

Post-COVID-19 Syndrome Experiences Among University Students: A Qualitative Cross-Sectional Study

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Abstract

Introduction: Post-COVID-19 syndrome refers to persistent symptoms that continue after an individual has recovered from acute COVID-19 infection. Although these symptoms are often milder than during the acute phase, they can still disrupt daily activities and impair quality of life. University students, as a productive age group with dense academic and social responsibilities, are at risk of COVID-19 exposure and long-term symptoms. This study aimed to explore the experiences of students living with post-COVID-19 syndrome.

Objective: To explore and describe the lived experiences of university students experiencing post-COVID-19 syndrome, particularly focusing on the impact of persistent anosmia and ageusia on appetite, eating patterns, and daily quality of life.

Methods: A descriptive qualitative approach with a cross-sectional design was used. Data were collected through in-depth interviews in June 2025. Three participants were selected using purposive sampling. Interviews lasted 30–45 minutes, were audio-recorded, transcribed verbatim, and analyzed thematically.

Results: The most frequently reported symptoms were anosmia and ageusia. These symptoms led to reduced appetite and altered eating patterns. Participants also reported feelings of frustration, a loss of enjoyment in food, and disruptions in daily social activities.

Conclusion: Post-COVID-19 anosmia and ageusia significantly affect appetite and dietary patterns among students, ultimately influencing their quality of life. These findings highlight the need for psychosocial support and long-term health monitoring for students experiencing persistent symptoms following COVID-19 infection.

Keywords

Post-Acute COVID-19 Syndrome; Anosmia; Ageusia; Students

Introduction

In December 2019, the World Health Organization (WHO) received reports of a cluster of pneumonia cases of unknown origin in Wuhan City, Hubei Province, China.¹ The disease was later identified as an infection caused by the novel coronavirus SARS-CoV-2, or COVID-19, which rapidly spread to several countries, including Thailand, Japan, and South Korea.^{1,2} While the acute phase symptoms of the infection have been extensively studied, the long-term residual symptoms following clinical recovery—commonly referred to as post-COVID-19 syndrome—remain incompletely understood due to the relatively recent emergence of the pandemic.

Post-COVID-19 syndrome is a sequela of COVID-19 infection, characterized by symptoms persisting for more than four weeks after the acute illness.^{3,4} Some studies have reported that symptoms may persist for up to six months after infection,⁵ with others noting symptom persistence as long as 18 months^{6,7} and even up to 24 months.^{8–10} The variability in symptom duration and presentation is likely attributable to differences in sample characteristics, research methodologies, or the inherently heterogeneous nature of the syndrome.

Pathophysiologically, the syndrome is believed to result from tissue damage, dysregulated innate immune responses involving excessive pro-inflammatory cytokine production, and coagulation system activation following SARS-CoV-2 infection.^{4,11} For instance, anosmia may result from damage or inflammation of the olfactory nerve, while prolonged fatigue has been associated with immune and autonomic nervous system dysregulation.

Importantly, post-COVID-19 syndrome is not limited to patients who experienced severe illness or were hospitalized, but can also affect individuals with mild to moderate symptoms, including those in younger age groups. Outpatients who have tested negative after recovery are likewise at risk of developing the syndrome.¹¹ University students—typically aged 18 to 25 years—represent a vulnerable population, given their intensive academic and social activities.¹² Campus environments, peer interaction, and extracurricular engagements contribute to increased exposure risk.

Previous research in Spain reported that long COVID negatively impacts students' academic performance.¹³ Additional reported consequences include sleep disturbances, appetite changes, difficulty concentrating, loss of motivation, social withdrawal, anxiety, and irritability.¹⁴ A study by Selvakumar et al. found a 49% prevalence of post-COVID-19 syndrome among individuals aged 12 to 25 years.¹⁵ In Indonesia, a study by Agus et al. found that 66.5% of COVID-19 survivors experienced residual symptoms post-recovery.¹⁶ Another study conducted in Bojongsari by Sri et al. reported a post-COVID-19 syndrome prevalence of 82% among survivors.¹⁷

Most existing studies have employed quantitative approaches, focusing on numerical data and prevalence rates. However, such approaches are insufficient for capturing the nuanced and subjective experiences of individuals, which often vary widely. A qualitative approach is therefore more appropriate to explore personal experiences, the meaning attributed to symptoms, and their impact on daily life.

This study aims to gain an in-depth understanding of university students' experiences with post-COVID-19 syndrome using a qualitative approach. It explores symptom characteristics, coping strategies, and the overall impact on quality of life. Insights from this study are expected to inform psychosocial interventions and policy initiatives to support students recovering from COVID-19.

Methods

This study employed a descriptive qualitative approach with a cross-sectional design, selected to explore individuals' subjective experiences within a specific period. Data collection was conducted in a hybrid manner, combining online and offline methods. The accessible population comprised active undergraduate physiotherapy students at Udayana University aged 18–24 years. Participants were selected using purposive sampling based on the following inclusion criteria: (1) history of COVID-19 infection, either confirmed by RT-PCR or antigen swab test, or indicated by clinical symptoms; (2) presence of post-COVID-19 syndrome symptoms; (3) currently enrolled as an active student in the Undergraduate Physiotherapy Program at Udayana University; (4) aged 18–24 years at the time of the study; (5) able to understand the Indonesian language and the research questions; and (6) willing to participate in the study. Exclusion criteria included: (1) unwillingness to participate; (2) no persistent symptoms following COVID-19 infection; (3) symptoms resembling post-COVID-19 syndrome but attributable to other diagnoses.

For initial screening, a modified questionnaire was used to identify potential participants. This tool was developed by the researchers based on relevant literature and aimed to assess COVID-19 history and the presence of post-COVID-19 symptoms. Although the questionnaire was not formally validated, it underwent internal pilot testing. Recruitment took place in December 2024 at the Jimbaran Campus of the Physiotherapy Program, Udayana University. Out of 114 respondents who completed the questionnaire, 18 were identified as having a history of COVID-19 infection. However, only four individuals reported persistent symptoms post-recovery and met the inclusion criteria.

In-depth interviews were conducted in June 2025. Interviews were held either offline at the Faculty of Medicine, Sudirman Campus, Udayana University, or online via Zoom, based on participants' preferences. The interviews were led by the principal investigator using a semi-structured interview guide developed based on the study's focus. Key topics included acute COVID-19 symptoms, post-COVID-19 syndrome symptoms, coping strategies, and the impact on daily life. Interviews lasted approximately 45 to 60 minutes on average.

During data collection, one participant was excluded from the analysis due to providing information that did not meet the inclusion criteria. Therefore, the final number of participants analyzed in this study was three (n = 3). Despite the small sample size, the use of in-depth interviews enabled rich and detailed exploration of personal experiences. As such, the data were considered sufficient for the preliminary exploratory aim of this qualitative study.

Interview data were recorded and transcribed using Turboscribe software, then organized and summarized by the researcher using Microsoft Word. Data were analyzed thematically, involving processes of data familiarization, initial coding, theme identification, and interpretation. The main themes identified were: (1) acute COVID-19 symptoms, (2) post-COVID-19 syndrome symptoms, (3) symptom management strategies, and (4) impacts on daily life. Data condensation followed the framework of Miles and Huberman, which involves summarizing and categorizing data according to predetermined themes. The results were presented in thematic matrices to facilitate pattern recognition and conclusion drawing.

To ensure the validity and reliability of the findings, theoretical and source triangulation was employed. Additionally, member checking was applied to selected quotations to verify the accuracy of the interpretations with the participants. Researcher reflexivity and cross-verification of data sources were conducted to minimize potential bias. This study received ethical approval from the Research Ethics Committee of the Faculty of Medicine, Udayana University (approval number: 2939/UN14.2.2.VII.14/LT/2024).

Results

Participant recruitment was conducted by distributing questionnaires to 114 active undergraduate students of the Physiotherapy Program at Udayana University. Among them, 18 individuals reported a history of COVID-19 infection. Of these, four participants indicated persistent symptoms after recovering from COVID-19. However, one participant was excluded due to inconsistencies between their questionnaire responses and interview data. Consequently, three individuals met the final inclusion criteria and were interviewed in depth (n = 3).

Table 1. Demographic and Clinical Characteristics of Study Participants

Characteristic	Participant 1	Participant 2	Participant 3
Initials	T	TD	D
Age	22 years	22 years	18 years
Sex	Female	Male	Female
Acute COVID-19 phase	2021	2021	2022
Smoking status	No	No	No
BMI	Normal	Overweight	Normal
Comorbidities	None	None	Anxiety and/or depression
COVID-19 vaccination	Yes (2 doses)	Yes (2 doses)	Yes (2 doses)

Source: Questionnaire Results, 2024

Table 1 presents the demographic and clinical characteristics of the three participants. The average age was 20.7 years, with two females and one male. Two participants experienced acute COVID-19 symptoms in 2021, and one in 2022. None had a history of smoking. Body Mass Index (BMI) was within the normal range for two participants, while one was classified as overweight. One participant reported comorbid anxiety and/or depression. All participants had received two doses of the COVID-19 vaccine.

Table 2. Summary of Interview Findings by Main Themes

Theme	Participant 1	Participant 2	Participant 3
Acute COVID-19 symptoms	Fever, chills, headache, runny nose, cough, anosmia, hypogeusia	Flu-like symptoms, anosmia	Anosmia, ageusia, sore throat, dry cough
Post-COVID-19 symptoms	Anosmia, hypogeusia	Anosmia	Anosmia, hypogeusia
Symptom management strategy	Sniff therapy (olfactory training with specific scents)	Sniff therapy, steam inhalation	Sniff therapy
Impact on daily life	Decreased appetite	Not mentioned	Stress due to loss of appetite, changes in eating patterns

Source: In-depth Interviews, June 2025

Table 2 summarizes the results of in-depth interviews with the three participants, organized into four major themes. All participants experienced anosmia as a primary post-COVID-19 symptom, and two also reported hypogeusia. The management strategy used by all participants was sniff therapy (olfactory training using specific scents), with one participant also employing steam inhalation.

The primary reported impact on daily life was a reduction in appetite. One participant expressed that this led to stress and a change in eating habits. However, not all participants explicitly described the effects of post-COVID-19 syndrome on their daily life. The label “not mentioned” indicates that the participant did not directly refer to the corresponding theme during the interview.

Illustrative quotations from participants include:

“I felt like food had no taste at all for two months after I recovered.” (Participant 1)

“I was stressed because I had no appetite, even though I used to love eating. My eating habits changed too.” (Participant 3)

Discussion

This study aimed to explore the lived experiences of university students affected by post-COVID-19 syndrome. Findings revealed that anosmia and ageusia were the most persistent symptoms, significantly impacting appetite and overall quality of life—particularly among individuals with underlying psychological vulnerabilities.

Participants reported a range of acute COVID-19 symptoms, including fever, chills, headache, rhinorrhea, flu-like symptoms, cough, anosmia, ageusia, sore throat, and dry cough. These manifestations align with the mild symptoms experienced by approximately 80% of COVID-19 patients.¹⁸

While fever is not always an initial symptom, it plays a crucial role in the acute phase. Fever represents a systemic immune response triggered by SARS-CoV-2 infection, wherein cytokines and other inflammatory mediators signal the hypothalamus to elevate core body temperature.¹⁹ Chills, characterized by rapid muscle contractions to generate heat, often accompany this febrile response, consistent with the findings of Gul et al.²⁰

Headache, reported by roughly half of COVID-19 patients and more frequently among younger individuals, is attributed to several mechanisms: disruption of the trigeminal nerve in the nasal cavity, endothelial involvement and ACE-2 receptor interaction activating the trigeminovascular system, and elevated levels of pro-inflammatory cytokines.^{21,22}

Rhinorrhea and flu-like symptoms are also commonly observed. Although COVID-19 is distinct from other respiratory viruses in its clinical course and severity, SARS-CoV-2 activates innate immune responses in a similar manner.²³ This finding corresponds with reports by Bai and Tao.²⁴

Cough is among the most prevalent symptoms in COVID-19, with an estimated prevalence between 40–80%.²⁵ It is driven by neuroinflammation and neuroimmune interactions involving the vagus nerve.²⁶ SARS-CoV-2 may also directly interact with sensory neurons, potentially explaining the onset of anosmia and ageusia. A qualitative study conducted in Switzerland in 2024 confirmed the damage to olfactory neurons in affected individuals.²⁷

Post-COVID-19 symptoms reported by participants were largely homogeneous, primarily involving anosmia and ageusia. These findings are consistent with previous studies published in 2022 and 2024.^{27,28} Anosmia related to SARS-CoV-2 is caused by disruption of olfactory neural circuits. In some cases, patients recovering from anosmia may experience hyperosmia, although this remains rare.²⁹

Participants adopted self-directed and traditional strategies, primarily olfactory training using specific scents. Although two participants did not seek professional care, this non-pharmacological intervention has demonstrated efficacy in previous studies. Repeated, brief exposure to specific odors may stimulate olfactory receptor neuron regeneration and promote neuroplasticity.^{30,31} Steam inhalation, though supported by limited scientific evidence, may offer ancillary benefits such as denaturation of viral proteins, relief of nasal congestion, enhanced mucus clearance, and improved respiratory function.³²

Persistent symptoms disrupted participants' daily routines, particularly in terms of dietary behavior. Reported consequences included reduced appetite and altered eating patterns due to diminished olfactory and gustatory function. Yom-Tov cited several studies linking anosmia with a notable decline in quality of life.³³

Interpretation of the results was conducted with caution due to the small sample size and potential for subjective bias. Nevertheless, the consistency of participant responses with previous literature strengthens the preliminary validity of these findings. The prominence of anosmia and ageusia may reflect the high affinity of SARS-CoV-2 for ACE-2 receptors in nasal epithelial tissue. Furthermore, the absence of formal medical consultation among participants may indicate limited awareness or access to appropriate healthcare services.

This study has several notable limitations. The small sample size ($n = 3$) and purposive sampling limit the generalizability of findings. Data were collected through retrospective, self-reported interviews, introducing the potential for recall bias and subjective interpretation. The lack of longitudinal data also constrains insight into symptom progression over time. Additionally, the homogeneous participant group—all students from a single academic program—further restricts generalizability. Future studies with larger, more diverse samples and the incorporation of data triangulation techniques are strongly recommended.

Given the limited sample size and scope, these findings cannot be generalized to the broader student population. Nonetheless, the study provides initial insights that may serve as a foundation for larger-scale mixed-methods research.

These findings highlight the need for structured monitoring of post-COVID-19 symptoms within university settings. Given the observed effects on nutrition and mental health, academic institutions should facilitate access to educational resources on self-management techniques (e.g., sniff therapy) and provide counseling services to support comprehensive recovery among students recovering from COVID-19.

Conclusion

This study reveals a wide variation in acute phase symptoms of COVID-19 among respondents. However, even after being declared recovered, some individuals continued to experience residual symptoms such as anosmia and ageusia. These persistent symptoms can be self-managed using methods such as sniff therapy or steam inhalation. Nonetheless, they may still negatively impact survivors' quality of life, leading to reduced appetite, altered dietary patterns, and increased psychological stress due to diminished enjoyment of food.

This study provides an initial overview of the subjective experiences of COVID-19 survivors affected by Post-COVID-19 Syndrome. Given the limited sample size, these findings cannot yet be generalized to a broader population. Future research is

therefore recommended to involve a larger cohort and adopt a quantitative or mixed-method approach to explore the long-term effects and identify more effective management strategies for Post-COVID-19 Syndrome.

Author Contribution

Putri Ayu Wulansari: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Visualization.

Angung Wiwiek Indrayani: Supervision, Methodology, Validation, Writing – review & editing.

Ari Wibawa: Supervision, Project administration, Writing – review & editing.

Ni Luh Putu Gita Karunia Saraswati: Methodology, Validation, Writing – review & editing.

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Conflict of Interest Statement

The author declares no conflict of interest related to this study.

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Ethics Statement

This study was approved by the Research Ethics Committee of the Faculty of Medicine, Udayana University (approval number: 2939/JUN14.2.2.VII.14/LT/2024). All participants provided written informed consent prior to participation. All participants provided informed consent for the use of anonymized quotations and data for research and publication purposes.

References

1. Johnson M. Wuhan 2019 novel coronavirus-2019-nCoV. *Mater Methods*. 2020;10:1.
2. Velavan TP, Meyer CG. The COVID-19 epidemic. *Trop Med Int Health*. 2020;25(3):278-280.
3. Perego E, Callard F, Stras L, Pope R, Alwan NA, Melville-Jóhannesson B, et al. Why the patient-made term “long covid” is needed. *Wellcome Open Res*. 2020;5:224.
4. Nalbandian A, Sehgal K, Gupta A, Madhavan MV, McGroder C, Stevens JS, et al. Post-acute COVID-19 syndrome. *Nat Med*. 2021;27(4):601-615.
5. Groff D, Sun A, Ssentongo AE, Ba DM, Parsons N, Poudel GR, et al. Short-term and long-term rates of postacute sequelae of SARS-CoV-2 infection: a systematic review. *JAMA Netw Open*. 2021;4(10):e2128568.
6. Hastie CE, Lowe DJ, McAuley A, Winter AJ, Mills NL, Black C, et al. Outcomes among confirmed cases and a matched comparison group in the long-COVID in Scotland study. *Nat Commun*. 2022;13:5663.
7. Legler F, Meyer-Arndt L, Mödl L, Kedor C, Freitag H, Stein E, et al. Long-term symptom severity and clinical biomarkers in post-COVID-19/chronic fatigue syndrome: results from a prospective observational cohort. *EClinicalMedicine*. 2023;63:102146.
8. Kim Y, Bae S, Chang HH, Kim SW. Long COVID prevalence and impact on quality of life 2 years after acute COVID-19. *Sci Rep*. 2023;13:14509.
9. Huang L, Li X, Gu X, Zhang H, Ren L, Guo L, et al. Health outcomes in people 2 years after surviving hospitalisation with COVID-19: a longitudinal cohort study. *Lancet Respir Med*. 2022;10(9):863-876.
10. Fernández-de-las-Peñas C, Rodríguez-Jiménez J, Cancela-Cilleruelo I, Guerrero-Peral A, Martín-Guerrero JD, García-Azorín D, et al. Post-COVID-19 symptoms 2 years after SARS-CoV-2 infection among hospitalized vs nonhospitalized patients. *JAMA Netw Open*. 2022;5(11):e2242106.
11. Yong SJ. Long COVID or post-COVID-19 syndrome: putative pathophysiology, risk factors, and treatments. *Infect Dis (Lond)*. 2021;53(10):737-754.
12. Hulukati W, Djibran MR. Analisis tugas perkembangan mahasiswa Fakultas Ilmu Pendidikan Universitas Negeri Gorontalo. *Bikotetik*. 2018;2(1):73-80.
13. Amer F, López T, Gil-Conesa M, Carlos S, Ariño AH, Carmona-Torre F, et al. Association between COVID-19 and outstanding academic performance at a Spanish university. *Arch Public Health*. 2023;81(1):135.
14. Cabacungan AM, Delima KRM, Mortiz JNB, Paguta LJDC, Billones R. Recovery from long COVID: how college students thrive during lockdown. *Tazkiya J Psychol*. 2022;10(2):85-96.
15. Selvakumar J, Havdal LB, Drevvatne M, Brodwall EM, Lund Berven L, Stiansen-Sonerud T, et al. Prevalence and characteristics associated with post-COVID-19 condition among nonhospitalized adolescents and young adults. *JAMA Netw Open*. 2023;6(3):e231087.
16. Susanto AD, Isbaniah F, Pratomo IP, Antariksa B, Samoedro E, Taufik M, et al. Clinical characteristics and quality of life of persistent symptoms of COVID-19 syndrome in Indonesia. *Germes*. 2022;12(2):158-168.
17. Sulistiowati S, Sari I. Gambaran sindroma pasca covid (long covid) pada penyintas COVID-19 di Kelurahan Serua Bojongsari. *J Ilm Kesehat Keris Husada*. 2022;6(2):14-27.
18. Baj J, Karakuła-Juchnowicz H, Teresiński G, Buszewicz G, Ciesielka M, Sitarz R, et al. COVID-19: specific and non-specific clinical manifestations and symptoms: the current state of knowledge. *J Clin Med*. 2020;9(6):1753.
19. Ding FM, Feng Y, Han L, Zhou Y, Ji Y, Hao HJ, et al. Early fever is associated with clinical outcomes in patients with coronavirus disease. *Front Public Health*. 2021;9:730602.
20. Gul MH, Htun ZM, Inayat A. Role of fever and ambient temperature in COVID-19. *Expert Rev Respir Med*. 2021;15(2):171-173.

21. Sampaio Rocha-Filho PA. Headache associated with COVID-19: epidemiology, characteristics, pathophysiology, and management. *Headache*. 2022;62(6):650-656.
22. Togha M, Hashemi SM, Yamani N, Martami F, Salami Z. A review on headaches due to COVID-19 infection. *Front Neurol*. 2022;13:944076.
23. Eccles R, Boivin G, Cowling BJ, Pavia A, Selvarangan R. Treatment of COVID-19 symptoms with over-the-counter medicines used for treatment of common cold and flu. *Clin Infect Pract*. 2023;19:100230.
24. Bai Y, Tao X. Comparison of COVID-19 and influenza characteristics. *Curr Med Issues*. 2021;22(2):87-98.
25. Chen Y, Zhang X, Zeng X, Xu T, Xiao W, Yang X, et al. Prevalence and risk factors for postinfectious cough in discharged patients with coronavirus disease 2019 (COVID-19). *J Thorac Dis*. 2022;14(6):2079-2088.
26. Song WJ, Hui CKM, Hull JH, Birring SS, McGarvey L, Mazzone SB, et al. Confronting COVID-19-associated cough and the post-COVID syndrome: role of viral neurotropism, neuroinflammation, and neuroimmune responses. *Lancet Respir Med*. 2021;9(5):533-544.
27. Moro-López-Menchero P, Martín-Sanz MB, Fernández-de-las-Peñas C, Gómez-Sánchez SM, Gil-Crujera A, Ceballos-García L, et al. Living and coping with olfactory and taste disorders: a qualitative study of people with long-COVID-19. *Healthcare (Basel)*. 2024;12(7):929.
28. Marchiori GM, Branco BHM, Ciquinato DA, Gehren AD, Carvalho GH, Mesti JJ, et al. Anosmia and ageusia in people after COVID-19: an analysis between the type and length of hospital stay. *Rev CEFAC*. 2022;24(2):e24222.
29. Di Stadio A, D'Ascanio L, De Luca P, Roccamatì D, La Mantia I, Brenner MJ. Hyperosmia after COVID-19: hedonic perception or hypersensitivity? *Eur Rev Med Pharmacol Sci*. 2022;26(6):2196-2200.
30. Lechien JR, Vaira LA, Saussez S. Effectiveness of olfactory training in COVID-19 patients with olfactory dysfunction: a prospective study. *Eur Arch Otorhinolaryngol*. 2023;280(3):1255-1263.
31. Treder-Rochna N, Mańkowska A, Kujawa W, Harciarek M. The effectiveness of olfactory training for chronic olfactory disorder following COVID-19: a systematic review. *Front Hum Neurosci*. 2024;18:1141415.
32. Kumar BD, Verma SK, Chaurasia A, Dubey D. Data on steam inhalation in combating COVID-19. *Bioinformation*. 2022;18(9):825-830.
33. Yom-Tov E, Lekkas D, Jacobson NC. Association of COVID-19-induced anosmia and ageusia with depression and suicidal ideation. *J Affect Disord Rep*. 2021;5:100156.