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ORIGINAL ARTICLE

THE INFLUENCE OF DEEP BREATHING TECHNIQUES AND NATURE-BASED SOUND THERAPY ON OXYGEN SATURATION AND COVID-19 PATIENTS' ANXIETY

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ABSTRACT

The treatment for COVID-19 patients with hypoxia is typically limited to invasive and non-invasive oxygenation therapy without any complementary therapy to accelerate improvement in the patient's health status. The physiological disorders faced by COVID-19 patients also affect their psychology. Anxiety disorders can interfere with physiological processes, such as respiratory processes, aggravating the patient's oxygenation problems and leading to worsened conditions and death. Therefore, oxygen therapy and pharmacotherapy must be supported by complementary therapies, such as deep breathing. This research aims to investigate the effects of deep breathing relaxation techniques and nature-based sound therapy on the oxygen saturation and anxiety of COVID-19 patients.
This study used a quasi-experimental approach with a pretest-posttest control group design approach with 66 samples selected by non-probability sampling. The sample comprised 33 patients in the control group and 33 in the intervention group. The statistical analysis used the Wilcoxon test.
The results showed that deep breathing relaxation techniques and nature-based sound therapy increase the patient's oxygen saturation values and decrease the anxiety score of COVID-19 patients with a p- value of < 0.001. The control group that received the deep breathing relaxation intervention obtained a p-value of <0.001 for increasing oxygen saturation and reducing anxiety levels. Therefore, deep breathing relaxation interventions and nature sound music therapy positively affect COVID-19 patients' oxygen saturation values and anxiety scores. There are changes in oxygen saturation and anxiety values in the intervention group and control group.

Keywords: *Deep breathing relaxation technique; nature sound music therapy; oxygen saturation*

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INTRODUCTION

On July 20, 2022, Indonesia had 6,143,431 confirmed cases of COVID-19, placing the country in 20th place worldwide for citizens infected with COVID-19. Indonesia was also the second most infected country in Southeast Asia, with 5,957,908 people in recovery and a death rate of 156,875 people. Banten province had 303,871 cases, with 297,730 people in recovery and a death rate of 2,936. Meanwhile, Tangerang City had 76,993 confirmed cases, 75,212 people in recovery, and 593 deaths (WHO 2020) ; bantenprov.go.id, 2022).

COVID-19 became a worldwide pandemic in two months. It caused global health problems and an economic crisis (WHO 2020)(Zhu et al. 2020). The disease is similar to influenza in the way it spreads and in its clinical manifestations (Sarbhai 2020). The clinical manifestations that arise in each individual suffering from COVID-19 vary from having no symptoms at all to mild symptoms, severe symptoms, and causing death (Sarbhai 2020). The SARS-CoV-2 protein enters through the ACE2 receptors in the lungs and kills healthy cells, causing inflammation in the alveoli and disturbing the diffusion process (Paules, Marston, and Fauci 2020). This disruption of the diffusion process leads to a decrease in oxygen saturation.

The decreasing oxygen saturation levels in COVID-19 patients are not always reflected in their clinical condition, i.e., not accompanied by shortness of breath. This condition is called “silent hypoxia” (Dhont, Derom, Van Braeckel, Depuydt, & Lambrecht, 2020); (O’Carroll et al. 2020). Silent hypoxia can endanger patients if they are not treated properly. Therefore, this condition needs to be dealt with immediately as it can lead to serious problems, including death.

Of the COVID-19 cases in Wuhan, 19% of patients had dyspnea, 62% had severe complaints, and 46% received intubation action or ended up dying with previously unaccompanied dyspnea (González-Duarte and Norcliffe-Kaufmann 2020). Therefore, the causes of hypoxia must be managed to improve the patient’s condition. According to the (NIH 2020), the treatment guidelines for hypoxia in COVID-19 patients are limited to invasive and non-invasive oxygenation therapies and prone positioning. Hypoxia caused by pneumonia requires antibiotic treatment, increased fluid intake, airway management, prone positioning, cough exercises, and inward breathing relaxation techniques.

Furthermore, COVID-19 patients experience physical issues and psychological problems. The risk of stigmatization, discrimination, minimal knowledge of the consequences of infection caused by a new virus that is potentially fatal, the need to undergo self-isolation, and feelings of impotence create mental problems in COVID-19 patients (Ransing et al., 2020; (Xiang et al. 2020). An Iranian hospital survey of 106 COVID-19 patients found that 100% of them had severe anxiety (Zandifar, Badrfam, Yazdani, et al. 2020). A variety of adverse effects can occur in COVID-19 patients who experience reduced oxygen saturation and anxiety.

Hypoxemia is an abnormally low blood oxygen level in the body. This condition will stimulate the sympathetic nerve and cause the heart to respond by generating a faster pulse, leading to tachycardia (Hall and Guyton 2020). In a state of severe oxygen deficiency, the center of the brain stem can affect the respiratory process, and if it continues, it may affect the nervous system and cause death (Lauralee Sherwood 2012). Anxiety can also lead to physiological problems such as increased pulse frequency, palpitations, dyspnea, rapid breathing, chest pain, choking sensations, and more (Chand & Marwaha, 2022).

COVID-19 has been linked to social disruption and economic issues. The risk of stigmatization and discrimination can lead to mental disorders in COVID-19 patients (Badrfam & Zandifar, 2020; Ransing et al., 2020) were distributed at Iranian hospitals, and it found that 100% of the sampled 106 COVID-19 patients had severe (0.9%) and very severe (99.1) anxiety (Zandifar, Badrfam, Yazdani, et al. 2020). COVID-19 patients face not only physical problems but also psychological problems. The public health crisis during the COVID-19 pandemic has been widely recognized as a traumatic event that poses a threat to physical problems and psychological stress in infected patients (Wei et al. 2020). Therefore, COVID-19 patients need physiological and psychological treatment.

People with chronic obstructive pulmonary disease have both physiological and psychological problems. The RCT study conducted by (Volpato, Banfi, Nicolini, & Pagnini, 2018) on 38 patients with COPD found that breathing relaxation and audio relaxation techniques can increase oxygen saturation ($p = 0.004$) and reduce anxiety ($p = 0.000$). Additionally, (Yuliana 2018) found that a combination of musical therapy with deep respiration exercises can help lower patients’ anxieties ($p = 0.000$). Thus, deep breathing relaxation techniques and music therapy can improve bodily functions.

This hypothesis aligns with Taneja (2020), which states that a modified version of the Bhramari Pranayama exercise, which includes deep breathing exercises, benefits COVID-19 patients. This technique was previously used in SARS cases in 2004, which share similarities with COVID-19, and provided benefits such as shortened ICU stay, reduced ventilator use, and prolonged life. Breath relaxation techniques benefit the patient’s respiratory system and psychological condition. Fear of the fatal consequences of the disease combined with severe anxiety, mental stress, insomnia, and the physical effects of the disease can create unfavorable conditions for patients, leading to mental health disorders (Xiang et al. 2020; Zandifar, Badrfam, Khonsari, et al. 2020).

Deep breathing relaxation is given to patients by teaching them to breathe (holding inspiration to the maximum) and exhale air slowly. This intervention aims to reduce anxiety, create a sense of calm, reduce pain, and increase ventilation and lung perfusion ((Smeltzer 2013). It does so by increasing the ventilation, causing the alveoli to expand to the maximum so that the surface that adheres to the capillary widens, maximizing the diffusion process (Yuliansyah, Handayani, and Kurniawan 2016).

Patients with COVID-19, besides combating the SARS-CoV-2 virus, also experience significant psychological pressure from the effects of a new potentially fatal virus on their physical condition and the need to self-isolate (Xiang et al., 2020). Additionally, during the pandemic, physical activity has decreased due to social restrictions, resulting in long-term physical and mental symptoms of COVID-19 becoming a serious public health issue (Clemente-Suárez et al., 2022; Zeng et al., 2023).

Among the variables of psychological pressure, several studies consistently report the positive effects of nature in reducing depression and anxiety (Yang et al., 2023) (23-25). Music also affects breathing because it is rhythmic. Deep and slow breathing induces calmness and emotional control and improves metabolism. Fast and shallow breathing leads to shallow and fragmented thinking, impulsive behavior, and a tendency to make mistakes. Music with a slow tempo can help affect slow and deep breathing (Malikul Mulki & Sunarjo, 2020).

Nevertheless, there is still debates on music therapy’s effectiveness, standard implementation procedures, and what type of music to use (Geraldina 2017). The World Federation of Music Therapy states that music therapy is a professional therapy that can be applied in the health sector, education sector, and daily environments whose targets can be individuals or groups. Its aim is to people’s improve quality of life, physical and mental health, social relations, communication, intellectual, and spiritual aspects (Baines and Edwards 2018). Music therapy, as a medical treatment, can be used effectively for the treatment of lung conditions. It is fun, low cost, and can be done virtually anywhere. It is best done using headphones so as not to be disturbed by the surrounding environment. Music therapy involving breathing exercises is associated with reduced bronchial resistance and reduced anxiety levels in asthma patients (Zuskin et al. 2009). Passive music therapy (listening to music) is effective in alleviating dyspnea and anxiety due to its relaxing effect, thereby improving exercise tolerance in patients with COPD (Galal et al. 2021).

Nature-based sound therapy comprises slow and long flows or frequencies capable of giving tranquility (Iman et al. 2019). Music has a relaxing effect on the sympathetic and parasympathetic nerves. Thus, it can improve people's moods and decrease heart rates (Raglio 2015). Based on this background, the researchers are interested in studying whether deep breath relaxation techniques and nature-based sound therapy can improve oxygen saturation and lower anxiety scores in COVID-19 patients (Iman et al. 2019; Raglio 2015; Yuliansyah et al. 2016).

Responses to auditory feedback allow for easier control of expiratory volume compared to conventional expiratory training methods. Long-term breathing exercises involving activities such as singing and playing the keyboard harmonica, when combined with increased airway pressure and strengthened abdominal respiratory function, can enhance the performance of intercostal and diaphragmatic muscles. Previous studies have shown that acoustic rhythm is closely associated with motor rhythm, supporting the phenomenon of respiratory synchronization. Auditory feedback helps adjust expiratory volume with greater precision, making it easier to regulate breathing time and volume compared to conventional threshold-based breathing methods. This significantly contributes to an improvement in FEV1.0% values.

METHOD

Design

This quantitative research employed a quasi-experimental design with a pretest-postest control group approach. Data was collected at two Type C hospitals in Tangerang City that treated COVID-19 from April to June 2021.

Respondents and setting

The following inclusion criteria were used for this study: COVID-19 patients with oxygen saturation values of 88-95% after using basic oxygen therapy (nasal cannula, simple mask, rebreathing mask, and non-rebreathing mask), patients with eupnea, tachypnea, and dyspnea respiratory patterns, patients without hearing impairments, and patients willing to be respondents. The exclusion criteria for the study were patients using ventilators, patients with a history of schizophrenia, and patients taking benzodiazepines. The non-probability sampling technique was employed to obtain 66 respondents (33 in the intervention group and 33 in the control group) at An-Nisa Tangerang Hospital and Husada Tangerang Mitra Hospital. No patients dropped out during the study.

The sample size was determined based on the independent two-sample mean test formula. For a standard alpha value of 5%, the value obtained was 1.64, and for a standard beta value of 90%, the value obtained was 0.84. The standard deviation from a study on providing deep breathing interventions and audio distraction to COPD patients is 8.78. The minimum significant difference in means the researcher considered is 36.38-31.26 = 5.42. The final value obtained is 32.8 samples. To avoid dropouts, 10% of the sample size is added to the calculation, resulting in around 66 samples. The samples were then divided into two groups, with 33 samples for the intervention group and 33 samples for the control group.

The intervention group was taught deep breathing relaxation techniques and nature-based sound therapy. The respondents were taught how to correctly perform deep breathing relaxation techniques by inhaling through the nose for 4 seconds, holding for 2 seconds, and exhaling slowly through the mouth for 8 seconds. They would do this breathing exercise cycle for 1 minute, rest and breathe normally for 2 minutes, and repeat for 15 minutes. Next, they were asked to rest for 1 hour before being given the nature-based sound intervention. The researcher advised the patient to sit in a semi-fowler's position and relax, with one hand on the chest and their stomach. The researcher then explained the same deep-breathing exercises while playing nature sound music for 15 minutes. The difference between the control group and the intervention group was that they did not use nature sound music therapy. The difference between the control group and the intervention group lies in the fact that the control group only received breathing relaxation exercises. Both groups underwent the intervention for seven consecutive days, once per day.

Instrument

This study used a calibrated oxymeter to measure oxygen saturation and the Hospital Anxiety Depression Scale-A (HADS) to measure anxiety. The validity and reliability of HADS have been examined by several studies and translated and distributed in 25 countries. In Indonesia, validity and reliability tests were conducted on the HADS by Widyadharma et al (2015), resulting in an inter-rater agreement for HADS-A of 0.706 and for HADS-D of 0.681. The scale's Cohen's Kappa values also ranged from 0.61 to 0.80, indicating good agreement. Since the instrument has been used globally, it no longer requires permission for its use.

HADS was measured immediately before the intervention on the first day and after the intervention on the seventh day. The intervention group underwent deep breathing relaxation and nature-based sound therapy simultaneously for seven days in a row. Each intervention had a duration of 15 minutes; one cycle consisted of deep breathing for one minute and then breaks of two minutes. This is repeated for up to 15 minutes. In contrast, the control group was taught deep breathing relaxation techniques for seven days in a row with the same duration and cycles as the intervention group. Both groups were trained in the deep breathing relaxation technique before data collection.

Data collection

The data were collected using observation sheets and the HADS questionnaire. Data was collected at the Type C Hospital in Tangerang City, which had a COVID-19 hospital service. Non-probability techniques were employed for sampling, where no randomization was performed. Members of the population had first to be samples because of some things such as: first visited/treated in the hospital or first bite found by the researcher. Samples with strange numbers were marked as intervention groups, while samples with full numbers were labeled as control groups. To avoid bias and preserve privacy during the intervention, curtains are closed.

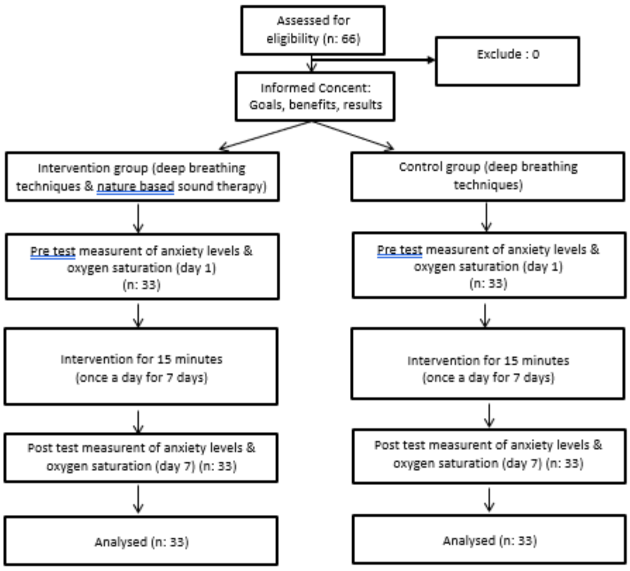

Figure 1. Flow of control and intervention group

Data analysis

The researchers described the collected data using descriptive statistics (mean, median, standard deviations, and frequencies). The Shapiro-Wilk's normality test with a significance of p>0.05 was conducted for the oxygen saturation scores of the intervention group prior to intervention, oxygen saturation scores after intervention, and post-intervention emergency scores. Next, Levine's test was used to determine homogeneity with a significance of p>0.05 for oxygen saturation scores prior to intervention, anxiety scores prior to intervention, gender, history of disease, Hb rates, body mass index (BMI), oxygen therapy, and history of smoking. A bivariate analysis was also conducted using the Wilcoxon test to determine anxiety differences between the control and intervention groups.

Ethical consideration

The ethical principles applied to this research are beneficence, respect for privacy and confidentiality, respect for human dignity, and justice. The researchers collected data after obtaining an ethical examination certificate from the Faculty of Nursing Sciences of the University of Indonesia: KET-87/UN2.F12.D1.2.1/PPM.00.02/2022.

RESULT

The respondents in the intervention group had an average age of 48 years, with the youngest respondent being 18 and the oldest 69. Meanwhile, the respondents in the control group had a median age of 50 years, with a minimum age of 19 and a maximum age of 73. Next, the oxygen saturation of the intervention group prior to intervention was 94%, with the lowest value of 90% and the highest 95%. On the other hand, the control group's oxygen saturation had a median value of 94%, with the lowest score being 89% and the highest at 95%. The intervention group's average anxiety score before the intervention was 11.55, with a 95% CI score of 10.45-12.64. Lastly, the control group's average stress scores averaged 11.36, with a 95% CI of 10.12-12.56. Distribution of Respondents Based on Age, Oxygen Saturation, and Anxiety Scores are presented in Table 1.

Table 1. Distribution of Respondents Based on Age, Oxygen Saturation, and Anxiety Scores (n = 66)

Variable	A (n = 33)			B (n = 33)		
	n	Median	Min-Max	n	Median	Min-Max
Age	33	48	18-69	33	50	19-73
SpO_2 Pre		94	90-95		94	89-95
SpO_2 Post		95	92-98		95	91-99
Anxiety Post		8	5-17		9	5-17
Variable		**Mean**	**CI 95%**		**Mean**	**CI 95%**
Anxiety Pre		11.55	10.45-12.64		11.36	10.12-12.56

Note: A: Intervention Group B: Control Group

Table 2 exhibits that the intervention group comprises 19 men (57.6%) and 14 women (13%). Meanwhile, the control group comprises 17 men (51.5%) and 16 women (48.5%). A total of 27 respondents in the intervention group had a disease history (81.8%), and 6 had no disease history (18.2%). Next, 28 people (84.8%) in the control group had a disease history, and 5 (15.2%) had no disease history. The hemoglobin levels in the intervention group were normal for 17 people (51.5%) and abnormal for 16 people (48.5%). Meanwhile, the hemoglobin levels in the control group were normal in 19 people (57.6%) and abnormal in 14 people (42.4%).

Table 2. Distribution of Respondents' Gender, Disease History, Hb Rate, Body Mass Index (BMI), Oxygen Therapy, and Smoking History (n = 66)

Variable		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
		A (n = 33)		B (n = 33)	
Gender	Male	19	57.6	17	51.5
	Female	14	42.4	16	48.5
Disease History	Yes	27	81.8	28	84.8
	No	6	18.2	5	15.2
Hb Rate	Normal	17	51.5	19	57.6
	Abnormal	16	48.5	14	42.4
BMI	Underweight	1	3	3	9.1
	Normal	9	27.3	9	27.3
	Overweight	13	39.4	9	27.3
	Obesity I	10	30.3	10	30.3
	Obesity II	0	0	2	6.1
Therapy Oxygen	Nasal Canulla	13	39.4	12	36.4
	Nonrebreathing mask	20	60.6	21	63.6
Smoking History	Smoking	13	39.4	9	27.3
	Had Smoke	8	24.2	7	21.2
	Did Smoke	12	36.4	17	51.5

Note: A: Intervention Group B: Control Group

Furthermore, the body mass index in the intervention group showed there was 1 (3%) underweight respondent, 9 people (27.3%) in the normal range, 13 people (39.4%) in the overweight range, and 10 people (30.3%) in the obesity range. The body mass index in the control group showed that 3 (9.1%) respondents were underweight, 9 (27.3%) were in the normal category, 9 (2.3%) were in the overweight category, 10 (30.3%) respondents were in the obese I category, and 2 (3%) were in the obese II category.

Next, 13 people (39.4%) in the intervention group used a nasal cannula, and 20 (60.6%) used nonrebreathing masks for oxygen therapy. In the control group, 12 people (36.4%) used a nasal cannula, and 21 (63.6%) used nonrebreathing masks for oxygen therapy.

Regarding smoking history, 13 people (24.2%) in the intervention group were active smokers (39.4%), eight people used to smoke, and 12 people did not smoke (36.4%). In the control group, nine people were active smokers (27.3%), seven used to smoke (21.2%), and 17 were non-smokers (51.5%).

Table 3 presents the respondents' oxygen saturation values before and after the intervention. The respondents' mean oxygen saturation value before the intervention was 94%. After the intervention, their mean oxygen saturation value was 95%. This difference of one per cent indicates a difference in the respondents' oxygen saturation scores before and after the intervention ($p < 0.05$).

Table 3 also presents data on the respondents' anxiety scores pre-and post-intervention. The median anxiety score pre-intervention was 11 and 8 after the intervention. This decrease in median anxiety score indicates a difference in the respondents' anxiety levels before and after the intervention ($p < 0.05$).

Table 3. Respondents' Oxygen Saturation Values and Anxiety Scores Before and After Intervention (n = 66)

Variable	Median	Median	Z count	p *value*
SpO_2 Group Intervention	Pre 94	Post 95	-4.756	0.001*
Anxiety Group Intervention	11	8	-4.439	0.001*

*Note *: Wilcoxon Test significance p < 0.05*

Table 4 presents data on oxygen saturation values before and after the deep breathing exercises in the control group. The mean oxygen saturation value in the control group before the exercises was 94% and 95% after the exercises. The difference of one per cent indicates a difference in the respondents' oxygen saturation before and after the exercises ($p < 0.05$).

Table 4 also presents data on anxiety scores before and after the deep breathing exercises in the control group. The respondents' average anxiety scores pre-and post-exercise were 11 and 9, respectively. This difference of 2 indicates a difference in the respondents' anxiety scores before and after the exercises ($p < 0.05$).

Table 4. Respondents' Oxygen Saturation Values and Anxiety Scores Before and After Deep Breathing Exercises in the Control Group (n = 66)

Variable	Median	Median	Difference	Z count	p *value*
	Pre	Post			
SpO_2 Group Control	94	95	1	-3.975	0.001*
Anxiety Group Control	11	9	2	-4.444	0.001*

*Note *: Test of Wilcoxon significance p < 0.05*

DISCUSSION

This study obtained an average oxygen saturation value of 94% before the intervention and 95% after, with a p-value of 0.001. These figures prove that the respondents' oxygen saturation increased after the deep breathing relaxation techniques and nature-based music therapy. These results align with the RCT exploration study on the effectiveness of breathing relaxation techniques with audio relaxation in COPD patients conducted by (Volpato et al. 2018). The study involved 38 CPD patients and found that patient's well-being improved as their anxiety levels decreased. The therapy provided also improved the ejaculation function of CPT patients suffering from dyspnea and increased their oxygen saturation ($p = 0.004$). Studies conducted on patients undergoing percutaneous coronary intervention also showed that the respondents' average statistical oxygen saturation value was higher in the group given music therapy than in the group not given the intervention (Chan 2007).

(Sarıtaş & Araç, 2016) also showed positive results in using music therapy in ICU patients. Their study found that their respondents' average oxygen saturation before music therapy was 96.18 ± 3.08, and after music therapy was 97.12 ± 2.42. Thus, the difference was considered significant ($p < 0.05$). The study also proved that breathing relaxation techniques and music therapy have positive physiological effects, such as oxygen saturation. A literature review study also found that 8 out of 18 studies (44%) concluded that music therapy was a significant modality therapy that was statistically effective in improving oxygen saturation values. Meanwhile, ten other studies (55.6%) stated that music therapy did not show statistical effectiveness (Chakravarty, Mehta, and Vir 2022).

Deep breathing techniques are a form of nursing care that involves teaching the patients how to breathe and exhale air slowly. This intervention improves the patients' peace of mind, reduces their anxiety and pain, and improves ventilation and lung perfusion (Smeltzer 2013). Additionally, passive music therapy (i.e., listening to music) effectively relieves dyspnea and anxiety due to its relaxing effects and increases exercise tolerance in patients with COPD (Galal et al. 2021).

Music can influence breathing because breathing is rhythmic. Deep and slow breathing can positively affect emotions, thoughts, and metabolism. Meanwhile, fast and shallow breathing has negative effects, such as undefined thinking, unregulated thinking, impulsive thinking, and a tendency to make mistakes. Slow music can give a person a deep breathing effect and give them peace of mind (Campbell 2001). Slow music can also stimulate nitric oxide (NO) molecules, which helps lower blood pressure (Mulyadi 2010).

Next, this study's results show a slight increase in oxygen saturation values before and after the intervention. Before the intervention, 13 respondents used nasal cannulas, and 20 respondents used non-breathing masks during oxygen therapy. After the deep breathing and nature-based sound therapy, 23 respondents breathed without oxygen therapy and 10 used nasal cannulas. These results indicate that the intervention contributed to clinical improvements. However, the data could not be presented statistically because the researchers only looked at the oxygen saturation values without considering the changes in the type of oxygen used.

The study obtained a median pre-treatment anxiety score of 11 before and eight after the intervention, with a p-value of 0.001. This decrease proves that deep breathing relaxation techniques and nature-based sound therapy decreased the respondents' anxiety. Deep breath relaxation techniques were also taught to patients, resulting in improved quality of life (77.82 ± 6.77) and quality of life. It also contributes to decreased levels of dyspnea and anxiety (Öner, Cengiz, Ayhan, and Güner 2021). Relaxation techniques are breathing techniques that reduce anxiety and psychological stress and benefit physiological parameters, such as oxygen saturation and heart rate (Wangsom, A. & Matchim 2017).

Several studies have shown that deep breathing can reduce stress, anxiety, and negative influences (Toussaint et al. 2021). Cortisol is a glucocorticoid steroid hormone that is released in response to stress. The release of cortisol is associated with depression, anxiety, and other negative emotions. The underlying mechanism for its release may be based on its sensory activity against the adrenal pituitary hypothalamic axis (HPA), which regulates metabolism, immunity, and mental processes, such as memory and emotional judgment. Plasma cortisol levels reflect changes in HPA axis activation with changes in CO2 inhalation, while salivary cortisol levels have been associated with a rapid increase in attention due to anger (Ma et al. 2017).

Respiratory relaxation and audio relaxation interventions given to COPD patients have been proven to decrease anxiety scores by $p = 0.000$ and improved respiratory function (Volpato et al. 2018). (Yuliana 2018) analyzed the impact of music therapy and deep breathing exercises on anxiety and physiological parameters in clients using mechanical ventilation and found that the patients' anxieties reduced ($p = 0.000$). Moreover, (Torres-Sánchez et al. 2018) provided music therapy and imaging techniques to women with fibromyalgia. They found that this intervention had a good effect on pain, but there was no statistically significant differences with the control group. Music therapy involving breathing exercises has also been associated with a decrease in bronchial resistance and reduced anxiety in asthma patients (Zuskin et al. 2009).

This study's results align with the research conducted by (Aghaie et al. 2014), who compared the pain and anxiety levels of coronary artery bypass graft patients given mechanical ventilation with the intervention group given nature-based sound therapy. Their results show that the intervention can significantly reduce the patient's pain and anxiety levels in the group given nature-based sound therapy.

The decrease in anxiety after combining music and mechanical ventilation intervention is caused by music's ability to stimulate the axons of the neurons of the ascendant reticular activating system. The stimulation is then transmitted to the area of the cerebral cortex, allowing the limbic system in the brain to release endorphins that suppress neurotransmitters that improve comfort (Liang et al. 2016).

LIMITATION

Various literature has stated that the anxiety experienced by COVID-19 patients is caused by declining health status, death threats, threats of being excluded, treatments that require isolation, and overwhelming unverified information on the disease. Therefore, nurses have the role of educators to clarify and educate patients on this disease.

CONCLUSIONS AND RECOMMENDATIONS

The data collected shows, that on average, the respondents were in the early age category, mostly male, most have a history of illness, have average oxygen saturation values below normal even with oxygen therapy, and moderate anxiety levels. There were changes in the respondents' oxygen saturation and anxiety values before and after intervention in the intervention and control groups. These results suggest that deep breath relaxation techniques and nature-based sound therapy can be used as non-pharmacological therapies to increase COVID-19 patients' oxygen saturation and lower anxiety scores. These therapies are safe, effective, easy, inexpensive, and can be applied at all ages. Further research can focus on combining breathing relaxation techniques and nature-based sound therapy in patients with oxygen saturation and other congestion problems. The analysis in future studies should also consider the effect of oxygen therapy and use a Randomized Control Trial (RCT) design.

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