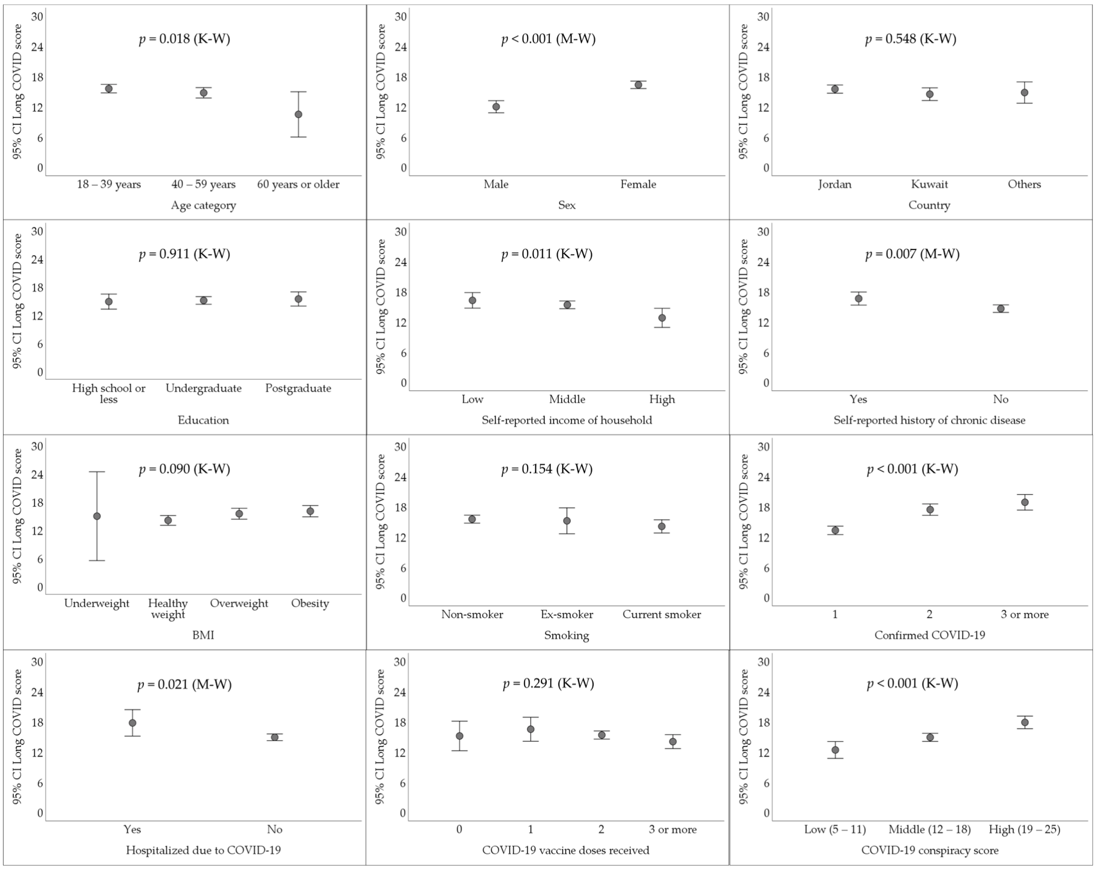

Figure 2. The association between the long COVID scores and the study variables (n = 493), shown as error bars representing the 95% confidence intervals (CIs) of the mean. K-W: Kruskal–Wallis H test;

M-W: Mann–Whitney *U* test; BMI: body mass index; COVID-19 conspiracy score: calculated based on five items assessed using a 5-point Likert scale.

3.3. Reliability of the Conspiracy Beliefs Index

The COVID-19 conspiracy theories index showed a fairly high internal consistency as evidenced by a Cronbach's α value of 0.844, which confirmed the index's reliability to measure the construct consistently across items. The inter-item correlation analysis showed that the COVID-19 conspiracy theories index was appropriate for its intended purpose, with inter-item correlations ranging from moderate to strong ($r = 0.403$ to $r = 0.748$, Figure 3). This result indicated a coherent relationship among the items, confirming the index's suitability to form a unified construct for the assessment of COVID-19 conspiracy beliefs.

Inter-Item Correlation Matrix	Item 2	Item 3	Item 4	Item 5
Item 1	0.549	0.501	0.748	0.466
Item 2		0.463	0.593	0.443
Item 3			0.472	0.403
Item 4				0.568

Figure 3. The inter-item correlation matrix for the COVID-19 conspiracy theories index. Higher correlations are indicated by deeper shades of green.

3.4. The Endorsement of COVID-19 Conspiracy Theories among Respondents Who Had Confirmed COVID-19 Diagnosis

The mean score of the COVID-19 conspiracy theories index was 15.18 ± 4.64, which indicated an overall neutral attitude to these theories among the respondents who reported a confirmed diagnosis of COVID-19. The distribution of the COVID-19 conspiracy theories index showed non-normality as evidenced by the Kolmogorov–Smirnov test ($p < 0.001$).

A statistically significant higher endorsement of COVID-19 conspiracy theories was noticed among the participants who did not receive COVID-19 vaccination compared to those who received a single dose, two doses, and three or more doses (mean COVID-19 conspiracy theories scores, 15.93 vs. 14.82 vs. 15.51 vs. 14.03, $p = 0.021$, K-W, Figure 4). Additionally, a statistically significant higher endorsement of COVID-19 conspiracy theories was observed among the participants with higher long COVID scores (mean COVID-19 conspiracy theories scores, 16.54 vs. 15.26 vs. 13.20, $p < 0.001$, K-W, Figure 4).

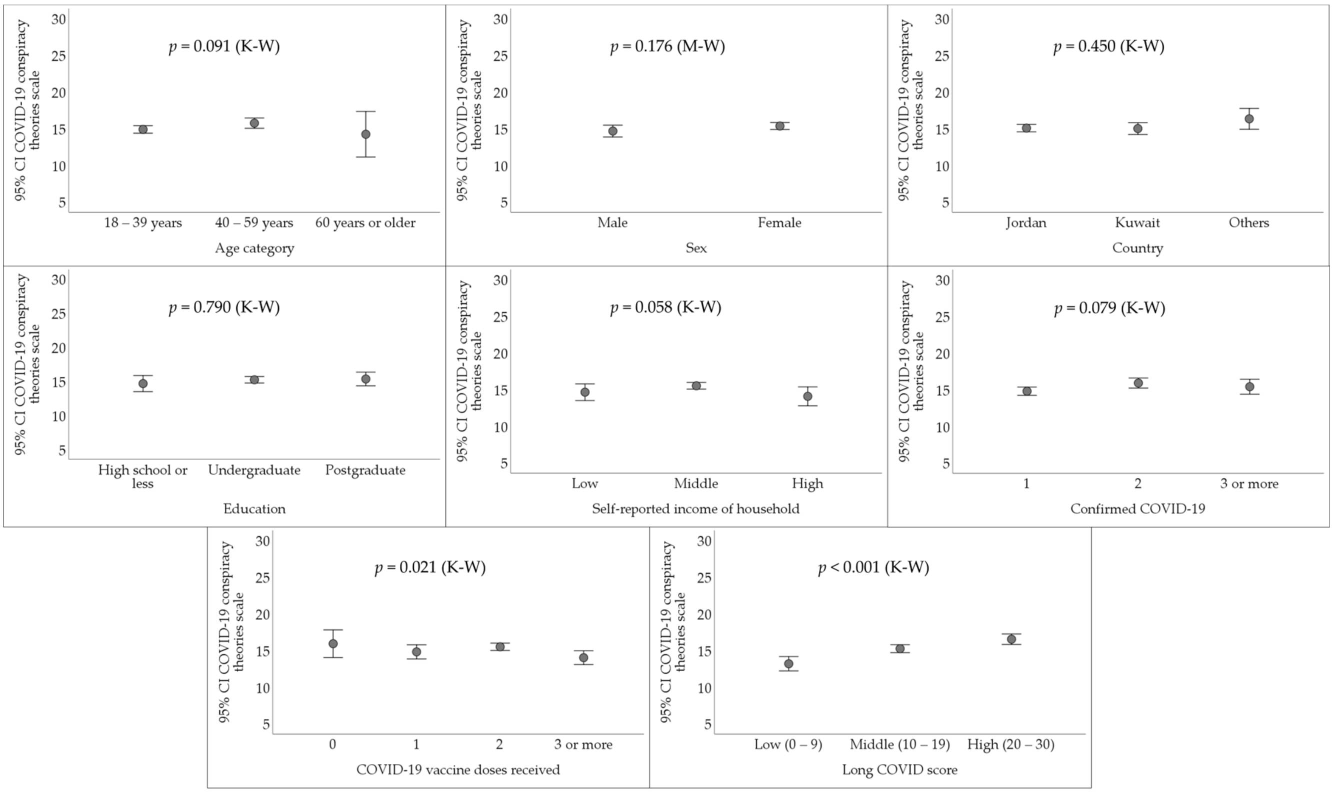

Figure 4. The association between the endorsement of COVID-19 conspiracy theories and the study variables ($n = 493$) shown as error bars representing the 95% confidence intervals (CIs) of the mean. K-W: Kruskal–Wallis H test; M-W: Mann–Whitney *U* test.

3.5. Higher Reporting of Long COVID Manifestations Was Associated with the Endorsement of COVID-19 Conspiracy Theories in Multivariate Analysis

In our regression model on possible factors influencing long COVID scores, collinearity diagnostics indicated that all predictor variables exhibited minimal multicollinearity, which ensured the reliability of our regression estimates. The VIF for each predictor remained close to 1, with values ranging from 1.007 for the COVID-19 conspiracy score to 1.022 for the age category, which indicates the absence of substantial collinearity that might affect the analysis.

In multinomial logistic regression analysis, which showed a Nagelkerke R^2 value of 0.266, the following variables were independently associated with statistically significant higher reporting of long COVID manifestations among the study respondents. High endorsement of COVID-19 conspiracy theories significantly predicted higher self-reporting of long COVID symptoms. Specifically, individuals scoring high on conspiracy beliefs (19–25) were much more likely to report high long COVID symptoms (adjusted Odds Ratio (aOR) = 6.85, 95% CI: 2.90–16.13, $p < 0.001$) and middle long COVID symptoms (aOR = 2.82, 95% CI: 1.32–6.06, $p = 0.008$) compared to those with lower scores.

Other significant predictors included sex, with females more likely to report both high (aOR = 5.15, 95% CI: 2.66–10.00, $p < 0.001$) and middle long COVID symptoms (aOR = 2.11, 95% CI: 1.26–3.55, $p = 0.005$), and household income, where self-reported low income levels correlated with a higher long COVID symptoms reported compared to higher income levels. Furthermore, individuals with frequent COVID-19 diagnoses (three times or more) reported high long COVID symptoms (aOR = 10.31, 95% CI: 3.73–28.57, $p < 0.001$) and middle long COVID symptoms (aOR = 4.76, 95% CI: 1.81–12.50, $p = 0.002$), and a history of hospitalization due to COVID-19 was also associated with a high long COVID symptoms reported (aOR = 5.53, 95% CI: 1.66–18.46, $p = 0.005$, Table 3).

Table 3. Multivariate analyses for the factors associated with higher reporting of long COVID manifestations.

High Long COVID Score (20–30) vs. Low Long COVID Score (0–9)	aOR [1] (95% CI [2])	*p* Value
Factors		
COVID-19 conspiracy theories		
High COVID-19 conspiracies score (19–25) vs. low COVID-19 conspiracies score (5–11)	6.85 (2.90–16.13)	**<0.001**
High COVID-19 conspiracies score (19–25) vs. medium COVID-19 conspiracies score (12–18)	3.21 (1.56–6.58)	**0.002**
Age		
18–39 years vs. 60 years or older	3.62 (0.65–20.32)	0.144
40–59 years vs. 60 years or older	2.09 (0.36–12.16)	0.413
Sex		
Female vs. male	5.15 (2.66–10.00)	**<0.001**
Self-reported income of household		
Low vs. high	4.70 (1.65–13.40)	**0.004**
Middle vs. high	2.40 (1.10–5.22)	**0.027**
Frequency of COVID-19 confirmed diagnosis		
Three times or more vs. once	10.31 (3.73–28.57)	**<0.001**
Three times or more vs. twice	1.90 (0.60–6.06)	0.276
History of hospitalization due to COVID-19		
Yes vs. no	5.53 (1.66–18.46)	**0.005**
Middle long COVID score (10–19) vs. low long COVID score (0–9)		
Factors		
COVID-19 conspiracy theories		
High COVID-19 conspiracies score (19–25) vs. low COVID-19 conspiracies score (5–11)	2.82 (1.32–6.06)	**0.008**
High COVID-19 conspiracies score (19–25) vs. middle COVID-19 conspiracies score (12–18)	1.23 (0.63–2.42)	0.538
Age		
18–39 years vs. 60 years or older	1.80 (0.54–6.04)	0.340
40–59 years vs. 60 years or older	1.66 (0.48–5.76)	0.423
Sex		
Female vs. male	2.11 (1.26–3.55)	**0.005**
Self-reported income of household		
Low vs. high	5.10 (2.03–12.84)	**0.001**
Middle vs. high	3.12 (1.60–6.06)	**0.001**
Frequency of COVID-19 confirmed diagnosis		
Three times or more vs. once	4.76 (1.81–12.50)	**0.002**
Three times or more vs. twice	1.52 (0.50–4.63)	0.466
History of hospitalization due to COVID-19		
Yes vs. no	2.69 (0.86–8.43)	0.089

[1] aOR: adjusted odds ratio; [2] CI: confidence interval. Statistically significant *p* values are highlighted in bold style.

4. Discussion

The findings of this study emphasized the complex interplay of various factors influencing the reporting of long COVID manifestations among adults primarily residing in Jordan and Kuwait. These factors include demographic characteristics, health history—

particularly the frequency and severity of COVID-19 infections—and psychological influences, notably the endorsement of conspiracy theories. The embrace of conspiracy beliefs may be amplified in environments where misinformation is prevalent, potentially distorting perceptions of post-COVID symptoms. In such contexts, conspiracy theories may foster mistrust in healthcare systems, leading individuals to attribute lingering symptoms to external factors, such as vaccines or the virus itself, rather than to the natural disease processes. Understanding the cultural, social, and healthcare contexts in Jordan and Kuwait is crucial for interpreting the relationship between conspiracy beliefs and the reporting of long COVID symptoms. Social norms, religious beliefs, and the level of trust in healthcare systems play significant roles in shaping both the endorsement of conspiracy theories and the subjective experience of long COVID. By incorporating these contextual factors, this study aimed to improve the understanding of how regional dynamics may influence the psychological and health-related outcomes of the pandemic, particularly the role of conspiracy theories in shaping health perceptions.

The study findings indicated that myalgia or arthralgia, fatigue, and headaches were the most commonly reported symptoms in long COVID among the study participants in the two Arab countries. This is consistent with the results of various studies and reviews in different regions worldwide [38,130,131]. Specifically, in a systematic review and meta-analysis dating back to 2022, myalgia was reported at a frequency of 22% and fatigue was reported at a rate of 37% at the >12-month follow-up [37].

Several hypotheses were cited in the recent literature in pursuit of explaining musculoskeletal symptoms in long COVID-19, as reviewed by Deniz Evcik in [132]. Chronic inflammation, possibly triggered by inflammatory cytokines, can reduce muscle protein synthesis [133]. Additionally, the effects of SARS-CoV-2 on myocytes and persistent viral gene particles may promote immune hyperactivation, with ongoing low-grade inflammation associated with long COVID manifestations [5,128,134].

A key and novel finding from our analysis in this study was the discernible association between endorsing COVID-19 conspiracy theories and the magnitude and frequency of long COVID symptoms self-reported by the participants. In this study, the participants with high conspiracy theories scores were found to be significantly more likely to report long COVID manifestations. The reliability of this result is supported by the validity of the survey instrument used to assess the endorsement of COVID-19 conspiracy theories in this study; the strong association between COVID-19 conspiracy endorsement and increased reporting of long COVID symptoms was highlighted by an adjusted odds ratio of approximately 7. This statistic indicated that the participants who strongly believe in COVID-19 conspiracies were seven times more likely to report higher long COVID manifestations compared to those who hold few or no such beliefs. This finding emphasizes the significant impact that psychological factors, including conspiratorial ideas, can have on the perception and reporting of health conditions [84,135].

In our attempt to explain this result, we suggest that the increased reporting of physical symptoms alongside certain psychological constructs may be influenced by attentional bias [136,137]. Attentional bias in individuals with higher conspiratorial beliefs may heighten their awareness of bodily sensations, potentially leading to the misattribution of ordinary physical symptoms to more serious conditions [82]. While this psychological mechanism may influence symptom perception, our analysis did not include a formal mediation model to test for such effects. Future studies employing structural equation modeling would be beneficial to explore whether conspiratorial beliefs mediate the relationship between attention bias and symptom reporting in the context of long COVID. The results from our multinomial logistic regression analysis may hint that the interaction between psychological factors and health perceptions could be mediated by cognitive and emotional responses, which can significantly enhance symptom awareness and reporting [138]. The insight gained from this particular result suggests the need for further studies for better understanding the variability observed in long COVID manifestations in light of this possible interplay between psychological constructs and physical health outcomes, such as long COVID manifestations.

Another plausible explanation for the observed correlation between endorsing COVID-19 conspiracy theories and more pronounced long COVID manifestations in this study may involve the psychological and social dimensions of conspiracy beliefs. These beliefs may not only reflect broader psychological discomfort and social alienation but also exacerbate the focus on physical sensations, which was shown in a study in the context of COVID-19 among senior citizens in China by Chen et al. [139]. This heightened attentiveness can lead to more frequent and intense reporting of symptoms. Thus, the endorsement of conspiracy theories could serve as an indicator of underlying psychological stress, which is known to be associated with increased symptom reporting [138]. While these results highlight an association between conspiracy beliefs and long COVID manifestations, further research is needed to explore the underlying psychological mechanisms, particularly in relation to stress and cognitive biases.

Previous studies have shown a strong link between heightened perception of physical symptoms and various psychological constructs, which supports the findings of our current study. For example, Lee et al. demonstrated that somatic symptom burden was closely associated with health anxiety, and both independently contribute to psychological distress, functional impairment, and increased healthcare utilization [140]. Similarly, Santoro et al. found that the severity of somatic symptoms could predict heightened levels of cyberchondria, a condition characterized by excessive and anxiety-driven online searches for health-related information, with health anxiety acting as a partial mediator in this relationship [141]. Pérez-Gay Juárez et al. highlighted the significant uncertainty during the COVID-19 pandemic regarding disease risks, public health measures, and novel vaccine safety [114]. This uncertainty exacerbates the tendency to over-interpret physical symptoms, particularly among individuals with a high intolerance of uncertainty, further supporting the interconnectedness of psychological responses and the perception of physical health during crises [114].

It is important at this point to acknowledge that the participants in our study might indeed experience physical long COVID symptoms at least to some extent. Additionally, it is essential to acknowledge that dismissing the physical nature of long COVID manifestations could have adverse consequences for the millions affected by this pervasive condition [33–40,142]. However, our findings also revealed a clear association between the endorsement of conspiracy theories and an increased perception and reporting of long COVID manifestations. This suggests that psychological factors influenced by misinformation and conspiratorial beliefs play a significant role in the manifestation of long COVID as reviewed by José Mora-Romo in [143]. Addressing these psychological aspects can be essential for the effective management of long COVID as interventions aimed at mitigating these influences could substantially alleviate symptoms of long COVID [81]. These psychological aspects of COVID-19 and long COVID burden have been demonstrated in recent studies from Germany and France [144–146]. Although changing deeply entrenched conspiracy beliefs presents a formidable challenge, incorporating psychological interventions into the treatment regimen could significantly improve outcomes for long COVID patients, complementing other medical treatments [143,147].

This study results also highlighted significant sex differences in the reporting of long COVID symptoms. In this study, female participants were more likely than males to report both high and moderate long COVID symptoms, with notable odds ratios indicating a strong sex disparity. This finding is consistent with the existing literature suggesting that females may be more perceptive of bodily symptoms or more willing to report health issues [148,149]. Additionally, the social and psychological burdens that were disproportionately carried by females during the COVID-19 pandemic—such as increased caregiving roles and job insecurity—might contribute to higher symptom reporting rates [150,151].

The significantly higher reporting of long COVID manifestations among females in this study is consistent with the findings of previous research as follows. For example, the "long

COVID in Scotland" study by Hastie et al. demonstrated a notably higher likelihood of no or partial recovery among females following COVID-19 [152]. Similarly, a study by Michael C. Sneller et al. in the U.S. highlighted an increased risk for PASC among females [153]. Additionally, Cohen and Yana van der Meulen Rodgers found that females were not only more prone to long COVID but also more likely to experience significant activity limitations due to the condition [154]. Moreover, a cross-sectional study in Denmark identified female sex as a significant factor, with an odds ratio of 1.7, associated with the development of de novo, multitype, post-COVID pain [155]. These consistent findings across diverse studies in various locations add further support to our finding of the sex-related disparities in the impact and recovery patterns of long COVID.

Furthermore, our findings indicated that the frequency of COVID-19 diagnoses and prior hospitalizations due to COVID-19 were strong predictors of increased reporting of long COVID manifestations. This correlation likely reflects the direct physiological consequences of severe or recurrent SARS-CoV-2 infections, which tend to result in more pronounced residual health effects. The higher likelihood of long COVID occurrence following severe COVID-19—as indicated by a history of hospitalization or re-infection—was highlighted in a recent review [156]. Therefore, the role of vaccination to prevent initial infection and to lessen its severity can be critical for effective mitigation of the risk of long COVID [157–159].

Finally, several limitations should be considered when interpreting the findings of our study. First, the cross-sectional design precluded any causal inferences between conspiracy beliefs and the reporting of long COVID symptoms in this study. It is possible that individuals experiencing long COVID symptoms may develop COVID-19 conspiracy beliefs as a result of dissatisfaction with healthcare or ongoing health issues, rather than the other way around. Without longitudinal data to track changes in beliefs and symptom reports over time, the potential for reverse causality cannot be ruled out. Second, a limitation of this study was the reliance on self-reported data for COVID-19 infection history, long COVID symptoms, and vaccination history, which may introduce subjective bias. Participants may have over- or under-estimated their symptoms due to personal beliefs or cognitive biases related to long COVID. It is important to underscore that self-reported data may not accurately reflect the true occurrence of symptoms, and this discrepancy could affect the magnitude and frequency of symptom reporting observed in this study. As such, the interpretations presented should be viewed with caution, particularly when considering the potential for misreporting or bias in the absence of clinical validation. To enhance the accuracy and reliability of findings, future studies should incorporate clinical assessments or medical records to reliably document long COVID manifestations and minimize subjective bias. Additionally, the study demographic composition, with a predominance of female participants—which may have been influenced by the majority of female authors—limits the generalizability of the results to broader populations due to the presence of selection bias. Moreover, the recruitment strategy, which relied on non-probabilistic sampling using social media, introduced selection bias and limited the sample's representativeness. Thus, participants in this study may differ from the general population in terms of education, socio-economic status, and access to healthcare. This sampling method may have also attracted individuals more engaged with online health discussions, potentially overrepresenting certain demographic groups or those with strong views on COVID-19 and conspiracy theories. Furthermore, despite the validity of the index used for assessment of conspiracy beliefs, the lack of a reliable tool for comprehensive assessment of long COVID may have resulted in an element of measurement bias. In assessing the association between self-reported long COVID symptoms and COVID-19 conspiracy beliefs, although we controlled for potential confounding variables, there may still be complex interactions or unmeasured confounders that were not fully accounted for. One of the key limitations of our study is the measurement of conspiracy theory endorsement using a Likert scale, which may oversimplify the complex and multi-dimensional nature of such beliefs. Although the index we used to evaluate the endorsement of COVID-19 conspiracies demonstrated good reliability, it may not fully differentiate between varying degrees of conspiracy endorsement and their specific impact on health behaviors and symptom reporting. Additionally, the measurement of conspiracy theory endorsement presents notable challenges, particularly given the complex and multi-dimensional nature of such beliefs [160]. In this study, we specifically examined COVID-19-related conspiracy theories, which are distinct from general conspiratorial ideation [161]. While both constructs share common psychological underpinnings, COVID-19-specific conspiracies may have a more direct impact on health behaviors and symptom reporting due to their immediate relevance to individuals' lived experiences during the pandemic [162]. This distinction is important, as it highlights the need for more refined measures that capture the depth and nuance of conspiracy theory endorsement. Finally, while COVID-19 vaccination status was accounted for in our analysis, with no significant difference in long COVID symptom reporting observed among vaccinated individuals, we recognize the need for more studies to assess the role of vaccination in preventing or reducing the severity of long COVID as shown in recent studies [163,164].

5. Conclusions

The correlation between conspiracy beliefs and the reporting of long COVID symptoms in this study highlighted the complex role that cognitive and psychological factors play in health perceptions. This study findings point to the role of individual beliefs, coupled with demographic factors, in influencing the reporting of long COVID symptoms. The strong association between conspiracy beliefs and symptom reporting emphasized the need for targeted public health interventions that address misinformation and its broader psychological and societal impacts. Understanding these dynamics is crucial for developing strategies that not only combat the spread of misinformation but also support the identification and treatment of long COVID.

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Abbreviations

ANOVA	Analysis of Variance
aOR	Adjusted Odds Ratio
BMI	Body mass index

CAWI	Computer-Assisted Web Interviewing
CI	Confidence interval
COVID	Coronavirus disease
ICU	Intensive care unit
K-W	Kruskal–Wallis test
M-W	Mann–Whitney *U* test
NPI	Non-pharmaceutical intervention
PASC	Post-acute sequelae of SARS-CoV-2 infection
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
VIF	Variance Inflation Factor
WHO	The World Health Organization

References

1. World Health Organization (WHO). COVID-19 Epidemiological Update—17 June 2024. Available online: https://www.who.int/publications/m/item/covid-19-epidemiological-update-edition-168 (accessed on 5 August 2024).
2. Meyerowitz, E.A.; Scott, J.; Richterman, A.; Male, V.; Cevik, M. Clinical course and management of COVID-19 in the era of widespread population immunity. *Nat. Rev. Microbiol.* **2024**, *22*, 75–88. [CrossRef] [PubMed]
3. Alizadeh, H.; Sharifi, A.; Damanbagh, S.; Nazarnia, H.; Nazarnia, M. Impacts of the COVID-19 pandemic on the social sphere and lessons for crisis management: A literature review. *Nat. Hazards* **2023**, *117*, 2139–2164. [CrossRef] [PubMed]
4. Kunal, K.; Choudhary, P.; Kumar, J.; Prakash, R.; Singh, A.; Kanchan, K. *Psychosocial Impact of COVID-19—A Global Scenario*; IntechOpen: London, UK, 2022. [CrossRef]
5. Jiao, T.; Huang, Y.; Sun, H.; Yang, L. Research progress of post-acute sequelae after SARS-CoV-2 infection. *Cell Death Dis.* **2024**, *15*, 257. [CrossRef]
6. Koc, H.C.; Xiao, J.; Liu, W.; Li, Y.; Chen, G. Long COVID and its Management. *Int. J. Biol. Sci.* **2022**, *18*, 4768–4780. [CrossRef]
7. Jason, L.A.; Hansel, N. Conceptual and Methodological Barriers to Understanding Long COVID. *COVID* **2024**, *4*, 582–591. [CrossRef]
8. Muthuka, J.K.; Nzioki, J.M.; Kelly, J.O.; Musangi, E.N.; Chebungei, L.C.; Nabaweesi, R.; Kiptoo, M.K. Prevalence and Predictors of Long COVID-19 and the Average Time to Diagnosis in the General Population: A Systematic Review, Meta-Analysis and Meta-Regression. *COVID* **2024**, *4*, 968–981. [CrossRef]
9. Castanares-Zapatero, D.; Chalon, P.; Kohn, L.; Dauvrin, M.; Detollenaere, J.; Maertens de Noordhout, C.; Primus-de Jong, C.; Cleemput, I.; Van den Heede, K. Pathophysiology and mechanism of long COVID: A comprehensive review. *Ann. Med.* **2022**, *54*, 1473–1487. [CrossRef]
10. Szabo, S.; Zayachkivska, O.; Hussain, A.; Muller, V. What is really 'Long COVID'? *Inflammopharmacology* **2023**, *31*, 551–557. [CrossRef]
11. Krishna, B.; Wills, M.; Sithole, N. Long COVID: What is known and what gaps need to be addressed. *Br. Med. Bull.* **2023**, *147*, 6–19. [CrossRef]
12. Tziolos, N.R.; Ioannou, P.; Baliou, S.; Kofteridis, D.P. Long COVID-19 Pathophysiology: What Do We Know So Far? *Microorganisms* **2023**, *11*, 2458. [CrossRef]
13. Au, L.; Capotescu, C.; Eyal, G.; Finestone, G. Long COVID and medical gaslighting: Dismissal, delayed diagnosis, and deferred treatment. *SSM Qual. Res. Health* **2022**, *2*, 100167. [CrossRef] [PubMed]
14. Henderson, A.D.; Butler-Cole, B.F.; Tazare, J.; Tomlinson, L.A.; Marks, M.; Jit, M.; Briggs, A.; Lin, L.Y.; Carlile, O.; Bates, C.; et al. Clinical coding of long COVID in primary care 2020-2023 in a cohort of 19 million adults: An OpenSAFELY analysis. *EClinicalMedicine* **2024**, *72*, 102638. [CrossRef] [PubMed]
15. Bonham, C.; Juarez, R.; Siegal, N. Long COVID and Unemployment in Hawaii. *Int. J. Environ. Res. Public. Health* **2023**, *20*, 6231. [CrossRef] [PubMed]
16. Thaweethai, T.; Jolley, S.E.; Karlson, E.W.; Levitan, E.B.; Levy, B.; McComsey, G.A.; McCorkell, L.; Nadkarni, G.N.; Parthasarathy, S.; Singh, U.; et al. Development of a Definition of Postacute Sequelae of SARS-CoV-2 Infection. *JAMA* **2023**, *329*, 1934–1946. [CrossRef] [PubMed]
17. Danesh, V.; Arroliga, A.C.; Bourgeois, J.A.; Boehm, L.M.; McNeal, M.J.; Widmer, A.J.; McNeal, T.M.; Kesler, S.R. Symptom Clusters Seen in Adult COVID-19 Recovery Clinic Care Seekers. *J. Gen. Intern. Med.* **2023**, *38*, 442–449. [CrossRef]
18. Davis, H.E.; Assaf, G.S.; McCorkell, L.; Wei, H.; Low, R.J.; Re'em, Y.; Redfield, S.; Austin, J.P.; Akrami, A. Characterizing long COVID in an international cohort: 7 months of symptoms and their impact. *EClinicalMedicine* **2021**, *38*, 101019. [CrossRef]
19. Huang, C.; Huang, L.; Wang, Y.; Li, X.; Ren, L.; Gu, X.; Kang, L.; Guo, L.; Liu, M.; Zhou, X.; et al. 6-month consequences of COVID-19 in patients discharged from hospital: A cohort study. *Lancet* **2023**, *401*, e21–e33. [CrossRef]
20. Raveendran, A.V.; Jayadevan, R.; Sashidharan, S. Long COVID: An overview. *Diabetes Metab. Syndr.* **2021**, *15*, 869–875. [CrossRef]
21. Aghajani Mir, M. Brain Fog: A Narrative Review of the Most Common Mysterious Cognitive Disorder in COVID-19. *Mol. Neurobiol.* 2023. [CrossRef]

22. Serafini, A.; Tagliaferro, A.; Balbi, F.; Bordo, A.; Bernardi, S.; Berta, G.; Trucco, L.; Perretta, E.; Gualco, E.; Zoccali, P.; et al. Screening of a Small Number of Italian COVID-19 Syndrome Survivors by Means of the Fatigue Assessment Scale: Long COVID Prevalence and the Role of Gender. *COVID* **2021**, *1*, 518–527. [CrossRef]
23. Kaur, A.; Michalopoulos, C.; Carpe, S.; Congrete, S.; Shahzad, H.; Reardon, J.; Wakefield, D.; Swart, C.; ZuWallack, R. Post-COVID-19 Condition and Health Status. *COVID* **2022**, *2*, 76–86. [CrossRef]
24. Luchian, M.-L.; Demeure, F.; Higny, J.; Berners, Y.; Henry, J.; Guedes, A.; Laurence, G.; Saidane, L.; Höcher, A.; Roosens, B.; et al. Three Years of COVID-19 Pandemic—Is the Heart Skipping a Beat? *COVID* **2023**, *3*, 715–727. [CrossRef]
25. Tana, C.; Bentivegna, E.; Cho, S.J.; Harriott, A.M.; García-Azorín, D.; Labastida-Ramirez, A.; Ornello, R.; Raffaelli, B.; Beltrán, E.R.; Ruscheweyh, R.; et al. Long COVID headache. *J. Headache Pain.* **2022**, *23*, 93. [CrossRef] [PubMed]
26. Su, S.; Zhao, Y.; Zeng, N.; Liu, X.; Zheng, Y.; Sun, J.; Zhong, Y.; Wu, S.; Ni, S.; Gong, Y.; et al. Epidemiology, clinical presentation, pathophysiology, and management of long COVID: An update. *Mol. Psychiatry* **2023**, *28*, 4056–4069. [CrossRef] [PubMed]
27. World Health Organization (WHO). Post COVID-19 Condition (Long COVID). Available online: https://www.who.int/europe/news-room/fact-sheets/item/post-covid-19-condition (accessed on 7 July 2024).
28. Soriano, J.B.; Murthy, S.; Marshall, J.C.; Relan, P.; Diaz, J.V. A clinical case definition of post-COVID-19 condition by a Delphi consensus. *Lancet Infect. Dis.* **2022**, *22*, e102–e107. [CrossRef]
29. Jeffrey, K.; Woolford, L.; Maini, R.; Basetti, S.; Batchelor, A.; Weatherill, D.; White, C.; Hammersley, V.; Millington, T.; Macdonald, C.; et al. Prevalence and risk factors for long COVID among adults in Scotland using electronic health records: A national, retrospective, observational cohort study. *EClinicalMedicine* **2024**, *71*, 102590. [CrossRef]
30. Hua, M.J.; Gonakoti, S.; Shariff, R.; Corpuz, C.; Acosta, R.A.H.; Chang, H.; Asemota, I.; Gobbi, E.; Rezai, K. Prevalence and Characteristics of Long COVID 7-12 Months After Hospitalization Among Patients From an Urban Safety-Net Hospital: A Pilot Study. *AJPM Focus.* **2023**, *2*, 100091. [CrossRef]
31. Huerne, K.; Filion, K.B.; Grad, R.; Ernst, P.; Gershon, A.S.; Eisenberg, M.J. Epidemiological and clinical perspectives of long COVID syndrome. *Am. J. Med. Open* **2023**, *9*, 100033. [CrossRef]
32. Perlis, R.H.; Santillana, M.; Ognyanova, K.; Safarpour, A.; Lunz Trujillo, K.; Simonson, M.D.; Green, J.; Quintana, A.; Druckman, J.; Baum, M.A.; et al. Prevalence and Correlates of Long COVID Symptoms Among US Adults. *JAMA Netw. Open* **2022**, *5*, e2238804. [CrossRef]
33. Jangnin, R.; Ritruangroj, W.; Kittisupkajorn, S.; Sukeiam, P.; Inchai, J.; Maneeton, B.; Maneetorn, N.; Chaiard, J.; Theerakittikul, T. Long-COVID Prevalence and Its Association with Health Outcomes in the Post-Vaccine and Antiviral-Availability Era. *J. Clin. Med.* **2024**, *13*, 1208. [CrossRef]
34. Hastie, C.E.; Lowe, D.J.; McAuley, A.; Mills, N.L.; Winter, A.J.; Black, C.; Scott, J.T.; O'Donnell, C.A.; Blane, D.N.; Browne, S.; et al. True prevalence of long-COVID in a nationwide, population cohort study. *Nat. Commun.* **2023**, *14*, 7892. [CrossRef] [PubMed]
35. Ford, N.D.; Agedew, A.; Dalton, A.F.; Singleton, J.; Perrine, C.G.; Saydah, S. Notes from the Field: Long COVID Prevalence Among Adults—United States, 2022. *MMWR Morb. Mortal. Wkly. Rep.* **2024**, *73*, 135–136. [CrossRef] [PubMed]
36. Harris, E. US Survey: About 7% of Adults, 1% of Children Have Had Long COVID. *JAMA* **2023**, *330*, 1516. [CrossRef] [PubMed]
37. Alkodaymi, M.S.; Omrani, O.A.; Fawzy, N.A.; Shaar, B.A.; Almamlouk, R.; Riaz, M.; Obeidat, M.; Obeidat, Y.; Gerberi, D.; Taha, R.M.; et al. Prevalence of post-acute COVID-19 syndrome symptoms at different follow-up periods: A systematic review and meta-analysis. *Clin. Microbiol. Infect.* **2022**, *28*, 657–666. [CrossRef] [PubMed]
38. Fernandez-de-Las-Peñas, C.; Notarte, K.I.; Macasaet, R.; Velasco, J.V.; Catahay, J.A.; Ver, A.T.; Chung, W.; Valera-Calero, J.A.; Navarro-Santana, M. Persistence of post-COVID symptoms in the general population two years after SARS-CoV-2 infection: A systematic review and meta-analysis. *J. Infect.* **2024**, *88*, 77–88. [CrossRef]
39. Fernández-de-Las-Peñas, C.; Torres-Macho, J.; Macasaet, R.; Velasco, J.V.; Ver, A.T.; Culasino Carandang, T.H.D.; Guerrero, J.J.; Franco-Moreno, A.; Chung, W.; Notarte, K.I. Presence of SARS-CoV-2 RNA in COVID-19 survivors with post-COVID symptoms: A systematic review of the literature. *Clin. Chem. Lab. Med.* **2024**, *62*, 1044–1052. [CrossRef]
40. Nguyen, K.H.; Bao, Y.; Chen, S.; Bednarczyk, R.A.; Vasudevan, L.; Corlin, L. Prior COVID-19 Diagnosis, Severe Outcomes, and Long COVID among U.S. Adults, 2022. *Vaccines* **2024**, *12*, 669. [CrossRef]
41. Tsampasian, V.; Elghazaly, H.; Chattopadhyay, R.; Debski, M.; Naing, T.K.P.; Garg, P.; Clark, A.; Ntatsaki, E.; Vassiliou, V.S. Risk Factors Associated With Post-COVID-19 Condition: A Systematic Review and Meta-analysis. *JAMA Intern. Med.* **2023**, *183*, 566–580. [CrossRef]
42. Calcaterra, V.; Zanelli, S.; Foppiani, A.; Verduci, E.; Benatti, B.; Bollina, R.; Bombaci, F.; Brucato, A.; Cammarata, S.; Calabrò, E.; et al. Long COVID in Children, Adults, and Vulnerable Populations: A Comprehensive Overview for an Integrated Approach. *Diseases* **2024**, *12*, 95. [CrossRef]
43. Fernández-de-Las-Peñas, C.; Raveendran, A.V.; Giordano, R.; Arendt-Nielsen, L. Long COVID or Post-COVID-19 Condition: Past, Present and Future Research Directions. *Microorganisms* **2023**, *11*, 2959. [CrossRef]
44. Subramanian, A.; Nirantharakumar, K.; Hughes, S.; Myles, P.; Williams, T.; Gokhale, K.M.; Taverner, T.; Chandan, J.S.; Brown, K.; Simms-Williams, N.; et al. Symptoms and risk factors for long COVID in non-hospitalized adults. *Nat. Med.* **2022**, *28*, 1706–1714. [CrossRef] [PubMed]
45. Pertwee, E.; Simas, C.; Larson, H.J. An epidemic of uncertainty: Rumors, conspiracy theories and vaccine hesitancy. *Nat. Med.* **2022**, *28*, 456–459. [CrossRef]

46. Romer, D.; Jamieson, K.H. Conspiracy theories as barriers to controlling the spread of COVID-19 in the U.S. *Soc. Sci. Med.* **2020**, *263*, 113356. [CrossRef]
47. Jabkowski, P.; Domaradzki, J.; Baranowski, M. Exploring COVID-19 conspiracy theories: Education, religiosity, trust in scientists, and political orientation in 26 European countries. *Sci. Rep.* **2023**, *13*, 18116. [CrossRef]
48. van Mulukom, V.; Pummerer, L.J.; Alper, S.; Bai, H.; Čavojová, V.; Farias, J.; Kay, C.S.; Lazarevic, L.B.; Lobato, E.J.C.; Marinthe, G.; et al. Antecedents and consequences of COVID-19 conspiracy beliefs: A systematic review. *Soc. Sci. Med.* **2022**, *301*, 114912. [CrossRef] [PubMed]
49. Fotakis, E.A.; Simou, E. Belief in COVID-19 related conspiracy theories around the globe: A systematic review. *Health Policy* **2023**, *137*, 104903. [CrossRef] [PubMed]
50. Freeman, D.; Waite, F.; Rosebrock, L.; Petit, A.; Causier, C.; East, A.; Jenner, L.; Teale, A.-L.; Carr, L.; Mulhall, S.; et al. Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England. *Psychol. Med.* **2022**, *52*, 251–263. [CrossRef]
51. Brown, P.; Waite, F.; Larkin, M.; Lambe, S.; McShane, H.; Pollard, A.J.; Freeman, D. "It seems impossible that it's been made so quickly": A qualitative investigation of concerns about the speed of COVID-19 vaccine development and how these may be overcome. *Hum. Vaccines Immunother.* **2022**, *18*, 2004808. [CrossRef]
52. Hughes, J.P.; Efstratiou, A.; Komer, S.R.; Baxter, L.A.; Vasiljevic, M.; Leite, A.C. The impact of risk perceptions and belief in conspiracy theories on COVID-19 pandemic-related behaviours. *PLoS ONE* **2022**, *17*, e0263716. [CrossRef]
53. Pinazo-Calatayud, D.; Agut-Nieto, S.; Arahuete, L.; Peris, R.; Barros, A.; Vázquez-Rodríguez, C. The strength of conspiracy beliefs versus scientific information: The case of COVID 19 preventive behaviours. *Front. Psychol.* **2024**, *15*, 1325600. [CrossRef]
54. De Coninck, D.; Frissen, T.; Matthijs, K.; d'Haenens, L.; Lits, G.; Champagne-Poirier, O.; Carignan, M.-E.; David, M.D.; Pignard-Cheynel, N.; Salerno, S.; et al. Beliefs in Conspiracy Theories and Misinformation About COVID-19: Comparative Perspectives on the Role of Anxiety, Depression and Exposure to and Trust in Information Sources. *Front. Psychol.* **2021**, *12*, 646394. [CrossRef]
55. Sallam, M. COVID-19 Vaccine Hesitancy Worldwide: A Concise Systematic Review of Vaccine Acceptance Rates. *Vaccines* **2021**, *9*, 160. [CrossRef] [PubMed]
56. Sallam, M.; Al-Sanafi, M.; Sallam, M. A Global Map of COVID-19 Vaccine Acceptance Rates per Country: An Updated Concise Narrative Review. *J. Multidiscip. Heal.* **2022**, *15*, 21–45. [CrossRef]
57. Ferreira, S.; Campos, C.; Marinho, B.; Rocha, S.; Fonseca-Pedrero, E.; Barbosa Rocha, N. What drives beliefs in COVID-19 conspiracy theories? The role of psychotic-like experiences and confinement-related factors. *Soc. Sci. Med.* **2022**, *292*, 114611. [CrossRef] [PubMed]
58. Pérez-Gay Juárez, F.; Khayyat, L.; Ronca, M.; Gold, I. *Viral Belief: The Psychology of COVID Conspiracy Theories*; Routledge: Oxford, UK, 2024; pp. 53–79. [CrossRef]
59. van Prooijen, J.W.; Douglas, K.M. Belief in conspiracy theories: Basic principles of an emerging research domain. *Eur. J. Soc. Psychol.* **2018**, *48*, 897–908. [CrossRef]
60. Hartman, T.K.; Marshall, M.; Stocks, T.V.A.; McKay, R.; Bennett, K.; Butter, S.; Gibson Miller, J.; Hyland, P.; Levita, L.; Martinez, A.P.; et al. Different Conspiracy Theories Have Different Psychological and Social Determinants: Comparison of Three Theories About the Origins of the COVID-19 Virus in a Representative Sample of the UK Population. *Front. Political Sci.* **2021**, *3*, 642510. [CrossRef]
61. Hakim, M.S. SARS-CoV-2, COVID-19, and the debunking of conspiracy theories. *Rev. Med. Virol.* **2021**, *31*, e2222. [CrossRef]
62. Douglas, K.M. COVID-19 conspiracy theories. *Group. Process. Intergroup Relat.* **2021**, *24*, 270–275. [CrossRef]
63. Tsamakis, K.; Tsiptsios, D.; Stubbs, B.; Ma, R.; Romano, E.; Mueller, C.; Ahmad, A.; Triantafyllis, A.S.; Tsitsas, G.; Dragioti, E. Summarising data and factors associated with COVID-19 related conspiracy theories in the first year of the pandemic: A systematic review and narrative synthesis. *BMC Psychol.* **2022**, *10*, 244. [CrossRef]
64. Imhoff, R.; Lamberty, P. A Bioweapon or a Hoax? The Link Between Distinct Conspiracy Beliefs About the Coronavirus Disease (COVID-19) Outbreak and Pandemic Behavior. *Soc. Psychol. Personal. Sci.* **2020**, *11*, 1110–1118. [CrossRef]
65. Islam, M.S.; Kamal, A.M.; Kabir, A.; Southern, D.L.; Khan, S.H.; Hasan, S.M.M.; Sarkar, T.; Sharmin, S.; Das, S.; Roy, T.; et al. COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence. *PLoS ONE* **2021**, *16*, e0251605. [CrossRef] [PubMed]
66. Juanchich, M.; Sirota, M.; Jolles, D.; Whiley, L.A. Are COVID-19 conspiracies a threat to public health? Psychological characteristics and health protective behaviours of believers. *Eur. J. Soc. Psychol.* **2021**, *51*, 969–989. [CrossRef] [PubMed]
67. Bierwiaczonek, K.; Gundersen, A.B.; Kunst, J.R. The role of conspiracy beliefs for COVID-19 health responses: A meta-analysis. *Curr. Opin. Psychol.* **2022**, *46*, 101346. [CrossRef]
68. Camargo, E.L.; Ribeiro, C.J.; Santos, G.R.; Almeida, V.S.; Carvalho, H.E.; Schneider, G.; Vieira, L.G.; Alvim, A.L.; Pimenta, F.G.; Carneiro, L.M.; et al. Belief in Conspiracy Theories about COVID-19 Vaccines among Brazilians: A National Cross-Sectional Study. *COVID* **2024**, *4*, 518–530. [CrossRef]
69. Sallam, M.; Kareem, N.; Alkurtas, M. The negative impact of misinformation and vaccine conspiracy on COVID-19 vaccine uptake and attitudes among the general public in Iraq. *Prev. Med. Rep.* **2024**, *43*, 102791. [CrossRef]
70. Alsanafi, M.; Salim, N.A.; Sallam, M. Willingness to get HPV vaccination among female university students in Kuwait and its relation to vaccine conspiracy beliefs. *Hum. Vaccin. Immunother.* **2023**, *19*, 2194772. [CrossRef]

71. Sallam, M.; Ghazy, R.M.; Al-Salahat, K.; Al-Mahzoum, K.; AlHadidi, N.M.; Eid, H.; Kareem, N.; Al-Ajlouni, E.; Batarseh, R.; Ababneh, N.A.; et al. The Role of Psychological Factors and Vaccine Conspiracy Beliefs in Influenza Vaccine Hesitancy and Uptake among Jordanian Healthcare Workers during the COVID-19 Pandemic. *Vaccines* **2022**, *10*, 1355. [CrossRef]
72. Alsanafi, M.; Al-Mahzoum, K.; Sallam, M. Monkeypox Knowledge and Confidence in Diagnosis and Management with Evaluation of Emerging Virus Infection Conspiracies among Health Professionals in Kuwait. *Pathogens* **2022**, *11*, 994. [CrossRef] [PubMed]
73. Sallam, M.; Dababseh, D.; Eid, H.; Al-Mahzoum, K.; Al-Haidar, A.; Taim, D.; Yaseen, A.; Ababneh, N.A.; Bakri, F.G.; Mahafzah, A. High Rates of COVID-19 Vaccine Hesitancy and Its Association with Conspiracy Beliefs: A Study in Jordan and Kuwait among Other Arab Countries. *Vaccines* **2021**, *9*, 42. [CrossRef]
74. Sisti, L.G.; Buonsenso, D.; Moscato, U.; Costanzo, G.; Malorni, W. The Role of Religions in the COVID-19 Pandemic: A Narrative Review. *Int. J. Environ. Res. Public. Health* **2023**, *20*, 1691. [CrossRef]
75. van Prooijen, J.W.; Song, M. The cultural dimension of intergroup conspiracy theories. *Br. J. Psychol.* **2021**, *112*, 455–473. [CrossRef] [PubMed]
76. Cichocka, A.; Marchlewska, M.; Golec de Zavala, A.; Olechowski, M. 'They will not control us': Ingroup positivity and belief in intergroup conspiracies. *Br. J. Psychol.* **2016**, *107*, 556–576. [CrossRef] [PubMed]
77. Rice, Z.S.; Liamputtong, P. Cultural Determinants of Health, Cross-Cultural Research and Global Public Health. In *Handbook of Social Sciences and Global Public Health*; Liamputtong, P., Ed.; Springer International Publishing: Cham, Switzerland, 2023; pp. 689–702. [CrossRef]
78. Sallam, M.; Dababseh, D.; Yaseen, A.; Al-Haidar, A.; Taim, D.; Eid, H.; Ababneh, N.A.; Bakri, F.G.; Mahafzah, A. COVID-19 misinformation: Mere harmless delusions or much more? A knowledge and attitude cross-sectional study among the general public residing in Jordan. *PLoS ONE* **2020**, *15*, e0243264. [CrossRef]
79. Sallam, M.; Eid, H.; Awamleh, N.; Al-Tammemi, A.B.; Barakat, M.; Athamneh, R.Y.; Hallit, S.; Harapan, H.; Mahafzah, A. Conspiratorial Attitude of the General Public in Jordan towards Emerging Virus Infections: A Cross-Sectional Study Amid the 2022 Monkeypox Outbreak. *Trop. Med. Infect. Dis.* **2022**, *7*, 411. [CrossRef]
80. Schudy, A.; Żurek, K.; Wiśniewska, M.; Piejka, A.; Gawęda, Ł.; Okruszek, Ł. Mental Well-Being During Pandemic: The Role of Cognitive Biases and Emotion Regulation Strategies in Risk Perception and Affective Response to COVID-19. *Front. Psychiatry* **2020**, *11*, 589973. [CrossRef]
81. Lemogne, C.; Gouraud, C.; Pitron, V.; Ranque, B. Why the hypothesis of psychological mechanisms in long COVID is worth considering. *J. Psychosom. Res.* **2023**, *165*, 111135. [CrossRef] [PubMed]
82. Gagliardi, L. The role of cognitive biases in conspiracy beliefs: A literature review. *J. Econ. Surv.* 2023. [CrossRef]
83. Douglas, K.M.; Sutton, R.M.; Callan, M.J.; Dawtry, R.J.; Harvey, A.J. Someone is pulling the strings: Hypersensitive agency detection and belief in conspiracy theories. *Think. Reason.* **2016**, *22*, 57–77. [CrossRef]
84. Douglas, K.M.; Sutton, R.M.; Cichocka, A. The Psychology of Conspiracy Theories. *Curr. Dir. Psychol. Sci.* **2017**, *26*, 538–542. [CrossRef]
85. Hart, W.; Albarracín, D.; Eagly, A.H.; Brechan, I.; Lindberg, M.J.; Merrill, L. Feeling validated versus being correct: A meta-analysis of selective exposure to information. *Psychol. Bull.* **2009**, *135*, 555–588. [CrossRef]
86. Kaanders, P.; Sepulveda, P.; Folke, T.; Ortoleva, P.; De Martino, B. Humans actively sample evidence to support prior beliefs. *eLife* **2022**, *11*, e71768. [CrossRef] [PubMed]
87. Kindred, R.; Bates, G.W. The Influence of the COVID-19 Pandemic on Social Anxiety: A Systematic Review. *Int. J. Environ. Res. Public. Health* **2023**, *20*, 2362. [CrossRef]
88. Carnahan, N.D.; Carter, M.M.; Sbrocco, T. Intolerance of Uncertainty, Looming Cognitive Style, and Avoidant Coping as Predictors of Anxiety and Depression During COVID-19: A Longitudinal Study. *Int. J. Cogn. Ther.* **2022**, *15*, 1–19. [CrossRef]
89. Alshehri, S.; Sallam, M. Vaccine conspiracy association with higher COVID-19 vaccination side effects and negative attitude towards booster COVID-19, influenza and monkeypox vaccines: A pilot study in Saudi Universities. *Hum. Vaccin. Immunother.* **2023**, *19*, 2275962. [CrossRef]
90. Sallam, M.; Abbasi, H.; Obeidat, R.J.; Badayneh, R.; Alkhashman, F.; Obeidat, A.; Oudeh, D.; Uqba, Z.; Mahafzah, A. Unraveling the association between vaccine attitude, vaccine conspiracies and self-reported side effects following COVID-19 vaccination among nurses and physicians in Jordan. *Vaccine X* **2023**, *15*, 100405. [CrossRef]
91. Aljaberi, M.A.; Al-Sharafi, M.A.; Uzir, M.U.H.; Sabah, A.; Ali, A.M.; Lee, K.H.; Alsalahi, A.; Noman, S.; Lin, C.Y. Psychological Toll of the COVID-19 Pandemic: An In-Depth Exploration of Anxiety, Depression, and Insomnia and the Influence of Quarantine Measures on Daily Life. *Healthcare* **2023**, *11*, 2418. [CrossRef] [PubMed]
92. Serafini, G.; Parmigiani, B.; Amerio, A.; Aguglia, A.; Sher, L.; Amore, M. The psychological impact of COVID-19 on the mental health in the general population. *QJM* **2020**, *113*, 531–537. [CrossRef] [PubMed]
93. COVID-19 Mental Disorders Collaborators. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *Lancet* **2021**, *398*, 1700–1712. [CrossRef] [PubMed]
94. Aikebaier, S. COVID-19, new challenges to human safety: A global review. *Front. Public. Health* **2024**, *12*, 1371238. [CrossRef]
95. Wang, C.; Pan, R.; Wan, X.; Tan, Y.; Xu, L.; Ho, C.S.; Ho, R.C. Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *Int. J. Environ. Res. Public Health* **2020**, *17*, 1729. [CrossRef]

96. Zidkova, R.; Malinakova, K.; van Dijk, J.P.; Tavel, P. The Coronavirus Pandemic and the Occurrence of Psychosomatic Symptoms: Are They Related? *Int. J. Environ. Res. Public. Health* **2021**, *18*, 3570. [CrossRef] [PubMed]
97. Aaseth, K.; Grande, R.B.; Leiknes, K.A.; Benth, J.; Lundqvist, C.; Russell, M.B. Personality traits and psychological distress in persons with chronic tension-type headache. The Akershus study of chronic headache. *Acta Neurol. Scand.* **2011**, *124*, 375–382. [CrossRef] [PubMed]
98. Yap, E.C. Myofascial pain—An overview. *Ann. Acad. Med. Singap.* **2007**, *36*, 43–48. [CrossRef]
99. Leibovitz, T.; Shamblaw, A.L.; Rumas, R.; Best, M.W. COVID-19 conspiracy beliefs: Relations with anxiety, quality of life, and schemas. *Pers. Individ. Dif.* **2021**, *175*, 110704. [CrossRef]
100. Earnshaw, V.A.; Eaton, L.A.; Kalichman, S.C.; Brousseau, N.M.; Hill, E.C.; Fox, A.B. COVID-19 conspiracy beliefs, health behaviors, and policy support. *Transl. Behav. Med.* **2020**, *10*, 850–856. [CrossRef] [PubMed]
101. Simione, L.; Vagni, M.; Gnagnarella, C.; Bersani, G.; Pajardi, D. Mistrust and Beliefs in Conspiracy Theories Differently Mediate the Effects of Psychological Factors on Propensity for COVID-19 Vaccine. *Front. Psychol.* **2021**, *12*, 683684. [CrossRef]
102. Jolley, D.; Marques, M.D.; Cookson, D. Shining a spotlight on the dangerous consequences of conspiracy theories. *Curr. Opin. Psychol.* **2022**, *47*, 101363. [CrossRef]
103. van Prooijen, J.W.; Etienne, T.W.; Kutiyski, Y.; Krouwel, A.P.M. Conspiracy beliefs prospectively predict health behavior and well-being during a pandemic. *Psychol. Med.* **2023**, *53*, 2514–2521. [CrossRef]
104. Tselebis, A.; Sikaras, C.; Milionis, C.; Sideri, E.P.; Fytsilis, K.; Papageorgiou, S.M.; Ilias, I.; Pachi, A. A Moderated Mediation Model of the Influence of Cynical Distrust, Medical Mistrust, and Anger on Vaccination Hesitancy in Nursing Staff. *Eur. J. Investig. Health Psychol. Educ.* **2023**, *13*, 2373–2387. [CrossRef]
105. Bogart, L.M.; Ojikutu, B.O.; Tyagi, K.; Klein, D.J.; Mutchler, M.G.; Dong, L.; Lawrence, S.J.; Thomas, D.R.; Kellman, S. COVID-19 Related Medical Mistrust, Health Impacts, and Potential Vaccine Hesitancy Among Black Americans Living With HIV. *J. Acquir. Immune Defic. Syndr.* **2021**, *86*, 200–207. [CrossRef]
106. Pivetti, M.; Paleari, F.-G.; Ertan, I.; Di Battista, S.; Ulukök, E. COVID-19 conspiracy beliefs and vaccinations: A conceptual replication study in Turkey. *J. Pac. Rim Psychol.* **2023**, *17*, 18344909231170097. [CrossRef]
107. Allen, J.D.; Fu, Q.; Shrestha, S.; Nguyen, K.H.; Stopka, T.J.; Cuevas, A.; Corlin, L. Medical mistrust, discrimination, and COVID-19 vaccine behaviors among a national sample U.S. adults. *SSM Popul. Health* **2022**, *20*, 101278. [CrossRef] [PubMed]
108. Carrieri, V.; Guthmuller, S.; Wübker, A. Trust and COVID-19 vaccine hesitancy. *Sci. Rep.* **2023**, *13*, 9245. [CrossRef] [PubMed]
109. Regazzi, L.; Lontano, A.; Cadeddu, C.; Di Padova, P.; Rosano, A. Conspiracy beliefs, COVID-19 vaccine uptake and adherence to public health interventions during the pandemic in Europe. *Eur. J. Public. Health* **2023**, *33*, 717–724. [CrossRef]
110. Georgiou, N.; Delfabbro, P.; Balzan, R. COVID-19-related conspiracy beliefs and their relationship with perceived stress and pre-existing conspiracy beliefs. *Pers. Individ. Dif.* **2020**, *166*, 110201. [CrossRef]
111. Alexander, F. *Psychosomatic Medicine: Its Principles and Applications*; W W Norton & Co.: New York, NY, USA, 1950; p. 300.
112. Ader, R.; Cohen, N. Psychoneuroimmunology: Conditioning and stress. *Annu. Rev. Psychol.* **1993**, *44*, 53–85. [CrossRef]
113. Fava, G.A.; Sonino, N. Psychosomatic medicine: Emerging trends and perspectives. *Psychother. Psychosom.* **2000**, *69*, 184–197. [CrossRef]
114. Pérez-Gay Juárez, F.; Solomonova, E.; Nephtali, E.; Gold, I. Conspiracies and contagion: Two patterns of COVID-19 related beliefs associated with distinct mental symptomatology. *Psychiatry Res. Commun.* **2024**, *4*, 100153. [CrossRef]
115. Poon, K.-T.; Chan, R.S.W.; Liang, J.; Li, L.M.W. Insomnia is associated with conspiracy mentality, psychological distress, and psychological well-being. *Soc. Sci. Med.* **2023**, *339*, 116384. [CrossRef]
116. Armstrong, K.; Rose, A.; Peters, N.; Long, J.A.; McMurphy, S.; Shea, J.A. Distrust of the health care system and self-reported health in the United States. *J. Gen. Intern. Med.* **2006**, *21*, 292–297. [CrossRef]
117. Molenda, Z.; Green, R.; Marchlewska, M.; Cichocka, A.; Douglas, K.M. Emotion dysregulation and belief in conspiracy theories. *Personal. Individ. Differ.* **2023**, *204*, 112042. [CrossRef]
118. Hoehn-Saric, R.; McLeod, D.R. Anxiety and arousal: Physiological changes and their perception. *J. Affect. Disord.* **2000**, *61*, 217–224. [CrossRef] [PubMed]
119. Kube, T.; Rozenkrantz, L.; Rief, W.; Barsky, A. Understanding persistent physical symptoms: Conceptual integration of psychological expectation models and predictive processing accounts. *Clin. Psychol. Rev.* **2020**, *76*, 101829. [CrossRef] [PubMed]
120. Munk, A.; Reme, S.E.; Jacobsen, H.B. What Does CATS Have to Do with Cancer? The Cognitive Activation Theory of Stress (CATS) Forms the SURGE Model of Chronic Post-surgical Pain in Women With Breast Cancer. *Front. Psychol.* **2021**, *12*, 630422. [CrossRef]
121. Faul, F.; Erdfelder, E.; Lang, A.-G.; Buchner, A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav. Res. Methods* **2007**, *39*, 175–191. [CrossRef]
122. Faul, F.; Erdfelder, E.; Buchner, A.; Lang, A.-G. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behav. Res. Methods* **2009**, *41*, 1149–1160. [CrossRef]
123. Moro-López-Menchero, P.; Martín-Sanz, M.B.; Fernandez-de-Las-Peñas, C.; Gómez-Sanchez, S.M.; Gil-Crujera, A.; Ceballos-García, L.; Escribano-Mediavilla, N.I.; Fuentes-Fuentes, M.V.; Palacios-Ceña, D. Living and Coping with Olfactory and Taste Disorders: A Qualitative Study of People with Long-COVID-19. *Healthcare* **2024**, *12*, 754. [CrossRef]

124. Fernández-de-Las-Peñas, C.; Guijarro, C.; Velasco-Arribas, M.; Torres-Macho, J.; Franco-Moreno, A.; Truini, A.; Pellicer-Valero, O.; Arendt-Nielsen, L. Neuropathic post-COVID pain symptomatology is not associated with serological biomarkers at hospital admission and hospitalization treatment in COVID-19 survivors. *Front. Med.* **2023**, *10*, 1301970. [CrossRef]
125. Fernández-de-Las-Peñas, C.; Ryan-Murua, P.; Rodríguez-Jiménez, J.; Palacios-Ceña, M.; Arendt-Nielsen, L.; Torres-Macho, J. Serological Biomarkers at Hospital Admission Are Not Related to Long-Term Post-COVID Fatigue and Dyspnea in COVID-19 Survivors. *Respiration* **2022**, *101*, 658–665. [CrossRef]
126. Matias-Guiu, J.A.; Delgado-Alonso, C.; Díez-Cirarda, M.; Martínez-Petit, Á.; Oliver-Mas, S.; Delgado-Álvarez, A.; Cuevas, C.; Valles-Salgado, M.; Gil, M.J.; Yus, M.; et al. Neuropsychological Predictors of Fatigue in Post-COVID Syndrome. *J. Clin. Med.* **2022**, *11*, 3886. [CrossRef]
127. Nalbandian, A.; Sehgal, K.; Gupta, A.; Madhavan, M.V.; McGroder, C.; Stevens, J.S.; Cook, J.R.; Nordvig, A.S.; Shalev, D.; Sehrawat, T.S.; et al. Post-acute COVID-19 syndrome. *Nat. Med.* **2021**, *27*, 601–615. [CrossRef] [PubMed]
128. Donald, J.; Bilasy, S.E.; Yang, C.; El-Shamy, A. Exploring the Complexities of Long COVID. *Viruses* **2024**, *16*, 1060. [CrossRef] [PubMed]
129. Maher, J.M.; Markey, J.C.; Ebert-May, D. The Other Half of the Story: Effect Size Analysis in Quantitative Research. *CBE-Life Sci. Educ.* **2013**, *12*, 345–351. [CrossRef] [PubMed]
130. Fernández-de-Las-Peñas, C.; Torres-Macho, J.; Ruiz-Ruigómez, M.; Arrieta-Ortubay, E.; Rodríguez-Rebollo, C.; Akasbi-Moltalvo, M.; Pardo-Guimerá, V.; Ryan-Murua, P.; Lumbreras-Bermejo, C.; Pellicer-Valero, O.J.; et al. Presence of SARS-CoV-2 RNA in COVID-19 survivors with post-COVID symptoms 2 years after hospitalization: The VIPER study. *J. Med. Virol.* **2024**, *96*, e29676. [CrossRef]
131. Fernández-de-las-Peñas, C.; Pellicer-Valero, O.J.; Martín-Guerrero, J.D.; Hernández-Barrera, V.; Arendt-Nielsen, L. Investigating the fluctuating nature of post-COVID pain symptoms in previously hospitalized COVID-19 survivors: The LONG-COVID-EXP multicenter study. *Pain Rep.* **2024**, *9*, e1153. [CrossRef]
132. Evcik, D. Musculoskeletal involvement: COVID-19 and post COVID 19. *Turk. J. Phys. Med. Rehabil.* **2023**, *69*, 1–7. [CrossRef]
133. Peter, R.S.; Nieters, A.; Kräusslich, H.G.; Brockmann, S.O.; Göpel, S.; Kindle, G.; Merle, U.; Steinacker, J.M.; Rothenbacher, D.; Kern, W.V. Post-acute sequelae of COVID-19 six to 12 months after infection: Population based study. *BMJ* **2022**, *379*, e071050. [CrossRef]
134. Diar Bakerly, N.; Smith, N.; Darbyshire, J.L.; Kwon, J.; Bullock, E.; Baley, S.; Sivan, M.; Delaney, B. Pathophysiological Mechanisms in Long COVID: A Mixed Method Systematic Review. *Int. J. Environ. Res. Public. Health* **2024**, *21*, 473. [CrossRef] [PubMed]
135. Hong, Y.-y.; Chan, H.-W.; Douglas, K.M. Conspiracy Theories about Infectious Diseases: An Introduction. *J. Pac. Rim Psychol.* **2021**, *15*, 18344909211057657. [CrossRef]
136. Bar-Haim, Y.; Lamy, D.; Pergamin, L.; Bakermans-Kranenburg, M.J.; van Ijzendoorn, M.H. Threat-related attentional bias in anxious and nonanxious individuals: A meta-analytic study. *Psychol. Bull.* **2007**, *133*, 1–24. [CrossRef]
137. Salkovskis, P.; Warwick, H.; Deale, A. Cognitive-Behavioral Treatment for Severe and Persistent Health Anxiety (Hypochondriasis). *Brief. Treat. Crisis Interv.* **2003**, *3*, 353–367. [CrossRef]
138. Schneiderman, N.; Ironson, G.; Siegel, S.D. Stress and health: Psychological, behavioral, and biological determinants. *Annu. Rev. Clin. Psychol.* **2005**, *1*, 607–628. [CrossRef] [PubMed]
139. Chen, W.C.; Chen, S.J.; Zhong, B.L. Sense of Alienation and Its Associations With Depressive Symptoms and Poor Sleep Quality in Older Adults Who Experienced the Lockdown in Wuhan, China, During the COVID-19 Pandemic. *J. Geriatr. Psychiatry Neurol.* **2022**, *35*, 215–222. [CrossRef] [PubMed]
140. Lee, S.; Creed, F.H.; Ma, Y.L.; Leung, C.M. Somatic symptom burden and health anxiety in the population and their correlates. *J. Psychosom. Res.* **2015**, *78*, 71–76. [CrossRef]
141. Santoro, G.; Starcevic, V.; Scalone, A.; Cavallo, J.; Musetti, A.; Schimmenti, A. The Doctor Is In(ternet): The Mediating Role of Health Anxiety in the Relationship between Somatic Symptoms and Cyberchondria. *J. Pers. Med.* **2022**, *12*, 1490. [CrossRef] [PubMed]
142. Gorna, R.; MacDermott, N.; Rayner, C.; O'Hara, M.; Evans, S.; Agyen, L.; Nutland, W.; Rogers, N.; Hastie, C. Long COVID guidelines need to reflect lived experience. *Lancet* **2021**, *397*, 455–457. [CrossRef]
143. Mora-Romo, J. Health psychology on long COVID: Strategies based on NICE and WHO guidelines recommendations. *Salud Ment.* **2022**, *45*, 199–208. [CrossRef]
144. Bahmer, T.; Borzikowsky, C.; Lieb, W.; Horn, A.; Krist, L.; Fricke, J.; Scheibenbogen, C.; Rabe, K.F.; Maetzler, W.; Maetzler, C.; et al. Severity, predictors and clinical correlates of Post-COVID syndrome (PCS) in Germany: A prospective, multi-centre, population-based cohort study. *EClinicalMedicine* **2022**, *51*, 101549. [CrossRef]
145. Engelmann, P.; Löwe, B.; Brehm, T.T.; Weigel, A.; Ullrich, F.; Addo, M.M.; Schulze Zur Wiesch, J.; Lohse, A.W.; Toussaint, A. Risk factors for worsening of somatic symptom burden in a prospective cohort during the COVID-19 pandemic. *Front. Psychol.* **2022**, *13*, 1022203. [CrossRef]
146. Gouraud, C.; Bottemanne, H.; Lahlou-Laforêt, K.; Blanchard, A.; Günther, S.; Batti, S.E.; Auclin, E.; Limosin, F.; Hulot, J.S.; Lebeaux, D.; et al. Association Between Psychological Distress, Cognitive Complaints, and Neuropsychological Status After a Severe COVID-19 Episode: A Cross-Sectional Study. *Front. Psychiatry* **2021**, *12*, 725861. [CrossRef]
147. Williams, M.N.; Ling, M.; Kerr, J.R.; Hill, S.R.; Marques, M.D.; Mawson, H.; Clarke, E.J.R. People do change their beliefs about conspiracy theories—But not often. *Sci. Rep.* **2024**, *14*, 3836. [CrossRef] [PubMed]

148. Barsky, A.J.; Peekna, H.M.; Borus, J.F. Somatic symptom reporting in women and men. *J. Gen. Intern. Med.* **2001**, *16*, 266–275. [CrossRef]
149. Fillingim, R.B. Sex, gender, and pain: Women and men really are different. *Curr. Rev. Pain.* **2000**, *4*, 24–30. [CrossRef]
150. Wade, M.; Prime, H.; Johnson, D.; May, S.S.; Jenkins, J.M.; Browne, D.T. The disparate impact of COVID-19 on the mental health of female and male caregivers. *Soc. Sci. Med.* **2021**, *275*, 113801. [CrossRef]
151. Purvis, R.S.; Ayers, B.L.; Rowland, B.; Moore, R.; Hallgren, E.; McElfish, P.A. "Life is hard": How the COVID-19 pandemic affected daily stressors of women. *Dialogues Health* **2022**, *1*, 100018. [CrossRef]
152. Hastie, C.E.; Lowe, D.J.; McAuley, A.; Winter, A.J.; Mills, N.L.; Black, C.; Scott, J.T.; O'Donnell, C.A.; Blane, D.N.; Browne, S.; et al. Outcomes among confirmed cases and a matched comparison group in the Long-COVID in Scotland study. *Nat. Commun.* **2022**, *13*, 5663. [CrossRef] [PubMed]
153. Sneller, M.C.; Liang, C.J.; Marques, A.R.; Chung, J.Y.; Shanbhag, S.M.; Fontana, J.R.; Raza, H.; Okeke, O.; Dewar, R.L.; Higgins, B.P.; et al. A Longitudinal Study of COVID-19 Sequelae and Immunity: Baseline Findings. *Ann. Intern. Med.* **2022**, *175*, 969–979. [CrossRef] [PubMed]
154. Cohen, J.; van der Meulen Rodgers, Y. An intersectional analysis of long COVID prevalence. *Int. J. Equity Health* **2023**, *22*, 261. [CrossRef]
155. Ebbesen, B.D.; Giordano, R.; Hedegaard, J.N.; Calero, J.A.V.; Fernández-de-las-Peñas, C.; Rasmussen, B.S.; Nielsen, H.; Schiøttz-Christensen, B.; Petersen, P.L.; Castaldo, M.; et al. Prevalence and Risk Factors of Multitype Post-COVID Pain in a Cohort of Previously Hospitalized COVID-19 Survivors: A Danish Cross-Sectional Survey. *J. Pain.* 2024; *online ahead of print*. [CrossRef]
156. Boufidou, F.; Medić, S.; Lampropoulou, V.; Siafakas, N.; Tsakris, A.; Anastassopoulou, C. SARS-CoV-2 Reinfections and Long COVID in the Post-Omicron Phase of the Pandemic. *Int. J. Mol. Sci.* **2023**, *24*, 12962. [CrossRef]
157. Català, M.; Mercadé-Besora, N.; Kolde, R.; Trinh, N.T.H.; Roel, E.; Burn, E.; Rathod-Mistry, T.; Kostka, K.; Man, W.Y.; Delmestri, A.; et al. The effectiveness of COVID-19 vaccines to prevent long COVID symptoms: Staggered cohort study of data from the UK, Spain, and Estonia. *Lancet Respir. Med.* **2024**, *12*, 225–236. [CrossRef] [PubMed]
158. Brannock, M.D.; Chew, R.F.; Preiss, A.J.; Hadley, E.C.; Redfield, S.; McMurry, J.A.; Leese, P.J.; Girvin, A.T.; Crosskey, M.; Zhou, A.G.; et al. Long COVID risk and pre-COVID vaccination in an EHR-based cohort study from the RECOVER program. *Nat. Commun.* **2023**, *14*, 2914. [CrossRef]
159. Richard, S.A.; Pollett, S.D.; Fries, A.C.; Berjohn, C.M.; Maves, R.C.; Lalani, T.; Smith, A.G.; Mody, R.M.; Ganesan, A.; Colombo, R.E.; et al. Persistent COVID-19 Symptoms at 6 Months After Onset and the Role of Vaccination Before or After SARS-CoV-2 Infection. *JAMA Netw. Open* **2023**, *6*, e2251360. [CrossRef]
160. Swami, V.; Barron, D.; Weis, L.; Voracek, M.; Stieger, S.; Furnham, A. An examination of the factorial and convergent validity of four measures of conspiracist ideation, with recommendations for researchers. *PLoS ONE* **2017**, *12*, e0172617. [CrossRef] [PubMed]
161. Imhoff, R.; Bertlich, T.; Frenken, M. Tearing apart the "evil" twins: A general conspiracy mentality is not the same as specific conspiracy beliefs. *Curr. Opin. Psychol.* **2022**, *46*, 101349. [CrossRef] [PubMed]
162. Salazar-Fernández, C.; Baeza-Rivera, M.J.; Manríquez-Robles, D.; Salinas-Oñate, N.; Sallam, M. From Conspiracy to Hesitancy: The Longitudinal Impact of COVID-19 Vaccine Conspiracy Theories on Perceived Vaccine Effectiveness. *Vaccines* **2023**, *11*, 1150. [CrossRef]
163. Xie, Y.; Choi, T.; Al-Aly, Z. Postacute Sequelae of SARS-CoV-2 Infection in the Pre-Delta, Delta, and Omicron Eras. *N. Engl. J. Med.* **2024**, *391*, 515–525. [CrossRef]
164. Notarte, K.I.; Catahay, J.A.; Velasco, J.V.; Pastrana, A.; Ver, A.T.; Pangilinan, F.C.; Peligro, P.J.; Casimiro, M.; Guerrero, J.J.; Gellaco, M.M.L.; et al. Impact of COVID-19 vaccination on the risk of developing long-COVID and on existing long-COVID symptoms: A systematic review. *EClinicalMedicine* **2022**, *53*, 101624. [CrossRef]