Medicina Clínica Práctica 8 (2025) 100501

MEDICINA CLINICA PRÁCTICA

www.elsevier.es/medicinaclinicapractica

Original article

Association between post COVID-19-related symptoms and quality of life two to three weeks after hospitalization: A cross-sectional study

Dafinë Ibrahimi Kaçuri[a], Samire Beqaj[b], Arbnore Ibrahimaj Gashi[b], Arben Boshnjaku[a], Ardiana Murtezani[b,c] and Merita Qorolli[b,c,*]

[a] University Fehmi Agani, Faculty of Medicine, Gjakova, Republic of Kosovo
[b] University of Prishtina, Faculty of Medicine, Physiotherapy Branch, Prishtina, Republic of Kosovo
[c] University Clinical Center of Kosovo, Prishtina, Republic of Kosovo

ARTICLE INFO

Article history:
Received 21 January 2025
Accepted 15 March 2025
Available online xxxx

Keywords:
Post COVID-19 condition
Symptoms
Quality of life
Hospitalization

ABSTRACT

Background and objectives: The most frequently reported symptoms of the post-COVID-19 hospitalized patients are fatigue, dyspnea, anosmia, sleeping difficulties, chest pain, headache, cough, and mental health symptoms. Our aim was to identify common post-COVID-19 symptoms two to three weeks after the hospital discharge and their relationship with the quality of life.
Materials and methods: This cross-sectional study included 39 Post-Covid-19 patients who were discharged from the Clinic for Infectious Diseases at the University Clinical Center of Kosova UCCK. A list of symptoms of post-COVID-19 as defined by the Delphi consensus published by the WHO was recorded. Quality of life is measured using the EuroQol-5D-5L (EQ-5D-5L) instrument.
Results: Excessive tiredness (84.6%) and difficulty in breathing (64.1%) were the most common symptoms expressed by most participants. The EQ-5D-5L subscale -usual activity was correlated with excessive tiredness ($r = -0.36$; 95% CI: −0.61 to −0.05), dizziness ($r = -0.34$; 95% CI: −0.59 to −0.02), and depression and anxiety ($r = -0.36$; 95% CI: −0.61 to −0.05). The pain/discomfort subscale was correlated with chest pain ($r = -0.45$; 95% CI: −0.67 to −0.15), memory difficulties ($r = -0.35$; 95% CI: −0.60 to −0.04), palpitations ($r = -0.38$; 95% CI: −0.62 to −0.08), dizziness ($r = -0.34$; 95% CI: −0.59 to −0.03) and joint pain ($r = -0.56$; 95% CI: −0.07 to −0.30). Dizziness and joint pain were predictors of EQ-5D-5L index value, $F(2, 36) = 10.73$, $p < 0.001$.
Conclusions: Excessive tiredness and difficulty in breathing were present in more than 50% of post-COVID-19′ patients 2–3 weeks after hospital discharge, while dizziness and joint pain could be predictors of diminished quality of life.

Asociación entre los síntomas post COVID-19 y la calidad de Vida dos a tres semanas después de la hospitalización: Un estudio transversal

Palabras clave:
Condición post-COVID-19
Síntomas
Calidad de vida
Hospitalización

RESUMEN

Antecedentes y objetivos: Los síntomas mas frecuentes en pacientes hospitalizados tras sufrir COVID-19 incluyen fatiga, disnea, anosmia, dificultades para dormir, dolor torácico, cefalea, tos y síntomas relacionados con la salud mental. Nuestro objetivo fue identificar los síntomas comunes de relación con la calidad de vida.
Materiales y métodos: Este estudio transversal incluyó a 39 pacientes que habían sido hospitalizados por COVID-19 y dados de alta en la Clínica de Enfermedades Infecciosas del Centro Clínico Universitario de Kosovo (UCCK). Se registró una lista de síntomas de acuerdo con la definición del consenso Delphi publicada por la OMS. La calidad de visa se evaluó utilizando el instrumento EroQol-5D-5L (EQ-5D-5L).
Resultados: El cansancio excesivo (84,6%) y la dificultad para respirar (64,1%) fueron los síntomas más comunes reportados por los participantes. La subescala EQ-5D-5L -actividad habitual se correlacionó con cansancio excesivo ($r = -0.36$; IC del 95%: −0.61 a − 0.05), mareos ($r = -0.34$; IC del 95%: −0.59 a − 0.02) y depresión y ansiedad ($r = -0.36$; IC del 95%: −0.61 a − 0.05). La subescala dolor/malestar se correlacionó con dolor en el

* Corresponding author at: University of Prishtina, Faculty of Medicine, Physiotherapy Branch, Bulevardi i Dëshmorëve n.n., 10000 Prishtina, Republic of Kosovo.
E-mail address: merita.qorolli@uni-pr.edu (M. Qorolli).

https://doi.org/10.1016/j.mcpsp.2025.100501

pecho ($r = -0.45$; IC del 95%: −0.67 a − 0.15), dificultades de memoria ($r = -0.35$; IC del 95%: −0.60 a − 0.04), palpitaciones ($r = -0.38$; IC del 95%: −0.62 a − 0.08), mareos ($r = -0.34$; IC del 95%: −0.59 a − 0.03) y dolor en las articulaciones ($r = -0.56$; IC del 95%: −0.075 a − 0.30). Además, los mareos y el dolor articular fueron predictores significativos del valor del índice EQ-5D-5L, $F(2, 36) = 10.728$, $p < 0.001$.

Conclusiones: El cansancio excesivo y la dificultad para respirar estuvieron presentes en más del 50% de los pacientes post COVID-19 2–3 semanas después del alta hospitalaria, mientras que los mareos y el dolor en las articulaciones podrían ser predictores de una calidad de vida disminuida.

Introduction

The post COVID-19 condition implies a range of persistent symptoms, the knowledge of which is still developing worldwide.[1] Most organs and their systems are affected, from which a variety of symptoms have been reported during the acute phase and recovery period, which helps to better identify the disease, diagnosis, and treatment.[2]

The duration of the symptoms varies. Symptoms of respiratory and cardiovascular dysfunction were observed for months after hospital discharge,[3] followed by physical and psychological impairments,[4] requiring long-term rehabilitation after infection.[5]

The most frequently reported symptoms after hospitalization in post-COVID-19 patients are fatigue, dyspnea, anosmia, sleeping difficulties, chest pain, headache, cough, and mental health symptoms.[6] Neurological problems have often been reported, including vertigo and/or tinnitus.[7] However, by one year after diagnosis, most individuals have notably reduced symptoms,[8] reporting only one symptom.[9]

Changes in quality of life after infection with the COVID-19 virus are visible in both human and social aspects.[10] The negative effect of Covid-19 infection on the quality of life is observed from 2 weeks[11] to 6 months[10] after hospital discharge, as well as beyond two years after Covid-19 infection regardless of hospitalization.[12] Additionally, the literature has investigated which factors have influenced quality of life, presenting a spectrum of symptoms as well as demographic features, mostly three month after Covid-19 infection [3,4,12]. Existing literature shows that after infection with COVID-19, patients require care for their symptoms to improve their quality of life.[13]

Bearing in mind that there is a paucity of evidence mapping the symptoms early after hospital discharge and their relation to the quality of life, our aim was to identify common symptoms two–three weeks after hospital discharge and their relationship with quality of life.

Methods and patients

This cross-sectional observational study, performed at the Physical Medicine and Rehabilitation Outpatient Clinic at the University Clinical Centre of Kosova (UCCK), included 39 post-Covid-19 patients who were discharged from the Clinic for Infectious Diseases at the UCCK between August 30, 2021, and December 3, 2021. As previously explained,[11] the patient's inclusion criteria were as follows: patients of both sexes, older than 18 years previously hospitalized due to COVID-19, and identified by polymerase chain reaction (PCR) test for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), while patients with moderate or severe heart disease, chronic neurological and lung disease, renal insufficiency, cognitive deficit, acute osteomuscular diseases and traumas, including the acute phase of rheumatological disorders and spinal disc malfunction, and immobility, were excluded from the study. A detailed description of how the patients were selected to participate in the research is explained and visually represented by a flowchart previously.[11] All study participants have signed an informed consent. The patients were assessed two–three weeks after hospital discharge. Informed consent was obtained from all the participants. Physiatrists were always present during physiotherapy assessment, which consisted of sociodemographic and clinical data[11] documented on the structured assessment form. A list of post-COVID-19 symptoms including the excessive tiredness, difficulty breathing, chest pain, memory difficulties, insomnia, palpitations, dizziness, joint pain and depression and anxiety were recorded on the structured assessment form, by responding to the statement: "Please identify the presence of the following symptoms." The list of symptoms is based on the clinical case definition of the post-COVID-19 condition, as defined by the Delphi consensus published by the WHO.[14] Quality of life was measured using the EQ-5D-5L instrument as described in our previous article.[11]

The study was conducted following the principles of the Helsinki Declaration upon obtaining permission from the UCCK Ethics Committee to conduct the study (protocol no. 1233).

Statistics

All data analyses were conducted using the statistical package SPSS 27 for Windows with the significance level set at 0.05 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were used to describe symptoms and frequency in general and were compared with gender. To determine the association between quality of life, measured by EQ-5D-5L, and symptoms, the Pearson correlation coefficient (r) was used along with 95% Confidence Interval (CI). Multiple regression analysis, following a stepwise model, was conducted to predict the covariates influencing the EQ-5D-5L index value and EuroQol 5D-5L Visual Analog Scale (EQ-5D-5L VAS). These covariates were chosen based on the symptoms with the highest correlation.

Results

Sociodemographic and clinical data of the participants have been presented previously.[11] In total, 39 subjects participated in this study, of whom 18 were biological females and 21 were biological males. Excessive tiredness (84.6%) and difficulty breathing (64.1%) were the most common symptoms expressed by the majority of participants, followed by insomnia (46.2%), chest pain (43.6%), memory difficulties (43.6%) and joint pain (41.0%). Other symptoms, such as palpitations (30.8%), anxiety (25.6%), and dizziness (17.9%), were observed less frequently. With respect to biological sex dispersions, higher percentages of females showed excessive tiredness compared to males (94.5% versus 76.2%, respectively), which was also observed in chest pain (61.1% in females versus 28.6% in males), memory difficulties (50.0% in females versus 38.1% in males), insomnia (61.1% in females versus 33.3% in males), palpitations (44.4% in females versus 19.0% in males), dizziness (33.3% in females versus 4.5% in males), joint pain (66.7% in females versus 19.0% in males), as well as depression and anxiety (33.3% in females versus 19.0% in males) (Table 1).

Table 2 presents findings from the correlation analysis between EQ-5D-5L subscales and symptoms. Pearson correlation coefficient (r) was used along with a 95% Confidence Interval (CI). Pain/discomfort subscale was found to be correlated with joint pain ($r = -0.56$; 95% CI: −0.075 to −0.30), chest pain ($r = -0.45$; 95% CI: −0.67 to −0.15), indicating a moderate negative correlation. Furthermore, pain/discomfort showed a weak inverse relationship with memory difficulties ($r = -0.35$; 95% CI: −0.60 to −0.04), palpitations ($r = -0.38$; 95% CI:

Table 1
Descriptive data for symptoms, frequency in general and compared with gender.

Symptoms		Frequency [yes/no]	Percentage [100%]
Excessive tiredness	Female [$n = 18$]	17/1	94.5
	Male [$n = 21$]	16/5	76.2
	Total [$n = 39$]	33/6	84.6
Difficulty breathing	Female [$n = 18$]	12/6	66.7
	Male [$n = 21$]	13/8	61.9
	Total [$n = 39$]	25/14	64.1
Chest pain	Female [$n = 18$]	11/7	61.1
	Male [$n = 21$]	6/15	28.6
	Total [$n = 39$]	17/22	43.6
Memory difficulties	Female [$n = 18$]	9/9	50.0
	Male [$n = 21$]	8/13	38.1
	Total [$n = 39$]	17/22	43.6
Insomnia	Female [$n = 18$]	11/7	61.1
	Male [$n = 21$]	7/14	33.3
	Total [$n = 39$]	18/21	46.2
Palpitations	Female [$n = 18$]	8/10	44.4
	Male [$n = 21$]	4/17	19.0
	Total [$n = 39$]	12/27	30.8
Dizziness	Female [$n = 18$]	6/12	33.3
	Male [$n = 21$]	1/20	4.8
	Total [$n = 39$]	7/32	17.9
Joint pain	Female [$n = 18$]	12/6	66.7
	Male [$n = 21$]	4/17	19.0
	Total [$n = 39$]	16/23	41.0
Depression and anxiety	Female [$n = 18$]	6/12	33.3
	Male [$n = 21$]	4/17	19.0
	Total [$n = 39$]	10/29	25.6

-0.62 to -0.08) and dizziness ($r = -0.34$; 95% CI: -0.59 to -0.03). Usual activity subscale was correlated with excessive tiredness ($r = -0.36$; 95% CI: -0.61 to -0.05), dizziness ($r = -0.34$; 95% CI: -0.59 to -0.02), as well as depression and anxiety ($r = -0.36$; 95% CI: -0.61 to -0.05) showing week negative correlation. Whereas the mobility subscale showed a noticeable negative trend presenting moderate correlation only with excessive tiredness ($r = -0.47$; 95% CI: -0.68 to -0.18), self-care subscale was correlated with dizziness ($r = -0.58$; 95% CI: -0.76 to -0.32) and depression and anxiety ($r = -0.51$; 95% CI: -0.71 to -0.23). Anxiety and depression subscale was found to be correlated with memory difficulties ($r = -0.32$; 95% CI: -0.58 to -0.01), while with dizziness ($r = -0.67$; 95% CI: -0.82 to -0.45) and the depression and anxiety symptom ($r = -0.65$; 95% CI: -0.80 to -0.42) showed a clear negative trend.

A linear logistic regression following a stepwise method was conducted to predict the covariates influencing EQ-5D-5L index value (Table 3). The EQ-5D-5L index value was previously published in Qorolli et al.[11] Residuals were independent, as assessed by a Durbin-Watson statistic of 2.38. Furthermore, homoscedasticity was assessed by visual inspection of a plot of standardized residuals versus unstandardized predicted values. The R^2 for the overall model was 61.1% with an adjusted R^2 of 37.3%, a medium-sized effect, according to Cohen (1988). Dizziness and joint pain predicted the EQ-5D-5L index value ($F(2, 36) = 10.73$, $p < 0.001$).

A second logistic regression was performed to predict the covariates influencing the EQ-5D-5L VAS score (Table 4). Residuals were independent, as assessed by a Durbin-Watson statistic of 2.79. Furthermore, homoscedasticity was assessed by visual inspection of a plot of standardized residuals versus unstandardized predicted values. The R^2 for the overall model was 50.4% with an adjusted R^2 of 25.4%, which is a small effect size according to Cohen (1988). Anxiety and depression were the only variables predicting the VAS score ($F(1, 36) = 12.23$, $p < 0.001$).

Discussion

COVID-19, even after infection, can persist, presenting new or existing symptoms that last for weeks or even months, regardless of the severity of the initial infection.[15] The variability of symptoms after COVID-19 may affect one or more organ systems manifesting general weakness, impaired cognitive functions, memory loss, depression, insomnia, dysgeusia, shortness of breath, cough, chest pain, abdominal pain, anorexia, nausea, vomiting, diarrhea, alopecia, and skin rashes.[16]

In our study, the most common symptom was observed to be excessive tiredness (84.6%), which is in line with previous studies conducted by Al Rasheed et al.,[17] Hedin et al.,[18] and Khot et al.[19] Furthermore, in a study conducted by Hedin et al., the patient's assessment period[18] described findings similar to ours (2 weeks after the symptoms occurred), although hospitalized patients were excluded. Another study[20] conducted symptom evaluation 3 months after hospitalization and reported fatigue, which accounted for 29.4% of cases, as the primary symptom whereas the study by Mandal et al.[21] reported persistent fatigue in 69% of patients at a median of 54 days after hospitalization. It has been shown that fatigue remains the most pronounced symptom even 24 months after the COVID-19 infection.[12,]

We analyzed the relationship between EQ-5D-5L subscales and symptoms, showing that the usual activity subscale was correlated with dizziness, fatigue, depression, and anxiety, while the pain/discomfort subscale was found to be correlated with chest pain, memory difficulties, palpitations, dizziness, and joint pain. Although we have included symptoms that have reflected more organ systems of organs,[14] we have found similarities between our study and recent studies that have included fewer symptoms. One typical case is a recent study conducted by Janols et al., which included memory/concentration problems, fatigue, and dyspnea, and presented the strongest correlation between usual activities and fatigue[22] which is in line with our study. In a previous study of ours[11] was reported that the most affected EQ-5D-5L domain was usual activity, followed by pain/discomfort, which supports our findings, even if we consider that joint and chest pain are reflected in the pain/discomfort subscale. In contrast, in the study by Hegde et al.[23], the most often presented subscale of EQ-5D-5L was anxiety/depression at hospital discharge, which decreased at 8 weeks. Likewise, Mastrorosa et al. (2023) reported that anxiety/depressive symptoms and sleep disorders decrease quality of life.[24] In our study,

Table 2
Correlation between EQ-5D-5L subscales and symptoms.

Variable		Symptoms								
		Excessive tiredness	Difficulty breathing	Chest pain	Memory difficulties	Insomnia	Palpitations	Dizziness	Joint pain	Depression and anxiety
EQ-5D-5L subscale Mobility	*n*	39	39	39	39	39	39	39	39	39
	r	−0.47	−0.02	0.14	0.04	−0.21	−0.10	−0.28	−0.17	−0.23
	95% CI LL	−0.68	−0.34	−0.18	−0.28	−0.49	−0.40	−0.55	−0.46	−0.51
	95% CI UL	−0.18	0.30	0.44	0.35	0.11	0.23	0.04	0.15	0.09
EQ-5D-5L subscale Self-care	*n*	39	39	39	39	39	39	39	39	39
	r	−0.18	−0.25	−0.17	−0.23	−0.27	−0.17	−0.58	−0.20	−0.51
	95% CI LL	−0.47	−0.52	−0.46	−0.51	−0.54	−0.46	−0.76	−0.48	−0.71
	95% CI UL	0.15	0.07	0.15	0.09	0.05	0.15	−0.32	0.13	−0.23
EQ-5D-5L subscale Usual activities	*n*	39	39	39	39	39	39	39	39	39
	r	−0.36	−0.24	−0.12	−0.08	−0.01	−0.02	−0.34	−0.31	−0.36
	95% CI LL	−0.61	−0.52	−0.42	−0.38	−0.33	−0.34	−0.59	−0.57	−0.61
	95% CI UL	−0.05	0.08	0.20	0.24	0.30	0.29	−0.02	0.01	−0.05
EQ-5D-5L subscale Pain/Discomfort	*n*	39	39	39	39	39	39	39	39	39
	r	−0.23	−0.01	−0.45	−0.35	−0.19	−0.38	−0.34	−0.56	−0.21
	95% CI LL	−0.51	−0.33	−0.67	−0.60	−0.48	−0.62	−0.59	−0.75	−0.49
	95% CI UL	0.09	0.31	−0.15	−0.04	0.14	−0.08	−0.03	−0.30	0.12
EQ-5D-5L subscale Anxiety/ Depression	*n*	39	39	39	39	39	39	39	39	39
	r	−0.22	−0.18	−0.19	−0.32	−0.29	−0.14	−0.67	−0.22	−0.65
	95% CI LL	−0.50	−0.47	−0.48	−0.58	−0.56	−0.44	−0.82	−0.50	−0.80
	95% CI UL	0.11	0.14	0.13	−0.01	0.02	0.18	−0.45	0.10	−0.42

Abbreviations: *n*, number of patients; *r*, correlation coefficient; CI, confidence interval; LL, lower limit; UL, upper limit.

anxiety and depression subscale scores were only correlated with memory loss.

Dizziness is a symptom expressed in most studies; however, the reports differ. In our study, we found that 18% of patients reported dizziness, while Aldè et al. reported that 16.6% to 31.8% of participants had experienced dizziness,[25] Gallus et al. reported that 8.3% of their patients had dizziness one month after infection with COVID-19,[26] while Saniasiaya et al. reported that dizziness was a symptom expressed in every third patient.[27] The reporting of dizziness depended on the time of evaluation.

To predict which symptoms affect the quality of life measured by the EQ-5D-5L index value, regression analysis was performed, which showed that dizziness and joint might pain predicted the EQ-5D-5L index values. The R^2 for the overall model was 61.1% with an adjusted R^2 of 37.3%, a medium-size effect according to Cohen (1988)[28]. Regarding the EQ-5D-5L VAS, we found that only anxiety and depression could predict it. The R^2 for the overall model was 50.4% with an adjusted R^2 of 25.4%, which is a small effect size according to Cohen (1988).[28]

Conclusions

Our study showed that post-COVID-19 symptoms were present in various percentages, with symptoms of excessive tiredness and difficulty breathing being present in more than 50% of post-COVID-19′ patients, 2–3 weeks after hospital discharge. In addition, the findings of this study showed that symptoms such as dizziness, excessive tiredness, depression and anxiety, joint pain, chest pain, memory loss, and palpitations have a negative impact on quality of life domains, measured by EQ-5D-5L, indicating that dizziness and joint pain are being found as predictors of diminished quality of life. However, the exclusion of the impact of the other symptoms on quality of life should not be misinterpreted as evidence that these symptoms have no impact on quality of life.

Although this study was performed to the best of our knowledge, certain limitations emerged. One typical issue that would have happened on the matter would be having a larger sample of participants, particularly if including non-hospitalized patients. In addition, it would be beneficial to include healthy controls, as well as to follow-up these patients over time. This study is one of the few studies that has

Table 3
Factors associated with EQ-5D-5L and dizziness and joint pain.

Chair stand	B	95% CI		SE B	β	R^2	ΔR^2
		LL	UL				
Model						0.61	0.37
Constant	−0.12	−0.48	0.24	0.18			
Dizziness	0.26	0.10	0.42	0.08	0.43		
Joint pain	0.20	0.07	0.33	0.06	0.42		

Notes. Model = "Stepwise" method in SPSS statistics.
Abbreviations: B = unstandardized regression coefficient; CI = confidence interval; LL = lower limit; UL = upper limit; SE B = standard error of the coefficient; β = standardized coefficient; R^2 = coefficient of determination; ΔR^2 = adjusted R^2.

Table 4
Factors associated with EQ-5D-5L VAS and anxiety and depression.

Chair stand	B	95% CI		SE B	β	R^2	ΔR^2
		LL	UL				
Model						0.50	0.25
Constant	33.17	13.13	53.21	9.88			
Anxiety and depression	19.05	8.01	30.10	5.45	0.50		

Notes. Model = "Stepwise" method in SPSS statistics.
Abbreviations: EQ-5D-5L VAS, EuroQol 5D-5L Visual Analog Scale; B = unstandardized regression coefficient; CI = confidence interval; LL = lower limit; UL = upper limit; SE B = standard error of the coefficient; β = standardized coefficient; R^2 = coefficient of determination; ΔR^2 = adjusted R^2.

provided insight into the relationship between symptoms and quality of life in post-COVID-19 patients, two to three weeks after hospital discharge.

Ethical considerations

The study was conducted following the principles of the Helsinki Declaration upon obtaining permission from the UCCK Ethics Committee to conduct the study (protocol no. 1233). All study participants have signed an informed consent.

Funding

This research was funded by the Ministry of Education, Science, Technology, and Innovation in the Republic of Kosovo (Grant/Award Number: 2-814-7) for data collection. Otherwise, the authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

Declaration of competing interest

Merita Qorolli reports equipment, or supplies were provided by the Ministry of Education, Science, Technology and Innovation of the Republic of Kosovo. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. WHO-2019-nCoV-clinical-2023.2. Accessed August 4, 2024. https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2023.2.
2. Amdal CD, Pe M, Falk RS, Piccinin C, Bottomley A, Arraras JI, Darlington AS, et al. Health-related quality of life issues, including symptoms, in patients with active COVID-19 or post COVID-19; a systematic literature review. Qual Life Res. 2021;30(12):3367–81. https://doi.org/10.1007/s11136-021-02908-z.
3. Mo X, Jian W, Su Z, Chen M, Peng H, Peng P, et al. Abnormal pulmonary function in COVID-19 patients at time of hospital discharge. Eur Respir J. 2020;55(6), 2001217. https://doi.org/10.1183/13993003.01217-2020.
4. Xiong TY, Redwood S, Prendergast B, Chen M. Coronaviruses and the cardiovascular system: acute and long-term implications. Eur Heart J. 2020;41(19):1798–800. https://doi.org/10.1093/eurheartj/ehaa231.
5. Sirayder U, Inal-Ince D, Kepenek-Varol B, Acik C. Long-term characteristics of severe COVID-19: respiratory function, functional capacity, and quality of life. IJERPH. 2022;19(10):6304. https://doi.org/10.3390/ijerph19106304.
6. Malik P, Patel K, Pinto C, Jaiswal R, Tirupathi R, Pillai S, et al. Post-acute COVID-19 syndrome (PCS) and health-related quality of life (HRQoL) – a systematic review and meta-analysis. J Med Virol. 2022;94(1):253–62. https://doi.org/10.1002/jmv.27309.
7. Daker LI, Elshafei RR, Bahi M, Mohammed A, Erfan R, Gomaa M. Could vertigo be a post-COVID-19 sequela or presenting symptom? Egypt J Neurol Psychiatr Neurosurg. 2023;59(1):65. https://doi.org/10.1186/s41983-023-00659-x.
8. Pérez Catalán I, Roig Martí C, Fabra Juana S, Bajo, Herrero Rodríguez G, Segura Fábrega A, et al. One-year quality of life among post-hospitalization COVID-19 patients. Front Public Health. 2023;11:1236527. https://doi.org/10.3389/fpubh.2023.1236527.
9. Manta A, Michelakis I, Dafni M, Spanoudaki A, Krontira S, Tsoutsouras T, et al. Long-term outcomes, residual symptoms and quality of life in COVID-19 hospitalized patients: a 12-month longitudinal study. J Invest Med. 2024;72(2):193–201. https://doi.org/10.1177/10815589231212899.
10. El Keshky MES, Basyouni SS, Al Sabban AM. Getting through COVID-19: the pandemic's impact on the psychology of sustainability, quality of life, and the global economy – a systematic review. Front Psychol. 2020:11 https://doi.org/10.3389/fpsyg.2020.585897.
11. Qorolli M, Beqaj S, Ibrahimi-Kaçuri D, Murtezani A, Krasniqi V, Mačak Hadžiomerović A. Functional status and quality of life in post-COVID-19 patients two to three weeks after hospitalization: a cross-sectional study. Health Sci Rep. 2023;6(8), e1510. https://doi.org/10.1002/hsr2.1510.
12. Brus IM, Spronk I, Haagsma JA, de Groot A, Tieleman P, Biere-Rafi S, et al. The prolonged impact of COVID-19 on symptoms, health-related quality of life, fatigue and mental well-being: a cross-sectional study. Front Epidemiol. 2023;3, 1144707. https://doi.org/10.3389/fepid.2023.1144707.
13. Lemhöfer C, Sturm C, Loudovici-Krug D, Guntenbrunner C, Bülow M, Reuken P, et al. Quality of life and ability to work of patients with Post-COVID syndrome in relation to the number of existing symptoms and the duration since infection up to 12 months: a cross-sectional study. Qual Life Res. 2023;32(7):1991–2002. https://doi.org/10.1007/s11136-023-03369-2.
14. Soriano JB, Murthy S, Marshall JC, Relan P, Diaz JV. WHO clinical case definition working group on post-COVID-19 condition. A clinical case definition of post-COVID-19 condition by a Delphi consensus. Lancet Infect Dis. 2022;22(4):e102–7. https://doi.org/10.1016/S1473-3099(21)00703-9.
15. Salamanna F, Veronesi F, Martini L, Landini MP, Fini M. Post-COVID-19 syndrome: the persistent symptoms at the post-viral stage of the disease. A systematic review of the current data. Front Med (Lausanne). 2021;8, 653516. https://doi.org/10.3389/fmed.2021.653516.
16. Premraj L, Kannapadi NV, Briggs J, Seal SM, Battaglini D, Fanning J, et al. Mid and long-term neurological and neuropsychiatric manifestations of post-COVID-19 syndrome: a meta-analysis. J Neurol Sci. 2022;434:120162. https://doi.org/10.1016/j.jns.2022.120162.
17. AlRasheed MM, Fekih-Romdhane F, Jahrami H, Pires GN, Saif Z, Alenezi AF, et al. The prevalence and severity of insomnia symptoms during COVID-19: a global systematic review and individual participant data meta-analysis. Sleep Med. 2022;100:7–23. https://doi.org/10.1016/j.sleep.2022.06.020.
18. Hedin K, Van Der Velden AW, Hansen MP, Moberg AB, Balan A, Bruno P, et al. Initial symptoms and three months follow-up after acute COVID-19 in outpatients: an international prospective cohort study. Eur J Gen Pract. 2023;29(2), 2154074. https://doi.org/10.1080/13814788.2022.2154074.
19. Khot R, Patil A, Rathod B, Kumbhalkar S, Joshi P. Post-COVID symptoms and recovery times in hospitalized mild and moderate COVID-19 patients. Int J Acad Med. 2023;9(2):39. https://doi.org/10.4103/ijam.ijam_95_22.
20. Qu G, Zhen Q, Wang W, Fan S, Wu Q, Zhang C, et al. Health-related quality of life of COVID-19 patients after discharge: a multicenter follow-up study. J Clin Nurs. 1742–1750;30(11–12):2021. https://doi.org/10.1111/jocn.15733.
21. Mandal S, Barnett J, Brill SE, Brown JS, Denneny EK, Hare SS, et al. Long-COVID': a cross-sectional study of persisting symptoms, biomarker and imaging abnormalities following hospitalisation for COVID-19. Thorax. 2021;76(4):396–8. https://doi.org/10.1136/thoraxjnl-2020-215818.
22. Janols H, Wadsten C, Forssell C, Raffeti E, Janson C, Zhou X, et al. Enhancing EQ-5D-5L sensitivity in capturing the most common symptoms in post-COVID-19 patients: an exploratory cross-sectional study with a focus on fatigue, memory/concentration problems and dyspnea dimensions. IJERPH. 2024;21(5):591. https://doi.org/10.3390/ijerph21050591.
23. Hegde S, Sreeram S, Bhat KR, Satish V, Shekar S, Babu M. Evaluation of post-COVID health status using the EuroQol-5D-5L scale. Pathog Global Health. 2022;116(8):498–508. https://doi.org/10.1080/20477724.2022.2035623.
24. Mastrorosa I, Del Duca G, Pinnetti C, Lorenzini P, Vergori A, Brita AC, et al. What is the impact of post-COVID-19 syndrome on health-related quality of life and associated factors: a cross-sectional analysis. Health Qual Life Outcomes. 2023;21(1):28. https://doi.org/10.1186/s12955-023-02107-z.
25. Aldè M, Barozzi S, Di Berardino F, Zuccotti G, Consonni D, Ambrosetti U, et al. Prevalence of symptoms in 1512 COVID-19 patients: have dizziness and vertigo been underestimated thus far? Intern Emerg Med. 2022;17(5):1343–53. https://doi.org/10.1007/s11739-022-02930-0.
26. Gallus R, Melis A, Rizzo D, Piras A, De Luca LM, Tramaloni P, et al. Audiovestibular symptoms and sequelae in COVID-19 patients. VES. 2021;31(5):381–7. https://doi.org/10.3233/VES-201505.
27. Saniasiaya J, Kulasegarah J. Dizziness and COVID-19. Ear Nose Throat J. 2021;100(1):29–30. https://doi.org/10.1177/0145561320959573.
28. Cohen LH, Cimbolic K, Armeli SR, Hettler TR. Quantitative assessment of thriving. J Soc Issues. 1998;54(2):323–35. https://doi.org/10.1111/j.1540-4560.1998.tb01221.x.