# Psychological symptoms, the role of appraisals, and experienced stress during the COVID-19 pandemic in a high incidence area in southern Thuringia, Germany

**Maeumbaed, Nelly**

**UNIVERSITY OF SPLIT**

**SCHOOL OF MEDICINE**

**Nelly Helene Maeumbaed**

# PSYCHOLOGICAL SYMPTOMS, THE ROLE OF APPRAISALS, AND EXPERIENCED STRESS DURING THE COVID-19 PANDEMIC IN A HIGH-INCIDENCE AREA IN SOUTHERN THURINGIA, GERMANY

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**Mentor:**

**Johannes Brachmann, MD, PhD**

**Ulrich Kastner, MD**

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# ABBREVIATIONS

| | |
|---|---|
| ADD | Attention Deficit Disorder |
| ANX | Anxiety Disorder |
| BDI | Beck Depression Inventory |
| COVID-19 | Coronavirus Disease 2019 |
| HDS | Hamilton Depression Scale |
| ICD | International Classification of Disease |
| MD | Major Depression |
| MDD | Major Depressive Disorder |
| PASA | Primary Appraisal Secondary Appraisal |
| PD | Panic Disorder |
| PTSD | Post-traumatic Stress Disorder |
| SARS CoV-2 | Severe Acute Respiratory Syndrome Coronavirus Type 2 |
| SSQ-25 | Subclinical Stress Symptoms – 25 |
| WHO | World Health Organization |

# 1. INTRODUCTION

## 1.1. COVID-19

All manifested in the beginning of December 2019 in Wuhan, which is the biggest metropolitan area of Hubei province, China, when a number of people were admitted to the hospital with "severe pneumonia of unclear cause". The COVID-19-producing Coronavirus, SARS-CoV-2, was causing a significant pandemic that is affecting the entire world. Even though humanity has survived other infectious disease pandemics, this one is unique in that it can take advantage of modern globalization to spread rapidly and widely across borders. One of the most significant pandemics in the last two generations was expected to hit the world. Each day, this new coronavirus, distinguished by its highly contagious nature, causes thousands of deaths and infections throughout the world.

The COVID-19 virus has swept across the globe, resulting in significant morbidity and mortality. As of March 29th, 2023, the World Health Organization (WHO) has reported over 761 million confirmed cases and over 6.8 million deaths worldwide. The incidence of COVID-19 varies by geographic region, with some countries experiencing significantly higher rates than others. For example, as of March 2nd, 2023, the United States has reported over 124 million cases of COVID-19 and over 2.5 million deaths, making it the country with the highest number of confirmed cases and deaths (1).

COVID-19 is primarily transmitted through respiratory droplets (2). It affects individuals of all ages, with varying degrees of severity. The pandemic has had a significant impact on healthcare systems globally, leading to resource allocation challenges and increased morbidity and mortality rates. Several risk factors have been identified for severe COVID-19 outcomes, including age, sex, comorbidities, and immunocompromised status (3).

The WHO has recommended several measures to prevent the spread of COVID-19, including wearing masks, physical distancing, frequent hand hygiene, and vaccination (4). Vaccines have been developed and are being administered globally, with varying rates of vaccine uptake, and availability across countries. As the pandemic continues to evolve, new variants of the virus have emerged, with varying levels of transmissibility and virulence. The WHO has emphasized the need for continued surveillance and genomic sequencing to monitor the evolution of the virus and inform public health interventions (5).

To conclude, the COVID-19 pandemic has had a significant impact on global health, with varying rates of incidence and mortality across geographic regions. The identification of risk factors for severe outcomes has helped inform public health interventions to prevent the spread of COVID-19. The development and administration of vaccines offer hope for

controlling the pandemic, but continued vigilance and surveillance are necessary to monitor the evolution of the virus and inform public health responses.

## 1.2. COVID-19 and Mental Health

People from various countries, continents, races, gender, age groups, and socioeconomic classes have been impacted by the pandemic. The necessary actions, such as isolating entire neighborhoods, closing schools, isolating people socially, and issuing shelter-in-place orders, have drastically altered daily life (6). While taking these actions may be essential to reducing the development of spreading the disease, they will surely have both immediate and long-term effects on mental health and well-being. The impact of the outbreak on both the mental health of an individual and a population was important to be addressed immediately, and this required direct intervention as well as actions focused on prevention (7).

Social distancing and isolation measures, particularly among older adults or individuals with preexisting mental health conditions, may exacerbate negative outcomes. It has been observed that such individuals may have limited access to mental health services, including consultations with psychiatrists or psychologists, due to pandemic-related restrictions (8). Understanding how psychological and social events could affect a person's physiological homeostasis is the main goal of psychophysiology, one of the principles of clinical health psychology. A comprehensive viewpoint is required during the current COVID-19 pandemic because new psychophysiological stresses such as social isolation, anxiety, uncertainty, unstable economies, and lack of trust in other individuals, and institutions had emerged. (9)

Currently, society's challenge is to comprehend and manage the various effects of this pandemic. One of the most effective strategies for preventing viral exposure and halting its spread is social isolation, which was adopted in many nations. Yet, maintaining emotional connections and maintaining physical distance from one another have been some of the largest issues of the previous few decades, having a direct impact on psychological health worldwide (10,11).

One of the most potent triggers can be fear (12). The concern of spreading the disease as well as possible job loss in industries where home office work is not possible or prohibited (13). Fear of being unable to cover their regular expenses due to a lack of financial resources. The fear associated with the possibility of being unable to visit family (11). Fear of the virus's distribution method. The worst dread: Will I become sick? Will I unknowingly transmit the

virus to my loved ones? Will my asymptomatic state contribute to the virus's spread and thus infect people who will die in the end because of the transmission (6)?

The COVID-19 pandemic has had a profound impact on the world, affecting every aspect of life, including physical and mental health. One of the most significant mental health challenges associated with the pandemic was the increased prevalence of major depression (MD) and post-traumatic stress disorder (PTSD) (14,15). These mental health conditions can be debilitating, affecting an individual's ability to work, socialize, and carry out daily activities.

### 1.2.1. Major Depression and COVID-19

Major depression (MD), also known as major depressive disorder (MDD), is a common mental health condition characterized by persistent sadness, loss of interest, and low mood that affects an individual's ability to carry out daily activities. MD has been associated with a wide range of factors, including genetic predisposition, environmental stressors, and neurobiological changes. Several studies have found a link between MD and COVID-19 infection (16,17). The COVID-19 pandemic has led to a rise in depression rates worldwide. Studies have indicated that there has been a rise in the prevalence of depression among the general population since the onset of the pandemic (16). Notably, healthcare workers have experienced a substantial increase in the number of reported cases, especially during the initial phase of the pandemic (18).

Several factors may contribute to the increased rates of depression associated with COVID-19. These include social isolation, financial stress, and uncertainty about the future. Additionally, the pandemic has disrupted access to mental health services, making it more challenging for individuals to seek treatment for depression. Studies have already confirmed that there was an increase in the percentage of medications used for depression during the pandemic (19).

### 1.2.2. PTSD and COVID-19

PTSD is a mental health condition that can develop after a person has experienced or witnessed a traumatic event. Symptoms of PTSD may include flashbacks, nightmares, and avoidance behaviors. The COVID-19 pandemic has been identified as a potential traumatic event that could lead to the development of PTSD.

The association between COVID-19 and PTSD is particularly evident among healthcare workers, who are at an elevated risk of developing PTSD due to the heightened demands of their profession, which have been significantly amplified by the pandemic (20).

### 1.2.3. Stress and COVID-19

Stress is a physiological and psychological natural response to a perceived threat or challenge, leading to various physical and emotional changes in the body (21). Stress can be classified into two types: positive stress or eustress and negative stress or distress (22,23). Eustress is a positive response to a challenge or opportunity, which motivates an individual to achieve their goals and improve their overall well-being (24). On the other hand, distress is a negative response to stress that can lead to various physical and emotional health issues (25).

The COVID-19 pandemic has caused widespread stress and anxiety among the general population, including healthcare workers (26), patients, and their families. Notably, there were discernible differences in stress exposure across gender and age groups, with elevated levels of stress and anxiety being more prevalent among certain demographics (27). Furthermore, a history of pre-existing mental illness was found to be a significant factor, as individuals with such conditions demonstrated an increase in stress levels during the pandemic (28).

## 1.3. Study

The COVID-19 pandemic profoundly impacted global health, including significant psychological distress for individuals worldwide. To identify vulnerable populations and inform targeted interventions, it is crucial to understand the psychological symptoms and the role of appraisals and experienced stress during the pandemic. Therefore, this retrospective study aimed to investigate the psychological symptoms and the role of appraisals and experienced stress during the COVID-19 pandemic in a high-incidence area in Southern Thuringia, Germany.

This study was designed to show the difference in psychological distress of patients acutely admitted to a psychiatric hospital, compared to patients admitted for planned elective therapy. A comparison of the different age and gender groups, which are examined in the statistics of this retrospective study, will provide further information on the consideration of stress levels in patients with the main diagnosis of MD and PTSD during the pandemic. As stress, PTSD and MD are important factors in human well-being, we conducted this study to investigate the importance of mental health even in situations where somatic diseases seem to

be more emphasized. The result of the study is essential as it allows us to better understand psychiatric events during a pandemic and to develop preventative strategies based on the statistics and results so that psychiatric and psychological care can be provided for the broad masses of society and prevent the worsening of mental illnesses in future pandemics.

# 2. OBJECTIVES

## 2.1. Aim of the Study

Our study aimed to investigate the psychological symptoms and the role of appraisals and experienced stress during the COVID-19 pandemic in a high-incidence area in southern Thuringia, Germany. We aimed to assess the prevalence and severity of psychological distress in psychiatric inpatients admitted during the pandemic and to explore potential differences in distress levels based on admission status (acute/emergency vs. elective/planned), age groups, and gender.

## 2.2. Primary Objectives

The primary objectives of our study were to determine the levels of psychological distress among psychiatric inpatients during the COVID-19 pandemic, and to compare distress levels between patients admitted acutely and via the psychiatric emergency room versus those admitted electively/planned. We aimed to assess the impact of the immediate and acute effects of the pandemic on mental health in patients requiring emergency psychiatric care.

## 2.3. Secondary Objectives

The secondary objectives of our study were to examine potential differences in distress levels based on age groups and gender. We aimed to explore whether age and gender may be associated with differential experiences of stress and psychological distress during the pandemic. We sought to investigate if elderly patients experienced higher levels of stress compared to younger age groups, and if there were gender differences in psychological distress levels among psychiatric inpatients during the pandemic.

## 2.4. Hypothesis

1. The psychological stress caused by the COVID-19 pandemic in patients who were admitted acutely and via the psychiatric emergency room is higher than that of patients who were admitted electively/planned.
2. The experienced stress during the pandemic in the elderly is higher than in the younger age groups.
3. The psychological stress is higher in males than in females.

# 3. MATERIALS AND METHODS

## 3.1. Study Design

In this retrospective, non-interventional study, we aimed to investigate the psychological symptoms and the role of appraisals and experienced stress during the COVID-19 pandemic in a high-incidence area in southern Thuringia, Germany. We utilized clinical data from 258 psychiatric inpatients (61 were acutely admitted to the hospital, 165 were elective ones and 32 were transferred from another (somatic) hospital) admitted to the Department of Psychotherapy at Helios Fachkliniken in Hildburghausen. The hospital is located in rural southern Thuringia, Germany, in a region with a high incidence of COVID-19 cases during the SARS-CoV-2 pandemic.

Our study focused on assessing the prevalence and severity of psychological distress among psychiatric inpatients and exploring potential differences in distress levels based on admission status, age groups (six groups: 10-19, 20-29, 30-39, 40-49, 50-59, > 60-year-old patients), and gender (female/male). To measure psychological distress, we utilized two questionnaires, the PASA and the SSQ-25 which have been widely used in previous research to assess subjective distress and psychological symptoms (29,30,31). The respondents in our study completed all questionnaires in German, which are all available upon request.

We collected data from the first of February until the 30$^{th}$ of November 2021, covering a period of substantial COVID-19 transmission and related restrictions in the study region. Statistical analyses were conducted to examine the relationships between the COVID-19 pandemic, psychological distress, and various demographic and clinical variables.

## 3.2. Material

### 3.2.1. BDI

The Beck Depression Inventory (BDI) is a widely used self-report instrument for assessing the severity of depressive symptoms in both clinical and non-clinical populations. It was developed by Aaron T. Beck and his colleagues in the 1960s as a tool for quantifying the severity of depressive symptoms based on a person's subjective experiences (32). This instrument consists of 21 items that assess various symptoms of depression, such as sadness, guilt, loss of interest, and suicidal ideation. Each item consists of four statements that reflect increasing levels of severity, and the respondent is asked to select the statement that best describes how they have been feeling during the past week (32,33).

Demonstrating good reliability and validity in various populations and settings, the BDI includes clinical and non-clinical samples (34). It has been translated into multiple languages and has been used in cross-cultural studies (35). The BDI has been widely used in research and clinical practice to assess depression severity and treatment outcomes. It has been used in studies investigating the effectiveness of various psychological and pharmacological treatments for depression (36). Additionally, the BDI has been used in screening for depression in primary care settings (37). To summarize, the BDI is a widely used self-report instrument for assessing the severity of depressive symptoms. It has demonstrated good reliability and validity and has been used in various populations and settings. The BDI has been used in research and clinical practice to assess depression severity and treatment outcomes.

### 3.2.2. HDS

The Hamilton Depression Scale (HDS) is a widely used tool for measuring the severity of depressive symptoms in clinical settings (38). The scale was developed by psychiatrist Max Hamilton in 1960 and has since been revised several times to improve its accuracy and reliability (38,39). The HDS consists of 21 items that assess various aspects of depressive symptoms, such as mood, guilt, suicidal ideation, and sleep disturbances.

Several studies have shown that the HDS has good reliability and validity in measuring depressive symptoms (38,40). Additionally, the HDS has been used in numerous clinical trials to evaluate the efficacy of various antidepressant medications (41). Despite its widespread use, the HDS has been criticized for its lack of sensitivity to certain aspects of depression, such as atypical symptoms and cognitive impairments (5). As such, it is often used in conjunction with other measures, such as the Beck Depression Inventory or the Montgomery-Asberg Depression Rating Scale, to provide a more comprehensive assessment of depressive symptoms.

In summary, the Hamilton Depression Scale is a valuable tool for measuring the severity of depressive symptoms in clinical settings, as supported by previous studies (38,40,41). Although it has its limitations, the HDS remains a widely used and respected instrument in the field of psychiatry (42).

### 3.2.3. PASA Questionnaire

The PASA questionnaire is a tool created by Richard Lazarus and Susan Folkman in 1984 to evaluate cognitive appraisals of stressful events. It is designed to assess how individuals perceive stressful situations as either threatening, challenging, or benign, as well as how they

believe they can cope with the stressor (29). However, the original questionnaire with 41 items can be time-consuming and impractical in some research settings. Therefore, a modified version called the Brief-PASA questionnaire was developed. This version has 16 items and a 6-point response scale, divided into two categories: primary and secondary appraisal, as shown in Figure 1.

Primary appraisal evaluates situational circumstances in terms of potential threats or challenges, while secondary appraisal assesses the extent of perceived coping options. The PASA measures these two appraisal processes through four subscales: "threat," "challenge," "self-concept of own abilities," and "control beliefs." The "stress index" can be calculated by comparing the results of the two appraisals. However, the PASA does not measure the evaluation of a situation in terms of potential loss, as this falls under transactional stress theory (43).

**PASA – Primary Appraisal Secondary Appraisal**

Name……. Datum…….

Die folgenden Aussagen beziehen sich auf eine konkrete Situation. Bitte geben Sie bei jeder Aussage an, wie stark sie im Augenblick für Sie persönlich zutrifft. Dabei haben Sie die Möglichkeit, jede Aussage als «ganz falsch», «ziemlich falsch» oder «etwas falsch» zurückzuweisen oder ihr mit «etwas richtig», «ziemlich richtig» oder «ganz richtig» zuzustimmen. Die Zustimmung nimmt damit von links nach rechts kontinuierlich zu. Markieren Sie bitte jeweils die Antwortalternative (○) durch deutliches Ankreuzen.

| Diese Aussage ist für mich zur Zeit ... | ganz falsch | ziemlich falsch | etwas falsch | etwas richtig | ziemlich richtig | ganz richtig |
|---|---|---|---|---|---|---|
| 1. Ich fühle mich durch die Situation **nicht** bedroht. | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. Die Situation ist für mich von Bedeutung (relevant). | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. In dieser Situation weiß ich, was ich tun kann. | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. Es hängt hauptsächlich von mir ab, ob ich die Situation bewältige. | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. Diese Situation ist mir sehr unangenehm. | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. Diese Situation lässt mich kalt. | ○ | ○ | ○ | ○ | ○ | ○ |
| 7. Ich weiß überhaupt **nicht**, was ich jetzt machen soll. | ○ | ○ | ○ | ○ | ○ | ○ |
| 8. Ich kann mich am besten selbst durch mein Verhalten vor Misserfolg in dieser Situation schützen. | ○ | ○ | ○ | ○ | ○ | ○ |
| 9. Ich fühle mich **nicht** beunruhigt, da die Situation keine Bedrohung für mich darstellt. | ○ | ○ | ○ | ○ | ○ | ○ |
| 10. Die Situation ist keine Herausforderung für mich. | ○ | ○ | ○ | ○ | ○ | ○ |
| 11. In dieser Situation fallen mir viele Handlungsalternativen ein. | ○ | ○ | ○ | ○ | ○ | ○ |
| 12. Ich kann sehr viel von dem, was in dieser Situation passiert, selbst bestimmen. | ○ | ○ | ○ | ○ | ○ | ○ |
| 13. Diese Situation macht mir Angst. | ○ | ○ | ○ | ○ | ○ | ○ |
| 14. Diese Situation fordert mich heraus. | ○ | ○ | ○ | ○ | ○ | ○ |
| 15. Für diese Situation fallen mir viele Lösungen ein. | ○ | ○ | ○ | ○ | ○ | ○ |
| 16. Wenn ich die Situation bewältige, ist das Folge meiner Anstrengung und meines persönlichen Einsatzes. | ○ | ○ | ○ | ○ | ○ | ○ |

**Figure 1:** PASA – Primary Appraisal Secondary Appraisal Questionnaire, German version (F.1)

### 3.2.4. SSQ-25 Questionnaire

The Subclinical Stress Symptoms Questionnaire (SSQ-25) is a self-report questionnaire designed to assess subclinical levels of stress symptoms. It was developed by Derogatis and colleagues in 1983 and has been widely used in research and clinical practice to assess stress symptoms in a range of populations and settings (44). The questionnaire consists of 25 items that assess physical, emotional, and cognitive symptoms commonly associated with stress. Participants rate the frequency and severity of each symptom on a five-point Likert scale, ranging from "not at all" to "extremely", as shown in Figure 2. Total scores on the SSQ-25 range from 0 to 100, with higher scores indicating greater symptom severity (45).

The SSQ-25 has good internal consistency, with Cronbach's alpha coefficients ranging from 0.86 to 0.96 in different populations (46). It has been used in a wide range of populations and settings, not only in psychiatric patients but also in students (47) and healthcare workers (48). It is utilized to assess the effectiveness of stress-reducing interventions, such as mindfulness-based stress reduction (49), and to identify risk factors for stress-related disorders, such as PTSD (50). One limitation of the SSQ-25 is that it is a self-report measure, which means that it relies on individuals' subjective perceptions of their symptoms. It also does not differentiate between acute and chronic stress, or between different types of stressors (51). The SSQ-25 is a reliable and valid measure of subclinical stress symptoms, with a wide range of applications in research and clinical practice. It should be used in conjunction with other measures and clinical assessments to ensure a comprehensive understanding of an individual's stress-related symptoms.

**Subclinical Stress Symptoms Questionnaire SSQ-25**

In stressful times or after certain events people can report the following symptoms. Which of these symptoms have you experienced within the last four weeks and to what extent?

| | not at all | slight | moderate | strong | very strong |
|---|---|---|---|---|---|
| 1. It was hard for me to concentrate. | □ | □ | □ | □ | □ |
| 2. Mistakes happened to me. | □ | □ | □ | □ | □ |
| 3. I was forgetful, unreliable or have lost track of things. | □ | □ | □ | □ | □ |
| 4. I have lost interest or joy in things I have formerly enjoyed. | □ | □ | □ | □ | □ |
| 5. I have not trusted myself anymore to do things that I am actually capable of. | □ | □ | □ | □ | □ |
| 6. I felt lost or lonely among people. | □ | □ | □ | □ | □ |
| 7. I felt empty or burnt-out. | □ | □ | □ | □ | □ |
| 8. I did not see any way out of my situation anymore. | □ | □ | □ | □ | □ |
| 9. I felt the need to be alone. | □ | □ | □ | □ | □ |
| 10. I have avoided or procrastinated important appointments, agreements or decisions. | □ | □ | □ | □ | □ |
| 11. I was not able to pull myself together because I was too exhausted. | □ | □ | □ | □ | □ |
| 12. I felt nervous. | □ | □ | □ | □ | □ |
| 13. I felt hounded or was jittery/nervous. | □ | □ | □ | □ | □ |
| 14. I was not able to wind down or was lost in thought. | □ | □ | □ | □ | □ |
| 15. I was easily irritated, annoyed or moody. | □ | □ | □ | □ | □ |
| 16. I felt dizzy or sick. | □ | □ | □ | □ | □ |
| 17. My eating habits or my weight have/has changed. | □ | □ | □ | □ | □ |
| 18. I had digestive disorders like constipation, flatulence etc. | □ | □ | □ | □ | □ |
| 19. I was oversensitive to environmental stimuli, like light, noise or temperature. | □ | □ | □ | □ | □ |
| 20. I got pains, for example, in the stomach, head or back. | □ | □ | □ | □ | □ |
| 21. I felt numbness or tingling or had a feeling of faintness in certain parts of the body. | □ | □ | □ | □ | □ |
| 22. I had palpitation or breathing difficulties. | □ | □ | □ | □ | □ |
| 23. I had trouble falling asleep, sleeping through or sleeping late. | □ | □ | □ | □ | □ |
| 24. My sexual life was affected. | □ | □ | □ | □ | □ |
| 25. I was more prone to other diseases (e.g. cold, tinnitus, skin irritations etc.). Please specify: _____ | □ | □ | □ | □ | □ |

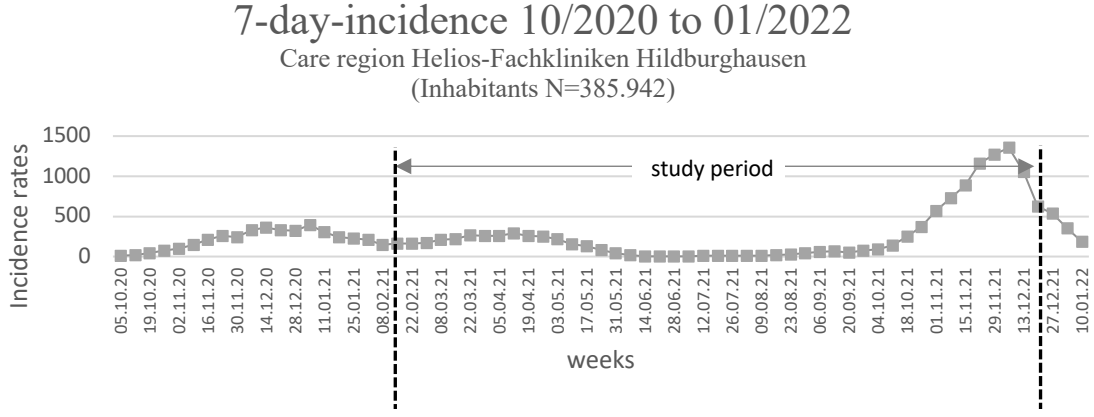
**Figure 2:** Subclinical Stress Symptom Questionnaire SSQ-25 (F.2)

## 3.3. Region

The Helios Fachkliniken Hildburghausen serves as the main provider of mental health care in a rural region with a population of 295,000 people residing in an area of 3051 $km^2$, resulting in a population density of 97.69 inhabitants per $km^2$. The region is characterized by various population sizes, with 18% living in small communities of less than 500 residents, 29% in communities of 500 to 5000 residents, 13% in cities with up to 10,000 residents, and 41% in cities with up to 35,000 residents. The average age of the population in the study region is higher than the national average, with 47.9 years compared to 44.5 years in 2019, according to data from the "Thüringer Landesamt für Statistik" and "Statistisches Bundesamt". Over the course of the study period, a total of 2101 patients were admitted as inpatients at the Helios Fachkliniken Hildburghausen, 361 of them at the Department of Psychotherapy. With the majority (81.2%) residing in the primary care region, 8.0% in adjacent areas, and 10.8% outside the study region. Participants who were living outside the care region (n=39) were excluded from the study. In total, 258 (80.1%) of the 322 patients admitted participated in the survey. The median length of stay for patients was 29.06 (SD 20.38) days (51).

The region has also experienced higher COVID-19 mortality rates compared to other areas in Germany, with infection rates ranging from 13.7 to 20.31 per 100,000 people, which is nearly twice as high as the national rates of 9.62 per 100,000 people. Mortality rates from COVID-19 in the region were also significantly higher, ranging from 2.5% to 3.2%, compared to the national average of 1.5%, as reported by the Robert Koch Institut (RKI) (52).

**Table 1**: Incidence rates (per 100.000 inhabitants) in the care region of Helios Fachkliniken Hildburghausen (Inhabitants n= 385.942). Study period February 1st, 2021, to November 30th, 2021. Data source: RKI COVID-19 Datahub (52).



## 3.4. Settings

To determine the characteristics of psychological distress among the populations impacted by the COVID-19 pandemic, we developed a retrospective, non-interventional study from the first of February 2021 until the 30. of November 2021. The study was done in Hildburghausen, south Thuringia, Germany, a city with outstandingly high incidences. Two questionnaires were handed out, the PASA and the SSQ-25, to measure the level of psychological discomfort. The questionnaires were answered and filled out by a total of 258 patients at the beginning of their inpatient admission. The prevalence and severity of psychological distress were assessed in patients who came for planned inpatient therapy and in patients who were admitted as an acute emergency due to crisis intervention.

## 3.5. Participants

258 adult females and males participated in the study at Helios Fachkliniken Hildburghausen, Thuringia, Germany. In this study, we examined and categorized gender groups (female and male), and different age groups (10-19, 20-29, 30-39, 40-49, 50-59, > 60-year-old patients) and the medical histories of the individual patients to enable classification of the diagnoses.

## 3.6. Ethical approval

The institutional review board of IRB gave the study their approval. Pseudonyms are used to identify all the data. The original list, used to identify the data, is only accessible to the treating physician. Only medical purposes are considered as part of treatment when using patient-related primary data. Upon request from the notified body or control body, the study-related data will be shown in the relevant test facility. It is not permitted to transfer the data for other uses. To prevent third parties from assigning test individuals, all publications are made only using anonymized data.

## 3.7. Data Source

All patient-related data is anonymized, and no conclusion can be drawn about the respective person. The patient's records were kept in the hospital information system, which was also used to gather data on admission and demographics. The foundation of the study was

comprised of the findings from the physical and psychological examinations, the summary doctor's letter, and the outcomes of the medical and psychological admissions evaluations. There is one Identification list, in which pseudonym numbers and the personal contact details of the patients are linked. This list remains in the Psychiatric Clinic and is treated with the strictest confidentiality and privacy. As part of the survey study, the personal data of the patients are recorded. These include surname, first name, date of birth, address, and telephone number or e-mail address. The patient-related data is encrypted with a pseudonym and provided with an identification number. The identification list, which combines the patient data with the pseudonym number is electronic and separated from the documentation. All patients gave their written consent to the processing of their data in the anonymized form as part of the treatment contract.

### 3.7.1. Setting

The dataset includes data from patients who were admitted as inpatients to Helios Fachkliniken Hildburghausen from 01.02.2021. to 30.11.2021. and met the inclusion criteria. The collection of demographic data and other measures of interest was done by record review in a 4-eyes-principle. The two raters were, first, a highly experienced medical colleague (chief of psychiatry) and, second, a medical student with a special interest in psychiatry.

## 3.8. Statistical Analysis

We used SPSS Version 28.0.1.1 (14) (https://www.ibm.com/de-de/analytics/spss-statistics-software) and R version 4.1.3 (2022-03-10) for the statistical analyses. To test for normality in data distribution, we utilized both the Kolmogorov-Smirnov and Shapiro-Wilk tests. These tests were essential in determining whether the data followed a normal distribution. We used the $\chi 2$-test to determine whether there was a significant association between categorical variables i.e., some sociodemographic factors. It was assumed that residuals smaller than -1.96 as well as larger than 1.96 with corrected alpha levels for multiple testing indicated significant differences between variable categories. The non-parametric Wilcoxon rank sum test was employed to compare independent groups. This test was appropriate when the data did not meet the assumptions of normality and homogeneity of variance. Similarly, the Kruskal-Wallis rank sum test was used to compare three or more independent groups, e.g. in age groups. This test was also appropriate when the data did not meet the assumptions of normality and homogeneity of variance.

To determine whether the variance was equal across groups, Levene's Test for Homogeneity of Variance was employed. Based on these results, both the Two Sample t-test and the Welch Two Sample t-test were used. The former was used to compare the means of two independent groups, assuming the data was normally distributed and had equal variances. The latter was a variation of the Two Sample t-test, utilized when the assumption of equal variances was not met. A Bonferroni correction was applied for controlling Type I error due to multiple comparisons.

## 3.9. Variables

Our retrospective study analyzed various clinical variables of psychiatric inpatients, including their primary diagnosis, symptoms of depressive disorder, length of stay, reason for admission, level of psychological and physical distress, appraisal of the SARS-CoV-2 pandemic, and potential suicidality. We collected data from participants' medical records and gathered epidemiological information such as age, sex, and region of origin. To assess stress and coping mechanisms related to the pandemic, we used the SSQ-25 and PASA questionnaires in their German versions. Clinical diagnoses, including major depression (MD), post-traumatic stress disorder (PTSD), panic disorder (PD), attention deficit disorder (ADD), and anxiety disorders (ANX), were obtained from medical records based on the ICD-10 classification. We also recorded the number of diagnoses and any history of suicide attempts or current suicidal ideation.

# 4. RESULTS

## 4.1. Sociodemographic Data

The dataset includes data from 258 patients who were admitted as inpatients to Helios Fachkliniken Hildburghausen from 01.02.2021. to 30.11.2021. and were treated in the Department of Psychiatry and Psychotherapy. Around 59% of the patients in the entire group were females. Patients in both groups were on average about 40 years of age. Both PASA and SSQ25 results were available for 218 (84.5%) patients; an additional 30 subjects had correctly completed only SSQ-25 (n=248, 96.12%); PASA questionnaires were available for evaluation for a total of 228 subjects (88.4%). The questionnaires were part of the routine clinical data; data analysis was retrospective. Therefore, no conclusions can be drawn as to why certain patients had not completed a questionnaire while others had.

The descriptive statistics of the demographic variables are summarized in Table 2. The age range in our study varied from 18.1 years to 75.0 years (M: 39.8 years, SD: 15.5 years). Descriptive statistics are given for the total sample, for the sample of female and male patients, and with regular and emergency admittance.

The regions of origin are exclusively in the primary care region of the clinic, as well as in northern Bavaria. The entire region was equally affected by the Corona pandemic with few time lags, but the region of Hildburghausen was the most affected and the earliest (see Methodology). No significant differences were found between the sexes in the individual regions.

There were also no differences in the type of admission (regular vs. emergency) or the initial treating admission unit (crisis intervention vs. psychotherapy). Among the primary diagnoses, significantly more males were found with diagnosis F32 (51 males, 48.6%) and more females with diagnosis F33 (100 females, 65.4%). There were no significant differences between the gender groups with regard to the average number of psychiatric or somatic diagnoses.

Regarding suicidality, differences were only found in the number of reported suicide attempts in the past; women reported a previous attempt in 7.8% of the cases, whereas only one man did so. The other factors recorded for suicidality showed no significant difference.

**Table 2:** Comparison of sociodemographic and clinical characteristics.

| | **Females (n = 145) M ± DS** | **Males (n = 101) M ± DS** | **Test Statistic** | ***df*** | ***p*** |
|---|---|---|---|---|---|
| **Age** (years) | 39.8 ± 15.5 | 41.6 ± 13.5 | t = .970 | 256 | .333 |
| **Region of living** | | | | | |
| North-Baveria | 21 (13.7%) | 9 (11.6%) | $\chi^2$ = 6.338 | 5 | .275 |
| Hildburghausen | 32 (20.9%) | 14 (17.8%) | | | |
| Ilmenau | 17 (11.1%) | 17 (13.2%) | | | |
| Meiningen | 24 (15.7%) | 20 (17.1%) | | | |
| Sonneberg | 28 (18.3%) | 17 (17.4%) | | | |
| City of Suhl | 31 (20.3%) | 28 (22.9%) | | | |
| **Admission ward** | | | $\chi^2$ = 1.184 | 1 | .277 |
| Crisis Intervention | 40 (26.1%) | 34 (32.4%) | | | |
| Psychotherapy | 113 (73.9%) | 71 (67.6%) | | | |
| **Type of Admission** | | | $\chi^2$ = 1.569 | 2 | .456 |
| Regular | 101 (66.0%) | 64 (61.0%) | | | |
| Emergency | 32 (20.9%) | 29 (27.6%) | | | |
| From Other Hospital | 20 (13.1%) | 12 (11.4%) | | | |
| **Primary Diagnosis** | | | | | |
| F32 | 43 (28.1%) | 51 (48.6%) | $\chi^2$ = 12.581 | 3 | 0.006*[b] |
| F33 | 100 (65.4%) | 47 (44.8%) | ➔ Differences between F32, F33 | | |
| F43 | 5 (3.3.%) | 2 (1.9%) | | | |
| other | 5 (3.3%) | 5 (4.8%) | | | |
| **Numbers of ICD10-V Diagnosis** | 1.54 | 1.66 | t = 1.709 | 256 | .219 |
| **Numbers of Somatic Diagnosis** | 1.52 | 1.52 | t = .578 | 256 | .030* |
| **Suicidality** | | | | | |
| Admission after Suicide Attempt | 17 (11.1) | 9 (8.6%) | $\chi^2$ = .443 | 1 | .506 |
| Admission with Suicidal Ideation | 36 (23.5%) | 21 (20.0%) | $\chi^2$ = .451 | 1 | .502 |
| Previous Suicide Attempt [a] | 12 (7.8%) | 1 (1.0%) | $\chi^2$ = 6.179 | 1 | .013* |
| Previous and Current Suicide Attempt | 25 (16.3%) | 18 (17.1%) | $\chi^2$ = .029 | 1 | .865 |

Note. * $p < 0.05$, ** $p < 0.01$. [b] remains significant after a Bonferroni correction.

In relation to the clinical parameters (Table 3), significant differences were found in the Beck Depression Inventory, the Hamilton Depression Scale, and the Subclinical Stress Symptoms Questionnaire. Women showed an increased depression score in the BDI and were also rated as significantly more depressed by the therapists. Women also showed a significant increase in the total score of the SSQ-25, as well as in both subscales (Table 7). No gender differences were found in the PASA.

**Table 3**: Comparison of clinical characteristics between females and males.

| | **Males (n = 101) M ± DS** | **Females (n = 145) M ± DS** | **Test Statistic** | ***df*** | ***p*** |
|---|---|---|---|---|---|
| Beck Depression Inventory (BDI) | 21.76 ± 10.09 | 26.79 ± 11.82 | -3.479 | 244 | <.001** |
| Hamilton Depression Scale (HDS) | 25.92 ± 4.83 | 27.93 ± 4.71 | -3.059 | 221 | .002* |
| Stress Index (PASA) | -1.08 ± 6.47 | 0.657 ± 7.07 | -1.882 | 226 | .061[c] |
| Primary Appraisal (PASA) | 15.00 ± 4.080 | 15.79 ± 4.29 | -1.385 | 226 | .168 |
| Secondary Appraisal (PASA) | 16.08 ± 3.71 | 15.13 ± 4.21 | 1.750 | 226 | .081 |
| Subclinical Stress Symptoms Questionnaire (SSQ-25) | 78.72 ± 30.37 | 92.82 ± 39.04 | -3.034[a] | 240.34 | .002*[d] |

Note. * p < 0.05, ** p < 0.01. [a] adjusted for unequal variances. [c] includes the subscales threat and challenge. [d] Includes subscales control expectancy and self-competence of own competence.

Regarding admission type (Table 4), 165 patients were admitted regularly, 61 in acute emergencies and 32 as transfers from another (somatic) hospital. The number of psychiatric diagnoses ranged from 0 to 4 with a mean of 1.61 diagnoses (SD = .75). Significant differences were found in the diagnostic categories of the primary diagnoses. In emergencies, more diagnoses of depressive episodes were found, and patients with recurrent depressive disorder were admitted more frequently as regular cases. This corresponds to clinical experience, according to which initial presentations are, by definition, initially classified as a first episode, and patients with recurrent phases of the illness seek access to treatment or are referred more regularly and possibly also earlier.

**Table 4:** Comparison of sociodemographic factors by type of admission

| | **Regular (n = 145) M ± DS** | **Emergency (n = 101) M ± DS** | **Test Statistic** | ***df*** | ***p*** |
|---|---|---|---|---|---|
| **Gender** | | | | | |
| female | 101 (61.2%) | 52 (55.9%) | $\chi^2 = .692$ | 1 | .406 |
| male | 64 (38.8%) | 41 (44.1%) | | | |
| **Primary Diagnosis** | | | | | |
| F32 | 52 (31.5%) | 42 (45.2%) | $\chi^2 = 20.505$ | 3 | 0.001**[b] |
| F33 | 107 (64.8%) | 40 (43.0%) | ➔ Differences between F32, F33, F43 | | |
| F43 | 6 (3.6%) | 4 (4.3%) | | | |
| other | 0 (0%) | 7 (7.5%) | | | |
| **Suicidality** | | | | | |
| Admission after Suicide Attempt | 1 (0.6%) | 25 (26.9%) | $\chi^2 = 45.314$ | 1 | <.001** |
| Admission with Suicidal Ideation | 10 (6.1%) | 47 (50.5%) | $\chi^2 = 68.358$ | 1 | <.001** |
| Previous Suicide Attempt | 6 (3.6%) | 7 (7.5%) | $\chi^2 = 1.881$ | 1 | .170 |
| Previous and Current Suicide Attempt | 14 (8.5%) | 29 (31.2%) | $\chi^2 = 22.062$ | 1 | <.001** |

Note. * p < 0.05, ** p < 0.01. [b] remains significant after a Bonferroni correction.

## 4.2. SSQ-25

No significant group differences were found in the categories and the total score of SSQ-25 with respect to the diagnostic groups. Patients who were regularly admitted showed a higher psychological stress score (M = 66.96; SD = 27.61, t (246) = 2.297, p = 0.022), physiological stress score (M = 24.22; SD = 11.01, t (246) = 2.202, p = 0.029) and total SSQ-25 (M = 91.17; SD = 37.84, t (246) = 2.326, p = 0.021) than patients who were transferred from other hospitals or who were admitted on an emergency basis (Table 5).

**Table 5:** Type of admission

| | **Regular (n=159)** | **Emergency (n=89)** | ***t*** | ***df*** | ***p*** | ***95% CI*** | |
|---|---|---|---|---|---|---|---|
| Psychological Stress | 66.96 ± 27.61 | 58.89 ± 24.697 | 2.297 | 246 | .022* | 1.149 | 14.984 |
| Physiological Stress | 24.22 ± 11.01 | 21.17 ± 9.474 | 2.202 | 246 | .029* | .322 | 5.775 |
| SSQ-25 | 91.17 ± 37.84 | 80.06 ± 33.062 | 2.326 | 246 | .021* | 1.703 | 20.527 |

*Note. * p < 0.05, ** p < 0.01. [a] adjusted for unequal variances.*

No differences were found in the age groups regarding psychological stress. Women showed higher psychological stress SSQ (M = 67.68; SD = 28.58, t (246) = 2.636, p = 0.009), physiological stress SSQ (M = 25.15; SD = 11.27, t (246) = 3.799, p <0.001), and sum score SSQ (M = 92.82; SD = 39.04, t (246) = 3.034, p = 0.003) than men (Table 6).

**Table 6:** Gender

| | **Male (n=100)** | **Female (n=148)** | ***t*** | ***df*** | ***p*** | ***95% CI*** | |
|---|---|---|---|---|---|---|---|
| Psychological Stress | 58.63±23.08 | 67.68±28.58 | -2.636 | 246 | .009* | -9.046 | 3.431 |
| Physiological Stress | 20.09±8.63 | 25.15±11.27 | -3.799 | 246 | <.001** | -5.059 | 1.332 |
| SSQ-25 | 78.72±30.69 | 92.82±39.04 | -3.034 | 246 | .003* | -14.104 | 4.649 |

*Note. * p < 0.05, ** p < 0.01. [a] adjusted for unequal variances.*

Lower physiological stress SSQ (M = 18.74; SD = 9.87, df = 5, p = 0.0099) and sum score SSQ (M =76.78; SD = 33.81, DF = 5, p = 0.10) were found in the younger patient group of 10-20 years old compared to the age group of 50-60 years old. Kruskal-Wallis Test was conducted to examine the differences between age groups. The test showed that there was a statistically significant difference in physiological stress SSQ between the different age classes,

$\chi^2 = 15.106$, p = 0.0099, with a mean score of 18.74 for 10 to19 years, 21.51 for 20 to 29 years, 22.26 for 30 to 39 years, 22.33 for 40 to 49 years, 28.04 for 50 to 59 years, and 22.60 for > 60 years. In the post hoc test, there were found significant differences between age class 10 to 19 years and 50 to 59 years (Table 7).

**Table 7:** physiological stress SSQ and age classes

| **SSQ-25** | | **N** | **Entire sample (n = 258)** | **Statistics** |
|---|---|---|---|---|
| **Physiological Stress SSQ-25** | | | | |
| Age class | 10 to 19 years | 23 | 18.74±9.87 | $\chi^2 = 15.106$, df = 5, p = .0099* |
| | 20 to 29 years | 43 | 21.51±9.18 | |
| | 30 to 39 years | 57 | 22.26±10.52 | |
| | 40 to 49 years | 46 | 22.33±10.19 | |
| | 50 to 59 years | 54 | 28.04±10.90 | →difference between age class 10 to19 and 50 to 59 years |
| | > 60 years | 25 | 22.60±10.74 | |

*Note. * p < 0.05, ** p < 0.01. [a] adjusted for unequal variances.*

## 4.3. PASA

For primary appraisal, no significant group differences were found for age, sex, or admission type. For the secondary appraisal, the Kruskal-Wallis test revealed a significant age group association ($\chi^2 = 16.679$, df = 5, p < 0.05). Post hoc analysis using the Wilcoxon rank sum test revealed that the 20 - 30-year-old group alone had no significant differences from other groups, while 50–60-year-old patients had a significantly higher mean score (M=16.74, SD = 4.47) compared to all other groups.

Patients with personality disorder (Table 8) showed higher scores in primary appraisal (M =17.25, SD =3.94, t (226) = 2.602, p = .005), threat (M = 15.72; SD =4.69, t (226) = 2. 070, p = .020), challenge (M = 18.78; SD = 3.86, t (226) = 2.488, p = .007), and lower scores in control expectancy (M =14.78; SD =3.80, t (226) = -1.916, p = .028). The stress index was significantly higher (M = 2.81; SD = 5.87, t (226) = 2.561, p = .006) than in the group without personality disorder (M = - .503; SD = 6.9251).

**Table 8***:* PASA by PD

| | **PD (n=32)** | **Non-PD (n=196)** | ***t*** | ***df*** | ***p*** | ***95% CI*** | |
|---|---|---|---|---|---|---|---|
| Threat | 15.72± 4.69 | 13.83± 4.796 | 2.070 | 226 | .020 | .091 | 3.684 |
| Challenge | 18.78± 3.86 | 16.54± 4.858 | 2.488 | 226 | .007* | .467 | 4.024 |
| Control Expectancy | 14.78± 3.80 | 16.42± 4.596 | -1.916 | 226 | .028 | -3.331 | .047 |
| Primary Appraisal | 17.25±3.94 | 15.184±4.2007 | 2.602 | 226 | .005* | .5012 | 3.6314 |
| Secondary Appraisal | 14.44±3.43 | 15.686±4.1087 | -1.628 | 226 | .052 | -2.7598 | .2623 |
| Stress Index | 2.81±5.87 | - .503±6.9251 | 2.561 | 226 | .006* | .7641 | 5.8660 |

*Note. * p < 0.05, ** p < 0.01. [a] adjusted for unequal variances.*

Patients with a history of suicide attempts (n=13) had higher overall psychological stress SSQ (M = 83.00; SD = 27.31, t (246) = 2.652, p = 0.009) and physiological stress SSQ (M = 31.85; SD = 8.55, t (246) =3.117, p = 0. 002) and in the sum score SSQ (M = 114.85; SD = 35.17, t (246) = 2.852, p = 0.005) than patients without suicide attempt (Table 9).

**Table 9:** SSQ25 patient with suicide former attempt

| | **Z91.8 (n=13)** | **nonZ91.8 (n=235)** | ***t*** | ***df*** | ***p*** | ***95% CI*** | |
|---|---|---|---|---|---|---|---|
| Psychological Stress | 83.00± 27.31 | 62.98± 2.46 | 2.652 | 246 | .009* | 5.149 | 34.893 |
| Physiological Stress | 31.85± 8.55 | 22.63± 10.47 | 3.117 | 246 | .002* | 3.395 | 15.047 |
| SSQ-25 | 114.85±35.17 | 85.60± 36.03 | 2.852 | 246 | .005* | 9.045 | 49.439 |

*Note. * p < 0.05, ** p < 0.01. [a] adjusted for unequal variances.*

# 5. DISCUSSION

The present study aimed to investigate psychological symptoms and the role of appraisals and experienced stress during the COVID-19 pandemic in a high-incidence area in Southern Thuringia, Germany. The retrospective analysis of clinical data from 258 psychiatric inpatients at Helios Fachkliniken Hildburghausen revealed interesting findings that shed light on the psychological impact of the pandemic in this region.

One particularly astonishing finding of this study was the higher burden experienced by regular patients. It was surprising to observe that this group faced increased psychological symptoms and distress compared to emergency patients. One possible explanation for this disparity could be that emergency patients, who sought immediate care for acute issues, were not as preoccupied with the pandemic and its psychological impact. Instead, they presented with other pressing concerns that overshadowed the pandemic-related stressors. This intriguing observation highlights the complexity of psychological responses during a crisis like the COVID-19 pandemic. While emergency patients may have been dealing with immediate problems, regular patients, who likely had ongoing psychiatric conditions, exhibited a higher burden. It suggests that individuals with pre-existing mental health issues may have been particularly vulnerable to the exacerbating effects of the pandemic.

Notably, our findings reveal a significant disparity in stress levels solely on the physiological aspect between elderly patients and younger age groups, specifically in the comparison of the 10 to 19 and 50 to 59 age groups. This noteworthy observation emphasizes the heightened vulnerability of elderly individuals to physiological stress during the pandemic. Multiple factors contribute to this discrepancy, including the increased susceptibility of older individuals to COVID-19 infection, a higher prevalence of comorbidities, challenges in accessing healthcare services, and the adverse consequences of social isolation. Collectively, these factors compound the psychological burden experienced by individuals in the 50-59 age group, leading to elevated levels of physiological stress.

Sociodemographic characteristics of the patients showed that around 59% of the entire group were females, and the average age of the patients was approximately 40 years. This is in line with previous research indicating that women may be more susceptible to psychological symptoms during times of crisis, such as the COVID-19 pandemic (53,54). Regarding the clinical parameters, significant gender differences were found in the BDI and HDS, with women showing higher depression scores compared to men. This result is consistent with previous research that has shown that females may be more vulnerable to psychological symptoms and mental health disorders, including MD and PTSD (55,56). In addition, women were rated as significantly more depressed by the therapists. A study conducted in China found

that the pandemic has led to high levels of stress, fear, and anxiety in the general population, with higher levels reported in women and younger individuals (27). These findings highlight the need for gender and age-specific interventions and support for individuals experiencing depressive symptoms during the pandemic, particularly among women.

Furthermore, women also showed a significant increase in the total score of the Subclinical Stress Symptoms Questionnaire (SSQ-25) and its subscales, indicating higher levels of stress compared to men. However, no gender differences were found in the Primary Appraisal of Stressful Events (PASA), which measures cognitive appraisals of stress. This suggests that while women may experience higher levels of stress during the pandemic, their cognitive appraisals of stress may not differ significantly from men. This finding contrasts with previous research suggesting that cognitive appraisals play a role in shaping individuals' stress responses (29), and further research may be needed to explore this discrepancy.

It is worth noting that the PASA scores were relatively low in both men and women, which may indicate that the patients in this study may have had limited cognitive appraisals of the stressful events related to the pandemic. This may be due to various factors, such as the severity of the patient's psychiatric conditions, their coping strategies, and the context of the pandemic in the region. Further research is needed to better understand the role of cognitive appraisals in the psychological response to the pandemic in this population.

Concerning suicidality, women reported a higher percentage of previous suicide attempts compared to men, although other factors recorded for suicidality did not show significant gender differences. These findings are consistent with previous research indicating that women may be more vulnerable to suicidal behaviors during the pandemic (55,56). Therefore, it is important to prioritize suicide prevention efforts, particularly among women, in high-incidence areas during the pandemic.

In terms of psychiatric diagnoses, the average number of diagnoses per patient was 1.61, with a range from 0 to 4. The number of psychiatric diagnoses ranged from 0 to 4, with a mean of 1.61 diagnoses, suggesting that the patients in this study had multiple psychiatric conditions. A study in Italy revealed that the pandemic has caused a significant increase in stress levels, particularly in individuals with already pre-existing mental health conditions (28).

Interestingly, significantly more males were found to have a diagnosis of MD (F32) compared to females, while more females were diagnosed with PTSD (F33). These findings are in line with previous research that has shown gender differences in the prevalence and presentation of psychiatric disorders (57,58). However, further research is needed to explore the underlying factors contributing to these gender differences in psychiatric diagnoses. The

regions of origin of the patients were primarily in the primary care region of the clinic, as well as in northern Bavaria, which were both equally affected by the pandemic with few time lags.

## 5.1. Strengths of the Study

The study has several strengths that make its findings robust and reliable.

First, the retrospective design of the study allows for the examination of the long-term impact of the pandemic on mental health. By collecting data from psychiatric inpatients who were hospitalized during the pandemic, the study provides insights into the lasting effects of the pandemic on mental health.

One of the strengths of the study is the focus on a high-incidence area. By focusing on a specific geographical area with a high incidence of COVID-19, the study can provide more specific and accurate information about the impact of the pandemic in that area. The significance of that result lies in the fact that the impact of the pandemic can fluctuate based on factors such as the prevalence of the virus in the community, the response of local health systems, and the cultural and social context of the area.

The study also benefits from the use of clinical data. Clinical data is collected in a standardized and systematic way, ensuring that the information gathered is reliable and valid. The use of clinical data also means that the study can provide a detailed and nuanced understanding of the psychological symptoms experienced by psychiatric inpatients during the pandemic.Detailed clinical data collection included psychiatric diagnoses, psychological symptoms, appraisals, and experienced stress. This provides a more nuanced understanding of the psychological effects of the COVID-19 pandemic on psychiatric patients.

Moreover, the study examines the role of appraisals and experienced stress in the psychological symptoms experienced by the participants. This result shows an important contribution to the literature on the impact of the pandemic on mental health because it highlights the role of individual factors in shaping the psychological response to the pandemic.

## 5.2. Limitations/ Possible Biases and Confounding Variables

The present study has several potential biases and confounding variables that need to be considered when interpreting the results. Also, some limitations of this study should be acknowledged.

The study did not account for potential confounding variables such as patient health behaviors, socioeconomic status, or access to healthcare, which could impact the results.

Another possible bias is that patients may have multiple factors or experiences unrelated to Covid-19 that could impact their mental health, such as the death of a family member or other life stressors. These external factors could confound the results and make it difficult to solely attribute the observed outcomes to Covid-19.

A further potential source of bias is related to the living situation of the patients, which could impact their mental health but may not have been fully captured in the study. For example, living alone versus living with family members could have different effects on mental health outcomes, and this information may not have been thoroughly observed or accounted for in the study.

Limitation is that no interviews were conducted to ensure the accuracy and completeness of the data obtained from the questionnaires. This could introduce potential biases in self-reported measures, as patients may have different levels of motivation or ability to accurately report their symptoms or experiences. Patients may have underreported or overreported their symptoms, depending on their individual experiences and perceptions.

Additionally, the study only covers a specific region and not the entire state of Thuringia or Germany, which may limit the generalizability of the findings to broader populations. The economic situation and health care system in Hildburghausen, where the study was conducted, may differ from other areas of Germany, such as larger cities like Munich. Therefore, prudence should be exercised when extrapolating the results to other populations or regions.

Our study findings provide insights into the impact of the pandemic on mental health in psychiatric inpatients and highlight the need for targeted interventions and support strategies for vulnerable populations. However, as just shown, future research with larger and more diverse samples, rigorous data collection methods, consideration of potentially confounding variables, diverse populations, and prospective designs are needed to better understand the complex relationship between COVID-19 and mental health. Therefore, it is important to interpret the results with caution and not make definitive conclusions solely based on this study, because further research is warranted to better understand the psychological effects of the pandemic and inform appropriate interventions to mitigate the impact of the pandemic on mental health.

# 6. CONCLUSION

Our retrospective study of clinical data from 258 psychiatric inpatients in a high-incidence area in southern Thuringia, Germany provides valuable insights into the psychological symptoms and the role of appraisals and experienced stress during the COVID-19 pandemic. Two hypotheses have been falsified while one of the three has been validated, as succinctly outlined in the following:

The psychological stress caused by the COVID-19 pandemic is higher in patients who were admitted acutely and via the psychiatric emergency room compared to patients who were admitted electively/planned. Our study revealed that patients who sought electively planned therapy had higher levels of psychological stress attributed to the pandemic compared to those admitted acutely via the emergency room. Contrary to expectations, it appears that individuals who actively sought treatment for their psychiatric conditions during the pandemic experienced greater distress than those who required immediate care due to acute crises.

The experienced stress during the pandemic was higher in elderly patients compared to younger age groups. Specifically, when considering physiological stress, a significant difference was observed in the comparison of age groups 10 to 19 and 50 to 59. Furthermore, our investigation has indicated that experienced stress during the pandemic was higher among elderly patients compared to younger age groups.

The psychological stress is higher in males than in females. Our study revealed that males experienced lower levels of psychological distress compared to females during the COVID-19 pandemic. This is consistent with previously mentioned research indicating that females may be more susceptible to mental health issues during stressful situations, including pandemics.

Overall, our study supports the hypothesis that the psychological stress caused by the COVID-19 pandemic is higher in patients admitted to elective therapy, in elderly patients, and females. These findings underscore the significant impact of the pandemic on mental health and highlight the need for targeted interventions and support strategies to address the unique psychological needs of different patient populations during and after the COVID-19 pandemic. Further research is warranted to better understand the underlying mechanisms and long-term effects of the pandemic on mental health and to inform appropriate interventions to mitigate the psychological effects of the pandemic.

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# 8. SUMMARY

**Objectives:** The objective of this study was to determine the characteristics of psychological distress among populations impacted by the COVID-19 pandemic in a high-incidence area in southern Thuringia, Germany. The study aimed to assess the prevalence and severity of psychological distress in patients who came for planned inpatient therapy and in patients who were admitted as an acute emergency due to crisis intervention.

**Material and methods:** A retrospective, non-interventional study was conducted from the first of February until the 30th of November 2021 in Hildburghausen, south Thuringia, Germany, a city with outstandingly high COVID-19 incidences. Two questionnaires, the PASA, and the SSQ-25, were administered to measure the level of psychological discomfort. The questionnaires were answered and filled out by a total of 258 psychiatric inpatients at the beginning of their inpatient admission.

**Results:** The study findings revealed the prevalence and severity of psychological distress among psychiatric inpatients in a high-incidence area during the COVID-19 pandemic. The results showed significant levels of psychological symptoms, including increased stress appraisals and experienced stress, in both patients who came for planned inpatient therapy and those who were admitted as an acute emergency due to crisis intervention.
The results showed that females had significantly higher depression and stress levels than males and that there were differences in the primary diagnoses between the two genders. Moreover, patients with recurrent depressive disorder were admitted more frequently as regular cases, while in emergencies, more diagnoses of depressive episodes were found.

**Conclusion:** This retrospective study provides important insights into the characteristics of psychological distress among populations impacted by the COVID-19 pandemic in a high-incidence area in southern Thuringia, Germany. The findings highlight the significant burden of psychological symptoms, including stress appraisals and experienced stress, in psychiatric inpatients during the pandemic. These findings may have implications for the development of interventions and support strategies to address the mental health needs of individuals in similar settings during and after the COVID-19 pandemic. Further research is warranted to better understand the long-term impact of the pandemic on mental health and inform appropriate interventions.

# 9. CROATIAN SUMMARY

**Naslov:** PSIHOLOŠKI SIMPTOMI, ULOGA PROCJENA I DOŽIVLJENOG STRESA TIJEKOM PANDEMIJE COVID-19 U PODRUČJU VISOKE INCIDENCIJE U JUŽNOJ TURINGIJI, NJEMAČKA

**Ciljevi:** Cilj ovog istraživanja bio je utvrditi karakteristike psihičke nelagode među populacijama pogođenim pandemijom COVID-19 u području visoke incidencije u Južnoj Turingiji, Njemačka. Istraživanje je imalo za cilj procijeniti prevalenciju i ozbiljnost psihičke nelagode kod pacijenata koji su došli na planirani bolnički tretman i kod pacijenata koji su primljeni kao akutna hitna intervencija zbog kriznog stanja.

**Materijali i metode:** Retrospektivna, neintervencijska studija provedena je od prvog veljače do 30. studenog 2021. godine u Hildburghausenu, Južnoj Turingiji, Njemačka, gradu s izuzetno visokom incidencijom COVID-19. Dva upitnika, PASA i SSQ-25, korištena su za mjerenje razine psihičke nelagode. Upitnici su ispunjeni odgovorima 258 psihijatrijskih pacijenata na početku njihovog bolničkog prijema.

**Rezultati:** Rezultati istraživanja otkrili su prevalenciju i ozbiljnost psihičke nelagode među psihijatrijskim pacijentima u području visoke incidencije tijekom pandemije COVID-19. Rezultati su pokazali značajne razine psihičkih simptoma, uključujući povećane procjene stresa i doživljeni stres, kako kod pacijenata koji su došli na planirani bolnički tretman, tako i kod pacijenata koji su primljeni kao akutna hitna intervencija zbog kriznog stanja. Rezultati su pokazali da su žene imale značajno veće razine depresije i stresa od muškaraca te da su postojale razlike u primarnim dijagnozama između dvaju spolova. Nadalje, pacijenti s rekurentnim depresivnim poremećajem češće su primljeni kao redovni slučajevi, dok su u hitnim slučajevima češće dijagnosticirane epizode depresije.

**Zaključak:** Ovo retrospektivno istraživanje pruža važne uvide u karakteristike psihičke nelagode među populacijama pogođenim pandemijom COVID-19 u području visoke incidencije u Južnoj Turingiji, Njemačka. Rezultati ističu značajan teret psihičkih simptoma, uključujući procjene stresa i doživljeni stres, kod psihijatrijskih pacijenata tijekom pandemije. Ovi rezultati mogu imati implikacije za razvoj intervencija i strategija podrške za adresiranje mentalnih zdravstvenih potreba pojedinaca u sličnim okruženjima tijekom i nakon pandemije COVID-19. Daljnja istraživanja su potrebna kako bi se bolje razumjeli dugoročni utjecaji pandemije na mentalno zdravlje i informirale prikladne intervencije.