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Relationship between anxiety levels and dyspnea among post-COVID-19 patients

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ABSTRACT

Background: Post-corona-virus disease 2019 **(**Post-COVID-19) syndrome also known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a condition where symptoms arise in COVID-19 patients who have been declared cured according to negative swab results. The level of anxiety can cause it because when anxiety occurs, there is a "fight or flight" response to protect oneself. The sympathetic nervous system works and releases the adrenaline hormone, causing dyspnea. Research objective knowing the relationship between anxiety levels and dyspnea in post-COVID-19 patients in Malang Raya.

Methods: This study used a cross-sectional design. The population of this study consisted of post-COVID-19 patients who live in Malang Raya, with a sample of 56 respondents. This study collected data of the Hamilton rating scale for anxiety (HRS-A) questionnaire to measure the level of anxiety and the Borg Scale to measure the level of dyspnea.

Results: Based on *Spearman's* statistical test, the level of anxiety and dyspnea obtained a value of p= 0.00, r= 0.503 with quite strong results, so there is a relationship between the level of anxiety and dyspnea.

Conclusion: There was a strong relationship between the level of anxiety and dyspnea in post-COVID-19 patients.

Keywords: Anxiety, dyspnea, post-COVID-19, COVID-19.

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INTRODUCTION

Due to the high number of infections over the past two years, the post-corona-virus disease 2019 (post-COVID-19) also known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus has attracted worldwide attention, and this incident has even been classified as a pandemic. This virus is unprecedented in the 21st century. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is also known as COVID-19 or severe acute respiratory syndrome. First appearing in Wuhan, China, in 2019, the main cause of COVID-19 is affecting the respiratory system.[1] Most patients have a mild infection with symptoms such as a mild cough and fever, but a minority of patients also develop severe illness. This condition can cause thrombotic side effects, gastrointestinal problems, heart failure, and arrhythmias. In moderate and severe cases of COVID-19, post-COVID-19 potential is proven and defined as finding persistent symptoms or recurrence of symptoms after the patient is declared cured of COVID-19 through swab or polymerase chain reaction examination.[2]

COVID-19 patients who experience symptoms after being declared cured with a negative swab test, these symptoms are known as post COVID-19. The National Institute for Health and Care Excellence (NICE) in the United Kingdom defines post-COVID-19 syndrome as signs and symptoms that persist after recovery from infection with the COVID-19 virus for more than 12 weeks and cannot be explained by another illness. 10.8% of participants in the Egyptian study who had recovered from COVID-19 had no symptoms at all.[3] Moreover, according to a study conducted in Italy, 87.4% of COVID-19 patients who have improved will continue to experience at least one persistent symptom for up to 60 days.[4] Anxiety (28%), joint pain (31.4%), chest pain (28%), depression (28.6%), and blurred vision (17.1%) were the most common post-COVID-19 effects. In contrast, anxiety indicative of health disorders and mental conditions is the most frequently reported symptom, with post-COVID-19 prevalence rates ranging from 6.5% to 63%. Other common symptoms included fatigue (77.7%), post-exertional malaise (72.2%), and cognitive dysfunction (55.4%). Causes of post-COVID-19 include damage to the immune system (immunology) caused by viruses, nervous system problems, and psychological factors are some of the causes of post-COVID 19.[5]

Anxiety for every individual after COVID-19 who experiences moderate to severe symptoms. Then the brain will instruct the nervous system to produce a fight-or-flight response when experiencing anxiety.[6] This is what can cause some of the symptoms of severe anxiety, including dyspnea. Adrenaline increases when there is anxiety and the nervous system activates in response to danger or

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worry. The production of this hormone will cause an increase in heart rate, which will cause breathing to become fast and shallow to take in more oxygen, blood sugar levels to spike, and senses to sharpen. All these changes, occurring instantly, will give them the energy they need to face danger or avoid it quickly.[7] So researchers are interested in examining how many post-COVID-19 patients experience anxiety with dyspnea.

METHODS

This type of research used analytic observational with a cross-sectional study. This research was conducted in January 2023 online using Google Form, and virtual interviews were conducted via Zoom meeting. The population of this study consisted of post-COVID-19 patients who live in Malang Raya. Sampling in this study used a purposive sampling technique based on predetermined inclusion and exclusion criteria. 56 respondents obtained the total sample. Data collection used the Hamilton Rating Scale for Anxiety (HRS-A) questionnaire to measure the level of anxiety, then followed by measuring the level of dyspnea with the Borg Scale. After that, data processing and analysis was carried out using the Kolmogorov-Smirnov test and the Spearman Rho correlation test using the SPSS 20 computer program.

Table 1. Characteristics of post-Corona-VIrus disease (COVID-19) patients

Characteristics	n	%
Gender		
Male	29	52%
Female	27	48%
Anxiety Level		
No Anxiety	21	37%
Mild Anxiety	12	21%
Moderate Anxiety	21	38%
Severe Anxiety	2	4%
Dyspnea Level		
Not Congested	32	46%
Very Mild	2	4%
Mild	17	24%
Moderate	14	20%
Slight Weight	4	6%
Weight	0	0%
Very Heavy	0	0%
Very Severe (barely able to breathe)	0	0%
Bad	0	0%

Table 2. The relationship between anxiety level and dypsnea in post-Corona-VIrus disease (COVID-19) patients

Variable	Frequency	*P*-value	*r*
Anxiety level	56	0.00	0.503
Dyspnea	56	0.00	0.503

RESULTS

The characteristics of the respondents observed in this study were gender, anxiety level, and dyspnea. Based on Table 1, it is known that most respondents were male as much as 52%, the most dominant level of anxiety experienced moderate anxiety as much as 38%, anddyspnea at most did not experience dyspnea as much as 46%.

Table 2 shows significant results p= 0.00 and r= 0.503, which means there is a relationship between anxiety levels and dyspnea. In addition, the relationship between anxiety levels and dyspnea is quite strong with a value of 0.503.

DISCUSSION

One of the risk factors for post-COVID-19 syndrome is female gender. Differences in immune responses between men and women, psychosocial stress, and additional social tasks that women have—such as working and caring for children—can all be cited as explanations for this.[8] Anxiety can impact the immune system by preventing communication between the immune system and the nervous, endocrine system. His five senses will be able to recognize someone anxious, and this information will be sent to the limbic region of the brain's central nervous system. a group of brain regions, specifically below the cerebral cortex and above the brainstem, that is involved in processing emotion, memory, and behavior.[9] Furthermore, the adrenal glands, which are situated above the kidneys, will receive psychosocial stimulation after passing through the autonomic nervous system. This stimulation will increase the hormone adrenaline production, which will then enter the bloodstream and affect heart palpitations, raised blood pressure, increased stomach acid, and uncontrollable emotions.[10]

The X chromosome and sex hormones in women can block some viral infections (SARS-CoV-2) that are assisted by estrogen receptors and expression of coronavirus receptors (ACE 2), which is high in males.[11] This results in the female immune system being more resistant to infection than the male immune system. B lymphocytes, Th2 lymphocytes, neutrophils, macrophages, and natural killer (NK) cells all have estrogen receptors. Estrogen hormonepromotes B lymphocyte cell proliferation and Th2 lymphocyte cell maturation, boosting the adaptive immune system to manufacture antibodies. Increased androgen hormone levels in men promote cell division, Th1 lymphocyte production, and T-cytotoxic cell activation. In regulating the immune system, Th1 lymphocyte cells and Th2 lymphocyte cells differ in that Th1 cells secrete

IFN, which can stimulate NK cell activation to lyse infected cells. In contrast, Th2 cells secrete IL-4, IL-5, and IL-13 cytokines, stimulating B lymphocyte cell maturation and proliferation. Consequently, Th1 cells remove infections inside cells, and Th2 cells eradicate pathogens outside of cells.[12]

One of the hallmark signs of anxiety is dyspnea. When they have difficulty breathing, they can also become more agitated, which makes them feel bad.[13] Because anxiety triggers the self-protective "fight or flight" response, any level of anxiety can cause dyspnea. The amygdala, a structure deep in the temporal lobe of the cerebral cortex that sits at the brain's core and is involved in identifying fear, begins the fight or flight. The amygdala alerts the hypothalamus when there is danger by sending messages. The hypothalamus will then stimulate the autonomic nervous system.[14] The sympathetic and parasympathetic nervous systems make up the autonomic nervous system. The sympathetic nervous system controls the fight-or-flight response. Meanwhile, the parasympathetic nervous system is in charge of regulating the freezing reaction. Which system applies when there is a hazard will determine the outcome of the reaction that will occur. The body will release adrenaline when the autonomic nervous system is stimulated. This hormone will be released when we are in danger, changing our physiological state. As a result of the body receiving less oxygen, this reaction can cause chest tightness, rapid breathing, and dyspnea, which forces the diaphragm, inner wall muscles, and lungs to work harder to breathe.[15] Sociocultural factors, such as social distancing and physical distancing during the COVID-19 era, can also cause anxiety events in post-COVID-19 patients and exacerbate their mental symptoms.[16] Respiratory problems are common in post-COVID-19 patients. Regardless of the occurrence of acute respiratory symptoms or the severity of theillness, dyspnea had a prevalence of 4.6% five weeks after COVID-19 infection. In addition, it takes a long time for survivors of COVID-19 to regain lung function.[17] This is in accordance with research by Crook et al. (2021), who reported dyspnea in 43.4% of 143 patients 60 days after the start of COVID-19. Several processes can spread to tissues and the bloodstream, including persistent inflammation that produces proinflammatory cytokines and reactive oxygen pecies (ROS). This has resulted in widespread damage, fibrotic changes in the lung tissue, and pulmonary vascular thromboembolism.[18]

Everyone experiences anxiety at different levels, influencing how they respond and handle stressful situations.[19] Anxiety often arises in people in uncomfortable situations.[20] There is much evidence that congenital abnormalities also accompany individuals who die from COVID-19, so the danger of contracting this virus will be even higher if there is excessive anxiety because it can reduce the body's resistance.[21] This should be a concern for all levels of society, especially those with a history of diseases such as disorders of the cardiovascular system and other diseases. Anxiety is a condition that causes a person to feel uncomfortable and is accompanied by fuzzy thoughts about helplessness and uncertainty that comes from an unclear situation.[22]

CONCLUSIONS

This study concluded that there is a relationship between the level of anxiety and dyspnea in post-COVID-19 patients, so anxiety greatly affects dyspnea. For future researchers, it is hoped that they can pay more attention to how severe the anxiety level disorder with dyspnea occurs in post-COVID-19 patients.

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CONFLICT OF INTEREST

This study has no conflicts of interest.

ETHICAL CONSIDERATION

Before starting the study, the authors got the sample's granted informed permission.

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THE AUTHOR'S CONTRIBUTION

DNP developed the study design, collected and analyzed data, and compiled manuscripts. AM, and NAR, interpret the data analyze and compile the manuscript.

REFERENCES

1. Khatib S, Sabobeh T, Habib A, John S, Gomez R, Sivasankar S, et al. Post-COVID-19 fatigue as a major health problem: a cross-sectional study from Missouri, USA. Ir J Med Sci. 2022;699–705.
2. Crook H, Raza S, Nowell J, Young M, Edison P. Long covid - Mechanisms, risk factors, and management. BMJ. 2021;374:1–18.

3. Kyzar EJ, Purpura LJ, Shah J, Cantos A, Nordvig AS, Yin MT. Anxiety, depression, insomnia, and trauma-related symptoms following COVID-19 infection at long-term follow-up. Brain, Behav Immun - Heal. 2021;16(July):100315.
4. Al-Jahdhami I, Al-Naamani K, Al-Mawali A. The post-acute covid-19 syndrome (long covid). Oman Med J. 2021;36(1):1–2.
5. Fumagalli A, Misuraca C, Bianchi A, Borsa N, Limonta S, Maggiolini S, et al. Pulmonary function in patients surviving to covid-19 pneumonia. Infection. 2021;49(1):153–7.
6. Raman B, Bluemke DA, Lüscher TF, Neubauer S. Long COVID: Post-Acute sequelae of covid-19 with a cardiovascular focus. Eur Heart J. 2022;43(11):1157–72.
7. Rakhmawati E, Kusdaryani W, Suhendri. Suryati, T. A phenomenology study: teacher's perception in exploring the merdeka curriculum for early childhood education. J Pendidik Anak . 2022;10(57):352–9.
8. Fernández-De-las-peñas C, Palacios-Ceña D, Gómez-Mayordomo V, Cuadrado ML, Florencio LL. Defining post-covid symptoms (post-acute covid, long covid, persistent post-covid): an integrative classification. Int J Environ Res Public Health. 2021;18(5):1–9.
9. Docherty AB, Harrison EM, Green CA, Hardwick HE, Pius R, Norman L, et al. Features of 20 133 uk patients in hospital with covid-19 using the isaric who clinical characterisation protocol: prospective observational cohort study. BMJ. 2020;369:1–2.
10. Kamal M, Abo Omirah M, Hussein A, Saeed H. Assessment and characterisation of post-covid-19 manifestations. Int J Clin Pract. 2021;75(3):1–5.
11. Li X, Geng M, Peng Y, Meng L, Lu S. Molecular immune pathogenesis and diagnosis of covid-19. J Pharm Anal. 2020;10(2):102–8.
12. Upadhya R K, Shenoy L, Venkateswaran R. Effect of intravenous dexmedetomidine administered as bolus or as bolus-plus-infusion on subarachnoid anesthesia with hyperbaric bupivacaine. J Anaesthesiol Clin Pharmacol. 2018;34(3):46–50.
13. Becking K, Spijker AT, Hoencamp E, Penninx BWJH, Schoevers RA, Boschloo L. Disturbances in hypothalamic-pituitary-adrenal axis and immunological activity differentiating between unipolar and bipolar depressive episodes. PLoS One. 2015;10(7):1–14.
14. Bwire GM. Coronavirus: why men are more vulnerable to covid-19 than women? SN Compr Clin Med. 2020;2(7):874–6.
15. Amelia. D-dimer Perbedaan peningkatan kadar d-dimer pada dewasa dan lansia yang terkonfirmasi covid-19 di rs swasta bintaro. J Res Educ Chem. 2022;4(1):1.
16. Zhao Y, Zhao Z, Wang Y, Zhou Y, Ma Y, Zuo W. Single-cell rna expression profiling of ace, the receptor of sars-cov-2. Am J Respir Crit Care Med. 2020;202(5):756–9.
17. Alkautsar A. Hubungan penyakit komorbid dengan tingkat keparahan pasien covid-19. J Med Hutama. 2021;03(01):1488–94.
18. Kurniawan Y, Susilo MNIB. Bangkit pascainfeksi: dinamika resiliensi pada penyintas covid-19. Philanthr J Psychol. 2021;5(1):131.
19. Goërtz YMJ, Van Herck M, Delbressine JM, Vaes AW, Meys R, Machado FVC, et al. Persistent symptoms 3 months after a sars-cov-2 infection: the post-covid-19 syndrome? ERJ Open Res. 2020;6(4):1–10.
20. Baig AM. Neurological manifestations in COVID-19 caused by sars-cov-2. CNS Neurosci Ther. 2020;26(5):499–501.
21. McCabe M. Fatigue in children with long-term conditions: an evolutionary concept analysis. J Adv Nurs. 2009. 65(8):1735–1745
22. Lam MH, Wing YK, Yu MW et.al. Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up. Arch Intern Med. 2009. 169(22):2142–2147.