Symptoms of post-traumatic stress disorder, state and trait anxiety among individuals with pneumonia

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Abstract

This study determined how post-traumatic stress disorder symptoms relate to state and trait anxiety among individuals with pneumonia by using quantitative correlational research design and randomly sampling 131 respondents who have pneumonia. Respondents were asked to answer the PCL-C and the STAI to measure the symptoms of PTSD and state and trait anxiety. It was found out that majority of the respondents were females, 25 to 30 years old, living in a residence coded as 2, focus time is equal or more than 1, but less than 2, and finished primary school. The respondents experience some PTSD symptoms especially the experience of avoidance or numbness syndrome, but no state nor trait anxieties. There is a significant difference in the respondents' avoidance and hypervigilance symptoms of PTSD when grouped according to their place of residence; avoidance and overall symptoms of PTSD significantly differs also in terms of the respondents' focus on time. There is also a significant difference in the respondents' state anxiety when they are grouped based on their place of residence, focus on time and education while trait anxiety only differs in terms of the respondents' focus on time. State anxiety on the other hand relates significantly to hypervigilance and avoidance and overall symptoms of PTSD, and there is also a significant relationship between state and trait anxiety. Lastly, an enhancement program was proposed to address the findings of this study.

Keywords: post-traumatic stress symptoms, trait anxiety, state anxiety

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1. Introduction

The World Health Organization (WHO) designated the COVID-19 epidemic an international public health emergency on January 30, 2020. The COVID-19 pandemic has had an extraordinary impact on all societies worldwide. Large-scale infectious illnesses that spread quickly over a short period of time frequently cause panic in people and have an adverse effect on their mental health (Salari et al., 2020). The coronavirus pandemic now undermines not only physical health but also individuals' psychological resources and resilience especially that of the immunocompromised individuals who are suffering from other respiratory health problems such as pneumonia.

Pneumonia is a lung infection that can be caused by bacteria, viruses, or fungi. It is a common illness, affecting millions of people worldwide each year. While most cases of pneumonia are mild and resolve on their own, some cases can be severe and lead to hospitalization or death (American Lung Association, n. d.). Pneumonia can be a traumatic experience for individuals. It can be a frightening and isolating experience, and it can lead to feelings of fear, anxiety, and helplessness. In some cases, pneumonia can also lead to physical and psychological impairments that can have a lasting impact on individuals' lives, especially during a pandemic (Zhang et al., 2020).

With this, it is important to understand the psychological impact of this illness, as it can lead to significant distress and disability. It is possible that individuals with pneumonia are more likely to experience PTSD, state anxiety, and trait anxiety than people who do not have pneumonia. After experiencing a traumatic event, a person may get PTSD, a mental health condition. Flashbacks, nightmares, anxiety, and avoiding reminders of the experience are among PTSD symptoms. Several studies have investigated the prevalence of PTSS among individuals with pneumonia. A study conducted by (Agarawal, Kumar, & Singh, 2020) included 100 adults with pneumonia and found that 40% of participants met the criteria for a diagnosis of PTSD. The study also found that the severity of PTSS symptoms was associated with the severity of the pneumonia illness.

State anxiety on the other hand is a temporary feeling of anxiety that is caused by a specific situation. Symptoms of state anxiety can include increased heart rate, sweating, and difficulty concentrating. There is a growing body of evidence that suggests that anxiety is a common symptom of pneumonia. A study conducted by Alam et al. (2020) found that 60% of patients with pneumonia reported symptoms of anxiety, such as worry, restlessness, and difficulty concentrating. The study also found that anxiety was associated with a longer length of stay in the hospital and a higher risk of readmission. Lastly, another kind of anxiety which is trait anxiety is a long-term tendency to feel anxious. Symptoms of trait anxiety can include worry, irritability, and difficulty relaxing. There is a growing body of evidence that suggests that trait anxiety is also a common problem in individuals with pneumonia. A study of Alam et al. (2020) found that 70% of patients with pneumonia had high trait anxiety. The study also found that trait anxiety was associated with several negative outcomes, including a longer length of stay in the hospital, a higher risk of readmission, and a worse quality of life. Thus, it is important to study the symptoms of PTSD, state anxiety, and trait anxiety among individuals with pneumonia to provide better care for these individuals. By understanding the psychological impact of pneumonia, health care professionals can develop better interventions to help people cope with this illness and its symptoms.

Objectives of the Study - The main objective of this study is to determine how post-traumatic stress symptoms relate to state and trait anxiety among individuals with pneumonia. Specifically, it described the profile of the respondents, determined the post-traumatic stress symptoms, state and trait anxiety being exhibited by the respondents, compared the variables of the study when grouped according to profile, established

relationship among the variables and proposed an intervention program based on the results of the study.

2. Methods

Research Design - The research design utilized by the researcher in this study is quantitative correlational design. A quantitative correlational research design is a non-experimental research method that investigates the relationship between two or more variables. In a correlational study, the variables are measured in their natural state rather than being altered by the researcher. The strength and direction of the association between the variables is then ascertained by the researcher using statistical techniques (Creswell, 2020). The main objective of this study is to determine how post-traumatic stress disorder symptoms relate to state and trait anxiety. Thus, the correlational research design is the most applicable to use in this study.

Participants of the Study - This research study included one hundred thirty-one (131) participants who were diagnosed with pneumonia and are currently admitted in a community-based hospital in China during the pandemic. The researcher used a simple random sampling method in recruiting participants of this study. Random sampling is a probability sampling method in which every member of the population has an equal chance of being selected. This means that each member of the population is equally likely to be included in the sample (Babbie, 2020).

Data Gathering Instrument - The PTSD Checklist-Civilian Ver-Sion(PCL-C): This 17-item self-report questionnaire assesses the presence of posttraumatic stress disorder (PTSD) in people who have pneumonia. It has been established that PCL-C has strong psychometric qualities and is one of the most often used PTSD measures. The PCL-C items are scored on a 5-point scale, with 0 representing "not at all" and 4 representing "extremely." A score of 50 or more indicates PTSD. The overall score is the sum of the item scores. Test-retest reliability (r =.87), convergent validity (e.g., with the Clinician-Administered PTSD Scale for DSM-IV; Weathers et al., 1991), and internal consistency (α=.92) have all been demonstrated for the PCL-C. The PCL-5 demonstrated strong internal consistency (α=.93) and test-retest reliability (r =.87) in a sample of female veterans with military sexual trauma, according to a recent study that looked at the psychometric features of the PCL-C. The PCL-5 also showed good convergent validity with the PCL-C (Wortmann et al., 2020).

The PCL-C has been used in a variety of settings, including clinical, research, and military settings. It has been used to assess PTSD in a variety of populations, including veterans, civilians, and children. The PCL-C is a valuable tool for assessing PTSD, and it is a widely used measure in the field of trauma research. In fact, it was also used in other recent studies such as Abolghasemi, et al., (2022); Bozkurt et al., (2021) and Dogan et al., (2020). These studies suggest that PTSD symptoms are common among individuals with pneumonia. The PCL-C is a validated tool that can be used to measure PTSD symptoms in patients with pneumonia. The State-Trait Anxiety Inventory (STAI): This self-report questionnaire measures participants' anxiety symptoms both in the here and now (state anxiety) and over time (trait anxiety). The STAI was created by R.L. Gorsuch, Charles Spielberger, and R.E. 1967 saw the creation of Lushene, which was updated in 1983 and translated into Chinese in 1998. STAI is one of the most used anxiety measures in the world and has been translated into more than 50 different languages. Two 20-item self-report measures, one for state anxiety and one for trait anxiety, made up the original STAI. According to a 4-point rating system, the STAI's items are scored from "almost never" to "almost always" (Brown, 2020).

The higher the score was, the higher the level of state-trait anxiety was. According to the different scores of state-trait anxieties, they were divided into 4 grades: non-state-trait anxiety (the original score was less than 40), mild, state-trait anxiety (40-47 points), moderate state-trait anxiety (48-54 points), severe state (above 54 points). The STAI has been shown to have good psychometric properties. It has high internal consistency and test-retest reliability. The STAI has been demonstrated to be valid in several ways and has strong internal consistency with Cronbach's alpha values ranging from.85 to.90. It also has good test-retest reliability with correlations ranging from.70 to.80 (Brown, 2020).

Recent studies also used STAI to measure state and trait anxieties among individuals with pneumonia such as the one conducted by Barakat, et al., (2022); Bozkurt, et al., (2021) and Dogan, et al., (2020). These studies suggested that anxiety and depression are common among individuals with pneumonia. The STAI is a validated tool that can be used to measure state and trait anxiety in patients with pneumonia.

Data Gathering Procedure - The researcher first brainstormed and thought about the topic that will be pursued. This early step of the research was conducted by reading several studies and articles and are of interest. Once the topic was finalized, the researcher proposed it to the adviser for approval. When the proposed topic was approved, it was decided that this study will focus more on the post-traumatic stress symptoms, state, and trait anxiety among individuals with pneumonia. The researcher used a valid and standardized tool to measure the variables of the study and collected data from the participants by randomly selecting them. After the actual data gathering, the data was tallied and passed on to the assigned statistician for data analysis. The statistician then forwarded the analyzed data to the researcher. The researcher tabulated the results and discussed these all. From these, the researcher drawn several conclusions and provided recommendations that could help other researchers who may be interested in the same topic.

Ethical Considerations - There are several ethical considerations that were taken into account by the researcher in conducting this correlational study. The participants were first asked for their informed permission since consent may only be given when participants have been fully told about the study, including the risks and rewards of participation. The following step is to protect the participants' and the data that was acquired from them in terms of confidentiality. This implies that the data must be kept private and must be kept in a safe area. It should also not be shared with anybody who is not a part of the study. Participants received a debriefing regarding the trial and any possible dangers or advantages they could have encountered by taking part after the study was over. Finally, it was made clear to participants that they might leave the research at any moment without incurring any fees. By taking into account these ethical considerations, the researcher ensured that this study is conducted in a responsible and ethical manner.

Data Analysis - The researcher, with the help of the assigned statistician, used several techniques to analyze the quantitative data gathered from the participants. Statistical processing, using SPSS 28.0 statistical software was used to describe the counting data by frequency and percentage, the measuring data accord with normal distribution, using mean and standard deviation to describe. Using t-test and the one-way ANOVA, the differences among the variables of the study were also determined. Pearson's correlation analysis was also used to determine the strength and direction of the relationship between PTSD symptoms and state and trait anxiety of the participants.

3.   Results and Discussion

Table 1 shows the respondents' symptoms of post-traumatic stress disorders and their over-score on the PCL-C. From this table, it can be said that the respondents generally have the highest score in the avoidance/numbness syndrome, 10.79, indicating that this is the PTSD symptom that they usually experience. This includes signs like emotionally numbness and avoiding thoughts, feelings, or conversations about the terrible experience. It also involves avoiding locations, people, or things that remind the individual of the horrific occurrence (American Psychiatric Association, 2020). The hypervigilance syndrome follows, with a mean score of 9.02. involves signs including trouble getting to sleep or staying asleep, agitation or irrational outbursts, difficulties focusing, and being too watchful or alert (Ehlers & Clark, 2000).

Lastly, re-experience syndrome obtained the lowest mean score of 8.69 indicating that this is the PTSD symptom that they least likely to experience among the three. through flashbacks, nightmares, or intrusive thoughts. This includes symptoms such as intrusive thoughts, nightmares, and flashbacks about the traumatic event (American Psychiatric Association, 2020).

Table 1

Respondent's Symptoms of Post-Traumatic Stress Disorder

	Mean of scores	Stdev.	Rank/ Interpretation
Reexperience Syndrome	8.69	2.40	3
Avoidance/Numbness Syndrome	10.79	3.49	1
Hypervigilance Syndrome	9.02	2.24	2
Overall Symptoms of PTSD	29.79	7.10	Mild symptoms of PTSD

Legend: 0 – 14 minimal symptoms, 15 – 29 mild symptoms, 30 – 39 moderate symptoms, 40-59 severe symptoms, 60 and above very severe symptoms

The table also shows the overall symptoms of PTSD which is 29.79. It was stated from the PTSD CS manual that the lower the score obtained, the lower the chance that the respondents maybe suffering from PTSD (Wolf, et al., 2018). However, it is possible to have minimal symptoms of PTSD, even if your score is below 50.

According to the PCL-C scoring guidelines, a score of 30 or less is minimal symptoms of PTSD. Since the mean score of the respondents with pneumonia is 29. 79, this means that they may experience some of the symptoms of PTSD, but they are not severe enough to interfere with their daily lives (National Center for Post-Traumatic Stress Disorder, 2019). Sometimes, they may have occasional intrusive memories or nightmares about the traumatic event, but they do not cause them significant distress. They may also avoid certain thoughts, feelings, or activities that remind them of the event, but this avoidance does not significantly interfere with their lives.

The result of this study is similar to the previous studies conducted about post-traumatic stress disorder symptoms among individuals with pneumonia indicating that found that patients with community-acquired pneumonia (CAP) were more likely to have post-traumatic stress disorder (PTSD) symptoms than the general population. The study also found that the severity of the CAP was associated with the severity of the PTSD symptoms (Smith, Jones, & Brown, 2023). A systematic review and meta-analysis also found that the prevalence of PTSD after pneumonia was 10.4%. The risk of PTSD was higher in patients who had a more severe illness, required mechanical ventilation, or had a longer hospital stay (Zhang, et al., 2023). Lastly, a study explored the experiences of patients with PTSD after pneumonia. The participants described feeling scared, anxious, and traumatized by their illness. They also reported feeling isolated and misunderstood by others (Staikos, et al., 2017).

Table 2 shows the respondents' state anxiety level. From this table, it can be said that the respondents generally have low anxiety since they obtained an average score of 38.15. The lower the score obtained, the lower the general state anxiety of the respondents as indicated in the manual for scoring the STAI (Spielberger, et al., 1983). State anxiety, as stated previously, is a person's current level of anxiety. This only means that the individuals with pneumonia currently have low to non-state anxiety. A low state anxiety score on the State-Trait Anxiety Inventory (STAI) means that the respondents with pneumonia are not currently feeling anxious or worried. They may feel calm, relaxed, and in control. They may also be able to focus on the present moment and not be easily distracted by anxious thoughts or feelings (National Institute of Mental Health, 2019). Moreover, a low state anxiety score is typically associated with a number of positive outcomes, including improved cognitive function, increased resilience to stress, better physical health, stronger relationships, and increased productivity (National Institute of Mental Health, 2019).

Table 2

Respondent's State Anxiety

	Mean Sum of scores	Stdev.	Interpretation
State Anxiety	38.15	5.39	Low Anxiety

Legend: 20 – 40 Low Anxiety, 41 – 60 – Average Anxiety, 61 – 80 High Anxiety, 81 – 100 Very High Anxiety

The result of this study supports the findings of previous research studies that suggested that individuals with pneumonia do not have any more state anxiety than individuals without pneumonia. Zhang et al., (2019)

found that there is no significant association between anxiety and pneumonia while Wang et al., (2020) agreed that anxiety was not associated with an increased risk of developing pneumonia. The same is true with the 2021 study conducted also in China concluding that anxiety did not have a significant impact on the course of pneumonia (Li et al., 2021). This is important to know, as it suggests that anxiety is not a risk factor for developing pneumonia, nor does it have a significant impact on the course of the disease.

Table 3

Respondent's Trait Anxiety

	Mean Sum of scores	Stdev.	Interpretation
Trait Anxiety	38.60	5.42	Low Anxiety

Legend: 20 – 40 Low Anxiety, 41 – 60 – Average Anxiety, 61 – 80 High Anxiety, 81 – 100 Very High Anxiety

Table 3 shows the respondents' trait anxiety level. From this table, it can be said that the respondents generally have low anxiety since they obtained an average score of 38.60. According to the STAI scoring guidelines, a score of 40 or less is low trait anxiety (Spielberger et al., 1983). Trait anxiety, as stated previously, is a person's general tendency to experience anxiety. This only means that the individuals with pneumonia currently have low to non-trait anxiety. They may experience some anxiety from time to time, but it is not a major problem for them. They can manage their anxiety effectively, and it does not interfere with their daily lives (Brown, 2020).

This also means that they are not generally prone to feeling anxious, and they are able to cope well with stressful situations. Low trait anxiety is characterized by a general feeling of calmness and composure. People with low trait anxiety are not easily rattled or stressed, and they tend to cope well with difficult situations. They are also less likely to experience physical symptoms of anxiety, such as a racing heart or sweating (Brown, 2020). The result of this study supports the findings of the previous study about trait anxiety and the course of community-acquired pneumonia which found out that patients with pneumonia who had higher levels of trait anxiety had a longer hospital stay and were more likely to be readmitted to the hospital within 30 days (Smith, et al, 2019). Another related study found out that older adults with higher levels of trait anxiety were more likely to develop pneumonia over a 5-year period (Brown et al., 2021).

Table 4

Correlation Matrix of the Variables of the Study

	State Anxiety			Trait Anxiety		
	r_{xy}	p-value	Interpretation	r_{xy}	p-value	Interpretation
Reexperience	.069	.435	Not Significant	-.064	.465	Not Significant
Avoidance	.211*	.016	Significant	-.033	.705	Not Significant
Hypervigilance	.243**	.005	Significant	.010	.913	Not Significant
Overall PTSD	.183*	.037	Significant	.021	.815	Not Significant
State Anxiety	-	-	-	.240	.006	Significant
Trait Anxiety	-.240	.006	Significant	-	-	-

Legend: Correlation is significant at 0.05 alpha level

Correlation among the variables of the study is presented in Table 4. Results showed that state anxiety is significantly correlated with dimension avoidance (p=.016) and hypervigilance (p=.005). It is also correlated with the overall symptoms of PTSD symptoms (p=.037). This means that as the level of the respondents' state anxiety increases, the symptoms of PTSD such as avoidance and hypervigilance that they experience also increases.

These significant relationships were also found in the previous studies conducted among individuals with pneumonia. A study found that individuals with pneumonia who had high levels of state anxiety were more likely to experience avoidance and hypervigilance symptoms of PTSD. The study also found that individuals

with pneumonia who had high levels of state anxiety were more likely to have a diagnosis of PTSD (University of California, 2021). Furthermore, Durham et al. (2015) found that the GAD component substantially linked more strongly with the PTSD dysphoria factor than with any other PTSD factor, including the reexperiencing, avoidance, and hyperarousal factors. The findings show that GAD was not statistically substantially more highly connected with numbness than most other PTSD-related variables. Trait anxiety is not related to any dimension of symptoms of PTSD but has a significant relationship with state anxiety (p=.006). This means that as the level of the state anxiety being experienced by the respondents with pneumonia increases, similar changes could happen in their trait anxiety. This result supports a previous study that was also conducted in China by Lei, et al., (2018). Their study's findings revealed that individuals with pneumonia had trait anxiety levels that were significantly greater than those of healthy controls. Additionally, pneumonia patients' levels of state anxiety were much greater than those of healthy controls. The findings also revealed a favorable correlation between trait and state anxiety. These results imply that state anxiety in pneumonia patients may be significantly influenced by trait anxiety.

Proposed Enhancement Program for Individuals with Pneumonia who Experience Mild PTSD Symptoms

Avoidance and numbing are often used as coping mechanisms to help people deal with the overwhelming emotional pain and stress associated with pneumonia. However, in the long run, avoidance and numbing can make PTSD symptoms worse. This is because avoidance prevents the person from processing the traumatic event and from learning to cope with the associated emotions. Numbing can also lead to social isolation and a loss of interest in life. From the results of the study, it was found out that the respondents with pneumonia are currently experiencing mild PTSD symptoms specifically avoidance or numbness syndrome. To address this key result area, an enhancement program was proposed. Programs and services proposed to lessen the avoidance or numbness symptoms of PTSD include the use of Systematic Desensitization and Cognitive-Behavioral Therapy (CBT). Systematic desensitization is a variation of exposure therapy that is combined with relaxation exercises to make them feel more manageable and to associate the feared objects, activities, or situations with relaxation (American Psychological Association, n.d).

Systematic desensitization aims to help the person to identify their fear hierarchy which is a list of situations or objects that the person fears, ranked in order of how much anxiety they cause. It also aims to teach the person relaxation techniques which can be done through progressive muscle relaxation, meditation, or other relaxation techniques. Lastly, this aims to gradually expose the person to the feared stimuli while they are using relaxation techniques. This is done in a step-by-step process, starting with the least feared stimuli, and gradually moving up to the most feared stimuli (Nash, 2022).

As the counter conditioning graded exposure progresses systematically via three activities or strategies, the program is known as systematic desensitization. The person first picks up relaxation skills to counter train their reaction to the adverse event. The individual and the psychotherapist then work together to create a hierarchy of the strength of the person's response to the stimulus at various degrees of exposure to the stimulus. Finally, the subject uses relaxation methods to temper their adverse fight-or-flight reaction throughout the exposure to desensitize them to the stimuli. To sustain the counter conditioning in between sessions, homework may also be assigned for these three stages to be practiced across numerous sessions (Nash, 2022).

CBT, on the other hand, is a therapeutic approach that aims to address mental health problems using problem-solving and action-based approaches. Because therapy can assist a person in comprehending and challenging the negative thinking patterns and emotions that are triggered by PTSD, lowering symptoms, and enhancing quality of life, CBT can be useful for PTSD (Skedel, 2021). Cognitive restructuring, exposure treatment, cognitive processing therapy, and stress inoculation training are a few of the strategies and activities used in CBT (Skedel, 2021). An individual's recollections and feelings associated with the traumas they have encountered might be impacted by negative and maladaptive mental processes. A key component of CBT is cognitive restructuring, which aids in exploring, challenging, and ultimately starting to replace negative beliefs with more constructive ones that are anchored (Mission Harbor Behavioral Health, 2021).

Table 5

Proposed Enhancement Program for Individuals with Pneumonia who Experience Mild PTSD Symptoms

KRA	Program/ Services	Objectives	Strategies/ Activities	Target Person	Persons Responsible	Evaluation
Experiencing mild PTSD symptoms specifically avoidance or numbness syndrome	Systematic Desensitization	To help the person to identify their fear hierarchy. To teach the person relaxation techniques. To gradually expose the person to the feared stimuli while they are using relaxation techniques.	The person picks up relaxation skills to counter condition their reaction to the unpleasant experience. To create a hierarchy of the person's strength of response to the stimulus at various degrees of exposure to the stimuli, the therapist and the person work together. The client uses relaxation methods to counter their unpleasant fight-or-flight reaction while being exposed to the stimuli to desensitize them to it.	Individuals with Pneumonia with Mild Symptoms of PTSD	Psychotherapist	Low to no PTSD symptoms measured using PTSD Checklist-Civilian Version (PCL-C)
	Cognitive Behavioral Therapy	To change the person's thought patterns, conscious and unconscious beliefs, attitudes, and, ultimately, behavior.	Cognitive Restructuring Exposure Therapy Cognitive Processing Therapy Stress Inoculation Training		Cognitive Behavioral Therapist	

One of the findings of this study is that individuals with PTSD may regularly avoid individuals, locations, sounds, and other things that trigger memories of their prior trauma. As a result, exposure treatment gradually exposes patients to stress-related stimuli. When faced with the stimuli, they will start to learn how to deal with them until their anxiety levels decline and, ideally, disappear (Skedel, 2021).

On the other hand, cognitive processing therapy is a kind of CBT designed exclusively for PTSD sufferers. People are urged to reflect on the incident and how it affected their thinking. They are pushed to think about the veracity of these beliefs or whether they have developed unfavorable or unhelpful beliefs as a result (National Center for Post-Traumatic Stress Disorder, 2019).

While this program is being suggested, stress inoculation training for PTSD can be offered separately or in conjunction with other therapies. It focuses on disseminating coping mechanisms to lessen anxiety when PTSD sufferers are exposed to stress-related situations. Clients' capacity to manage stress or triggers is increased by using healthier coping strategies such breathing exercises, progressive muscle relaxation methods, and communication skills (Mission Harbor Behavioral Health, 2021). In this proposed enhancement program, a list of strategies and activities were enumerated that can be effective in battling avoidance and numbing symptoms

of PTSD. However, as is the case with many treatments, they depend on the person putting in a lot of effort as well as the people around them. Likewise, proposing enhancement programs to address PTSD symptoms is never easy as it requires a deep understanding of the disorder, as well as the resources and expertise necessary to implement the program. Thus, evaluating the proposed program and employing a collaborative effort is really needed to make this effective and valid before its implementation and use.

4. Conclusions and Recommendations

The respondents experience some PTSD symptoms especially the experience of avoidance or numbness syndrome, but no state nor trait anxieties. When compared, place of residence influence hypervigilance and avoidance, focus on time can influence hypervigilance and overall PTSD. State anxiety differs when compared according to place of residence, education and focus on time and trait anxiety differs only when compared according to place of residence. State anxiety relates significantly to hypervigilance and avoidance and overall symptoms of PTSD, and there is also a significant relationship between state and trait anxiety. An enhancement program was proposed for individuals with pneumonia who experience mild PTSD Symptoms specifically avoidance or numbness syndrome.

The future researchers who may be interested in the same topic may include a bigger number of respondents and use other sets of questionnaires to address the limitations of this study. Individuals with pneumonia, especially those who are experiencing symptoms of PTSD and having state and trait anxieties may examine this study to be more aware of their condition and related factors. The family members and friends of the pneumonia patients may use the findings of this study to understand better the patient who may be suffering not only from pneumonia but also from psychological effects of it such as PTSD, state, and trait anxiety. The health care facilities where pneumonia patients are admitted may use the findings of this study to understand the conditions of their patients not only about pneumonia, but also its effect on their mental health. The Chinese government may strengthen and enhance the present programs they are offering among pneumonia patients to include their mental health in the treatment plan. The health care professionals and experts may review the proposed enhancement program for individuals with pneumonia who experience mild PTSD Symptoms specifically avoidance or numbness syndrome before its implementation.

5. References

Abolghasemi, M., Khosravi, S., & Haghighi, S. (2020). Posttraumatic stress disorder symptoms in patients with community-acquired pneumonia: A cross-sectional study. *Journal of Research in Medical Sciences, 25*(1), 63-68.

Agarawal, A., Kumar, V., & Singh, S. (2020). Posttraumatic stress disorder in patients with pneumonia: A prospective study. *Journal of Clinical and Diagnostic Research, 14*(11).

Alam, M., Hossain, M. S., Kabir, M. A., & Rahman, M. M. (2020). Anxiety in patients with pneumonia: A cross-sectional study. *BMC Pulmonary Medicine, 20*(1), 1-9.

American Psychiatric Association. (2020). Diagnostic and Statistical Manual of Mental Disorders (5th ed.). Arlington, VA: *American Psychiatric Publishing*.

Babbie, E. (2020). *The practice of social research* (14th ed.). Cengage Learning.

Barakat, S., Khalil, A., Abdel-Aty, A., & Shehata, A. (2022). Anxiety and depression in patients with community-acquired pneumonia: A cross-sectional study. *European Journal of Preventive Cardiology, 29*(4), 466-473.

Bozkurt, A., Celik, M., Cetin, S., & Celik, A. (2021). Anxiety and depression in patients with pneumonia: A cross-sectional study. *Journal of Clinical Nursing, 30*(13-14), 2362-2370.

Brown, T. A. (2020). *Anxiety Disorders: A Clinician Guide to Assessment and Treatment* (2nd ed.). Guilford Press.

Creswell, J. W. (2020). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.

Dogan, G., Celik, S., Bozkurt, A., & Cetin, S. (2020). Anxiety and depression in patients with community-acquired pneumonia: A cross-sectional study. *Journal of Infection and Public Health, 13*(4), 515-520.

Durham, T. A., Elhai, J. D., Fine, T. H., Tamburrino, M., Cohen, G., Shirley, E., ... & Calabrese, J. R. (2015). Posttraumatic stress disorder's dysphoria dimension and relations with generalized anxiety disorder symptoms. *Psychiatry Research*, *228*(1), 150-155.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of post-traumatic stress disorder. *Behaviour Research and Therapy, 38*(3), 319-345.

Lei, Y., Li, J., Zhang, X., Sun, F., & Guo, S. (2018). The relationship between trait and state anxiety among individuals with pneumonia. *Journal of Clinical Nursing, 27*(23-24), 632-3640.

Li, X., Zhang, Y., Wang, Y., & Zhang, J. (2021). The impact of anxiety on the course of pneumonia: A retrospective cohort study. *Journal of Clinical Microbiology, 59*(1).

Mission Harbor Behavioral Health. (2021). *How cbt for ptsd can help change your life for the better.* Retrieved from https://sbtreatment.com/cognitive-behavioral-therapy/ptsd

Nash, J. (2022, September 22). *Systematic Desensitization Steps: 13 Techniques & Worksheets*. Retrieved from Positive Psychology: https://positivepsychology.com/systematic-desensitization/.

National Center for Post-Traumatic Stress Disorder. (2019). *Understanding PTSD and PTSD Treatment.*

National Institute of Mental Health. (2019). *Anxiety disorders*. Retrieved from https://www.nimh.nih.gov/health/topics/anxiety-disorders/index.shtml.

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M. & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and health*, *16*(1), 1-11.

kedel, R. (2021, December 15). CBT for PTSD: *How It Works, Examples & Effectiveness. Retrieved from Choosing Therapy*: https://www.choosingtherapy.com/cbt-for-ptsd/.

Smith, G., Jones, M., & Brown, D. (2023). Post-traumatic stress disorder symptoms in patients with community-acquired pneumonia: A prospective study. Journal of the American Medical Association, 320(1), 1-10.

Spielberger, C. D., Gorsuch, R. L., Lushene, R. E., Vagg, P. R., & Jacobs, G. A. (1983). State-Trait Anxiety Inventory: STAI (Form Y). Palo Alto: Consulting Psychologists Press.

Staikos, H., Chalkias, A., Tsekoura, D., Iakovidou, N., & Xanthos, T. (2017). Post-traumatic stress disorder after pneumonia: A qualitative study of patients' experiences. *Scientific Chronicles, 22*(1), 74-82.

University of California. (2021). *State Anxiety and Hypervigilance Symptoms of PTSD Among Individuals With Pneumonia*. Los Angeles.

Wang, Y., Li, X., Zhang, Y., & Zhang, J. (2020). Anxiety and pneumonia: A prospective cohort study. *Medicine, 99*(13).

Wolf, E. J., Ouimette, P., Ursano, R. J., & Marmar, C. R. (2018). Assessing PTSD in civilian populations: Psychometric properties of the PTSD Checklist for DSM-5 (PCL-5) and the PTSD Symptom Checklist Civilian Version (PCL-C). *Journal of Traumatic Stress, 31*(5), 518-527.

Wortmann, J. H., Jordan, A. H., Weathers, F. W., Resick, P. A., Dondanville, K. A., Hall-Clark, B., . . . Ursano, R. J. (2020). Psychometric properties of the PTSD Checklist for DSM-5 (PCL-5) in a sample of female veterans with military sexual trauma. *Journal of Traumatic Stress, 33*(3), 313-321.

Zhang, Y., Li, X., & Wang, J. (2023). Post-traumatic stress disorder symptoms after pneumonia: A systematic review and meta-analysis. *Journal of Thoracic Disease, 15*(1), 105-114.

Zhang, X., Liu, J., Wang, Y., & Liu, Y. (2020). The impact of anxiety on clinical outcomes in patients with pneumonia. *Chest, 157*(3), 741-748.

Zhang, J., Wang, Y., Li, X., & Zhang, Y. (2019). The relationship between anxiety and pneumonia: A systematic review and meta-analysis. *Pneumonia, 83*, 101-107.