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*Community Prevalence of Anxiety Disorders in the Romanian Population in the Context of Covid 19 Pandemic. Strategies for Adapting Community Psychiatric Services for the Prevention and Treatment of Anxiety Disorders*

**PhD THESIS SUMMARY**

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## I. Background

The novel SARS-CoV-2 virus has rapidly spread to countries around the world, prompting the World Health Organization to declare the latest pandemic on 11 March 2020 [1]. Previous studies have shown that outbreaks are associated with mental health disorders among survivors and families of victims, but also in the wider community [2,3]. The COVID-19 pandemic caused a high number of deaths globally, and data in the literature have attempted to identify mental health risk factors in affected populations [4- 6]. Studies conducted since the onset of the pandemic have revealed a significant increase in the prevalence of psychiatric disorders, the most common being anxiety, depression and post-traumatic stress disorder. At the same time, it is estimated that the initial prevalence of psychiatric symptoms may increase in direct proportion to the duration of the pandemic and the duration of social distancing measures. [7].

Uncertainty, disruption of daily routines, and concerns about the health and well-being of family and loved ones during the COVID-19 pandemic are likely associated with increased prevalence of generalized anxiety [8]. Page et al. demonstrated a significant correlation between human mobility and daily rate of SARS-CoV-2 infection on the one hand and change in the prevalence of anxiety disorders on the other [9]. Between 2010 and 2019, the number of people diagnosed with anxiety disorder increased by 11.2%, reaching an annual incidence of approximately 30 million new cases worldwide [10]. A meta-analysis led by Felipe M. Delpino that included more than 2.4 million subjects estimated a prevalence of anxiety during the COVID-19 pandemic of approximately 35%, with 15.45% suffering from a mild form of anxiety, while 5.65% experienced a severe or very severe form [11]. According to this meta-analysis, no differences in anxiety prevalence were observed according to the country's level of economic development. Another meta-analysis including 48 studies estimated the incidence during the pandemic period at 76.2 million new cases, which would translate into more than 44.5 million disability-adjusted life years [8]. A systematic literature review that included a meta- analysis of 103 studies published by February 2021 and approximately 140 thousand participants found that the prevalence of anxiety was 27.3% among the general population [12].

More optimistic studies have estimated the prevalence of anxiety in the general population at around 21% to 25%, with the caveat that the studies were conducted until the end of September 2020, just six months after the debut of COVID-19 [13,14].

At the time of writing, the daily number of SARS-CoV-2 infections and deaths due to SARS-CoV-2 have been significantly reduced in most countries. However, the long-term consequences of this rapid increase in anxiety prevalence are still unknown. The high prevalence of anxiety disorders and associated morbidity remains a public health problem [15]. For example, people with anxiety disorders are more likely to suffer from other chronic conditions such as depression. Also, people with an anxiety disorder are three to five times more likely to go to the doctor and are six times more likely to be hospitalized in a psychiatric clinic. Furthermore, persistent symptoms of COVID-19 infection, also known as long-COVID-19, may exacerbate the impact of the pandemic on mental health in the general population. Longitudinal studies assessing this interaction may confirm this hypothesis [16]. On the other hand, pharmacological and non-pharmacological treatments for anxiety disorders are widely recognized. Furthermore, policies and public campaigns to improve awareness of anxiety disorder should be encouraged to reduce stigma and provide adequate access to diagnosis and treatment.

Most studies have failed to find a significant association between the prevalence of anxiety disorder and the economic level of the country in which they were conducted [9,10]. Based on the analysis of data collected by the Global Burden of Disease study, a higher rate of anxiety disorders was demonstrated in countries with a medium socio-demographic index (a composite indicator consisting of per capita income, years of education and fertility rate). With this exception, no differences in anxiety prevalence were observed in any other category. Although no difference in anxiety prevalence was observed between low-, middle- and high-income countries, the economic consequences of the COVID-19 pandemic (such as reduced income and employment) were more pronounced in less advantaged populations [10,17]. For populations in high-income countries, there is a clearer awareness of symptoms, a higher rate of diagnosis and easier access to effective treatments [10]. Therefore, experts recommend strategies to reduce the burden of anxiety, strategies targeted particularly at low- and middle-income countries. Early prevention is considered the most cost-effective approach by compensating for functional impairments associated with anxiety disorders.

The overall burden of anxiety disorders is not negligible and continues to grow steadily, with significant heterogeneity. Understanding the specific characteristics of anxiety disorders worldwide, reducing risk factors (such as stigma), establishing effective dissemination routes for psycho-educational programmes and materials, and early diagnosis are extremely important elements of an effective and targeted strategy.

## **II. Personal contributions**

### **Research hypotheses**

The premise of the research starts from the importance of identifying, defining, and quantifying the psychological response to the COVID-19 pandemic. Assessing anxiety in the context of the COVID-19 pandemic is important for understanding the impact of this crisis on mental health and to develop appropriate interventions. The working hypothesis is the need to assess the prevalence and clinical features of anxiety in the context of a pandemic. The explosive anxiety pathology of this era has unique evolutionary implications that necessitate an in-depth understanding of the phenomenology and a specialized, reproductive approach through the adaptation of community psychiatry services.

### **Aims**

#### **Main objective**

Assessing the prevalence of anxiety-related manifestations in a pandemic context using the current SARS-Cov-2 pandemic as a model.

#### **Secondary objectives**

1. Identification and quantification of major mental disorders in the context of the current COVID-19 pandemic. Comparison of anxiety, depression, and insomnia prevalence.
2. Identifying population groups at risk of developing anxiety disorders in the event of a disaster.
3. Identifying key protective factors against anxiety during the COVID-19 pandemic.
4. Assessing correlations between anxiety, resilience and perceived stress in a pandemic context.
5. Impact of main sources of information on anxiety levels.
6. Perspectives on the uptake of vaccination.

## General methodology

The research was carried out in two stages (Figure 1). The first phase consisted of an online survey assessing the prevalence of the main mental disorders associated with the COVID-19 pandemic, with the aim of confirming the hypothesis that anxiety is a significant consequence of the pandemic. The second phase included 3 studies and included the main research directions.

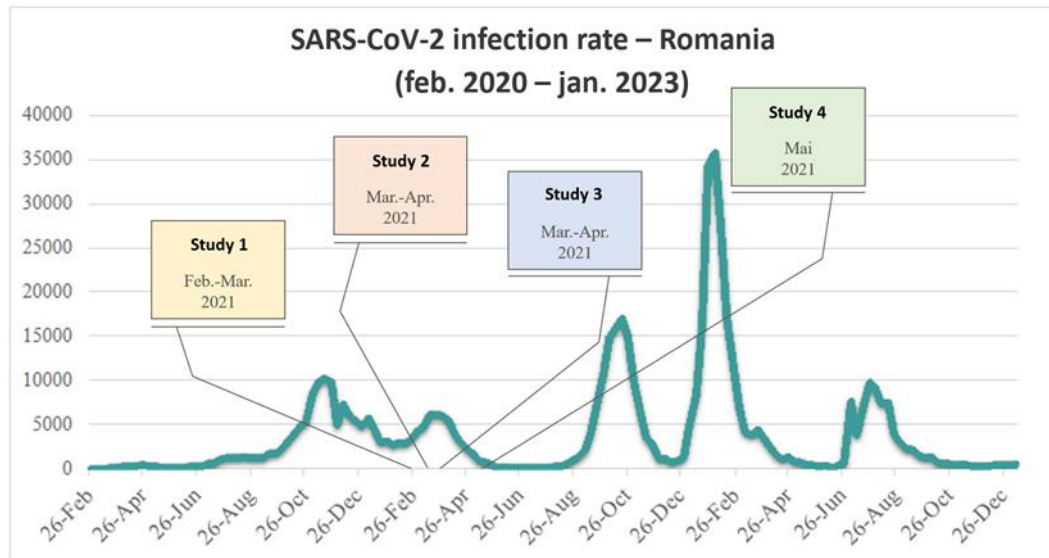


Figure 1: Timeline of the 4 studies in this paper overlaid on the infection rate. Data taken from John Hopkin University [17].

Demographic data such as age, gender, marital status, educational level, place of residence, employment status, monthly income and working hours, household structure and composition, lifestyle and changes in lifestyle during the pandemic were collected through the questionnaires. A separate section of the questionnaire investigated the covid status of the respondents and their relatives, time since infection, clinical manifestations and their intensity, perceptions and fears related to the pandemic, main sources of information, rate of acceptance of vaccination or otherwise reason for refusal.

A series of screening and self-assessment instruments with a high degree of reproducibility were used, all of which are validated in Romanian language on the Romanian population (Hospital Anxiety and Depression Scale - study 1; Athens Insomnia Scale - study 1; Zung Anxiety Self-Assessment Scale - study 2, 3, 4; Cohen's Perceived Stress Scale - study 3; Connor Davidson CD-Risc-10 Scale - study 3; International Health and Behaviour Survey - study 4).



For the proper conduct of the research, the scientific research ethics approvals were obtained both from the University of Medicine and Pharmacy "Carol Davila" Bucharest and from the College of Physicians in Bacau, in whose jurisdiction the data collection of study 2 and 3 was conducted. Study participants were informed about the purpose and significance of the study and gave informed consent to participate in the study.

### **Study 1. Mental health during the COVID-19 pandemic.**

The results of this study provide initial information on the rates of anxiety, depression and insomnia among the working population in Romania, one year after the onset of the COVID-19 pandemic, as well as the modulating factors associated with positive screening for these mental health disorders. The present study demonstrated a number of associations between anxiety levels and various demographic, psychosocial and clinical factors.

More than 4 out of 10 respondents (40.5%) experienced symptoms of anxiety, while almost a quarter (23.7%) experienced depressive symptoms. The items with the highest mean values were those concerning feeling tense/tired, feeling that something bad is about to happen and slowing down of useful performance. More than 2 in 10 respondents (21.29%, n = 132) scored above the threshold score for insomnia, and 39.03% (n = 242) experienced minor sleep disturbances. All these results indicate an exacerbation of anxiety, depressive and hypnic disorders, results consistent with the initial hypothesis that the current pandemic context associates an increase in psychiatric symptomatology associated with prolonged stress, with anxiety being the most frequent consequence.

A higher level of anxiety was observed among women, those up to 25 years old, those living alone, those with a lower level of education and those known to have at least one pre-existing comorbidity. Physical activity and exercise intensity was statistically significantly correlated with lower anxiety, with anxiety decreasing with increased exertion.

With respect to SARS-CoV-2 infection, those who had experienced the disease were associated with lower levels of anxiety than those who had not been infected. Infection or death due to COVID-19 of loved ones is not a risk factor for anxiety in the studied group.

## **Study 2. Characteristics of anxiety during the COVID-19 pandemic.**

As for the group studied, 4 out of 10 respondents (40.8%) scored above the threshold value on the anxiety scale. Regarding the severity of symptoms, 33.2% had mild intensity anxiety symptoms, 6.6% moderate intensity and 1.0% severe intensity symptoms. The most common anxiety symptoms were pessimism, related to the psychological domain, and anxiety, sweating and difficulty falling asleep, related to the somatoform domain.

Women scored significantly higher on anxiety, and respondents over 55 were more likely to have anxiety symptoms above the screening threshold. Lower educational level, lack of involvement in professional or academic activities (unemployed, retired), sedentariness were correlated with higher anxiety scores. The presence of at least one somatic co-morbidity was also associated with higher anxiety. In contrast to Study 1, those not living alone associated more intense anxiety symptoms.

With reference to the main sources of information about SARS-CoV-2 infection, the anxiety index measured using the SAS scale was positively correlated with the choice of internet as the first source of information, thus respondents who were mainly informed by blogs, social networks and websites had higher scores on the anxiety screening scale.

## **Study 3. Anxiety, perceived stress, and resilience during the COVID-19 pandemic.**

The spread of SARS-CoV-2 has been associated with a natural increase in concerns in the general population. Low levels of resilience as well as increased levels of stress are predictors of the occurrence of anxiety, particularly when we are talking about the loss of a close person (Figure 2). Resilience is negatively associated with perceived levels of stress (Table 1). Among the population studied, the severity of anxiety symptoms was not associated in any way with infection, intensity of illness symptoms or time elapsed since the illness.

Table 1: Interscale correlations

		<b>Resilience (RISC-10 CD)</b>	<b>Perceived stress (PSS)</b>	<b>Anxiety (SAS)</b>
<b>Resilience (RISC-10 CD)</b>	Pearson Correlation	1	-0.676 **	-0.551 **
	Sig (2-tailed)		0.000	0.000
<b>Perceived stress (PSS)</b>	Pearson Correlation	-0.676 **	1	0.622 **
	Sig (2-tailed)	0.000		0.000
<b>Anxiety (SAS)</b>	Pearson Correlation	-0.551 **	0.622 **	1
	Sig (2-tailed)	0.000	0.000	

Note. SAS = Self-rated Anxiety Scale, CD RISC-10 = Connor-Davidson Resilience Scale 10-item version; PSS = Cohen's Scale of Perceived Stress. \* Correlation is significant at the 0.05 level (2- tailed). \*\* Correlation is significant at the 0.01 level (2-tailed).

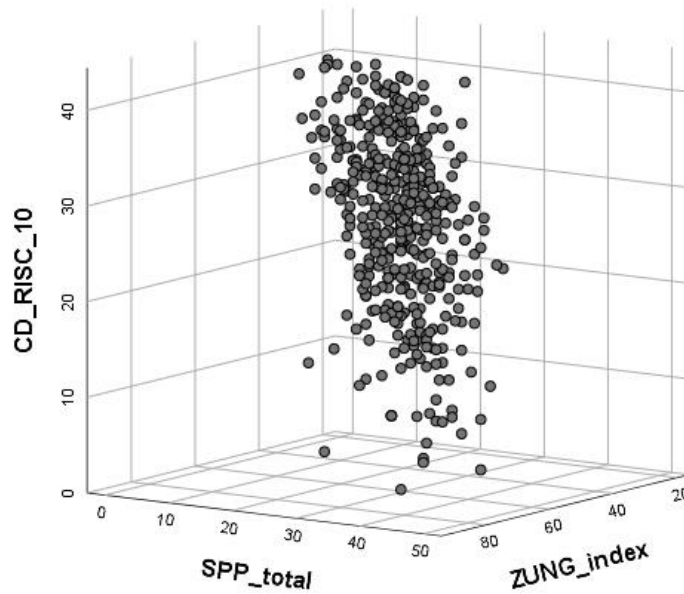


Figure 2: Interscale correlations (Simple 3D Scatter anxiety-resilience-perceived stress). ZUNG\_index = anxiety index, CD\_RISC\_10 = resilience level, SPP\_total = perceived stress level.

According to our findings, patients who sought care from their GP during the pandemic had a high level of anxiety, which was related to a variety of predictors such as gender and age, the presence of pre-existing comorbid conditions. Anxiety was also associated with socioeconomic and occupational status.

Thus, in the context of the current crisis, it is essential to identify people who are prone to developing anxiety disorders. It is imperative to establish a screening method for anxiety in primary healthcare units and to draw up a guide for general practitioners on recommendations for psychotherapeutic and psychopharmacological interventions.

Harnessing these possibilities is essential for managing the increased demands for mental health care that will arise because of a crisis such as the COVID-19 pandemic and for minimizing existing disparities in access to mental health care.

#### **Study 4. Anxiety, Sanogenic Behaviours and Vaccination**

In terms of general perceptions of the pandemic, the findings from previous studies remain the same, with respondents most frequently experiencing a negative impact on interpersonal relationships, with the main anxieties continuing to be related to the risk of infection and death of loved ones, concerns about the capacity of the medical system and social isolation.

More than 40% of respondents experienced anxiety symptoms of varying severity: mild 31.7%, moderate 8.4%, severe 1.2%. Only 1 in 10 respondents who scored above the threshold had a psychiatric diagnosis, and less than half of these were also receiving treatment at the time of the survey. Positive screening for anxiety symptoms was statistically correlated with lower educational attainment, parenting status and number of children, lower income during the pandemic and poorer family financial background.

Compared to those who believe the virus exists and is a serious threat and those who believe the virus exists but is not a threat, those who believe SARS-CoV-2 does not exist had the highest level of anxiety. Participants with moderate and severe COVID-19 infection symptoms reported significantly higher levels of anxiety compared to those who were asymptomatic or had only mild symptoms. For SARS-CoV-2 infection, higher levels of anxiety were associated with symptom severity in infected individuals requiring hospital admission. In patients infected with SARS-CoV-2, the presence of dyspnoea, headache and fatigue were associated with more severe anxiety symptoms.

A higher reluctance to vaccination was observed among women, those aged 25 to 44, those with a lower level of education and those without an occupation. Also, those who consider themselves fairly poor had a higher refusal rate. People who are single and not in a stable relationship showed a higher intention to vaccinate. One of the most important determinants of intention to vaccinate was the presence of somatic comorbidities,

particularly cardiovascular and metabolic comorbidities. A higher rate of vaccination was also observed among those who have or have had close contacts infected. On the other hand, self-reportedly religious people and those whose income decreased during the pandemic showed lower vaccination intention.

Following multiple linear regression, predictors from the individual characteristics category, with an accuracy of 30.6% and a total coefficient of 35.828, to predict higher levels of anxiety include: satisfaction with own life, self-rated health status, presence of pre-existing psychiatric comorbidity, presence of pre-existing somatic comorbidity, gender, age, occupational status, marital status (Table 2, Figure 3).

Table 2: Multiple linear regression predictors of anxiety  
(Individual characteristics)

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	%
	B	Std. Error	Beta			
Intercept	35.828	2.220		16.140	.000	
satisfaction with own life	4.573	.342	.319	13.376	.000	0.480
self-rated health status	1.924	.251	.173	7.155	.000	0.156
pre-existing psychiatric comorbidity	-7.007	1.029	.165	7.293	.000	0.124
gender	3.346	.593	-.119	-5.158	.000	0.082
presence of pre-existing somatic comorbidity	2.569	.556	.128	5.300	.000	0.056
age	-.100	.020	-.144	-5.898	.024	0.037
student	2.487	.639	-.039	-1.756	.031	0.037
unemployed	2.577	.249	-.025	-1.088	.001	0.032
marital status	2.238	.117	.001	.035	.013	0.016

a. Dependent Variable: Anxiety Index

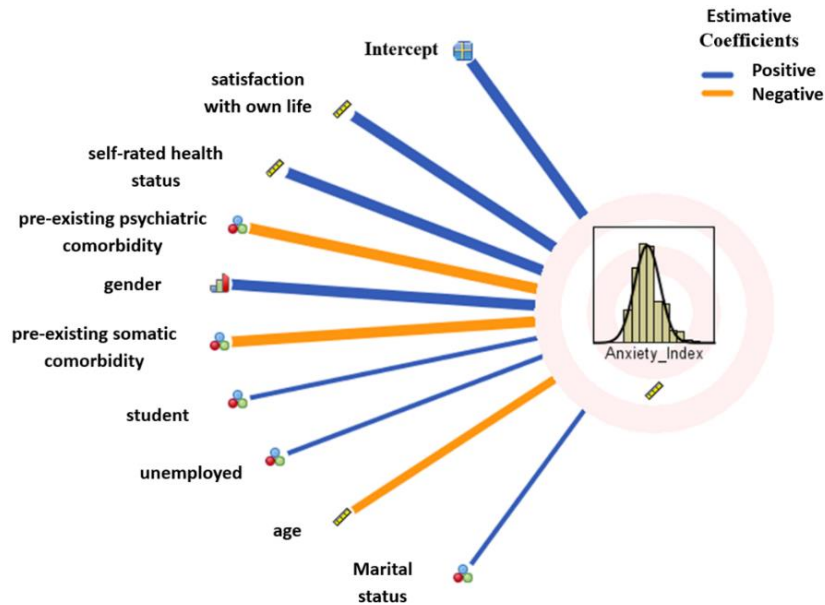


Figure 3: Multifunctional Statistical Model. Main individual predictors of anxiety level by effect size

Following multiple linear regression, predictors from the category of stressors associated with the COVID-19 pandemic, with an accuracy of 9.5% and a total coefficient of 54.506, to predict a higher level of anxiety include: fear of death, fear of infecting loved ones, decreased income, social isolation, belief that the virus does not exist, severity of symptoms of infection, stigma in case of infection (Table 3, Figure 4).

Table 3: Multiple linear regression predictors of anxiety (Pandemic-associated stressors)

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Importance
	B	Std. Error	Beta			
Intercept	54.506	1.054		51.726	.000	
decreased income	-4.005	.582	-.102	-6.879	.000	0.379
fear of death	-4.165	.738	-.143	-5.642	.000	0.255
social isolation	-1.933	.526	-.165	-3.675	.000	0.108
severity of symptoms of infection	7.858	2.2279	.144	3.448	.001	0.095
fear of infecting loved ones	-1.763	.562	-.047	-3.137	.002	0.079
perception of virulence	-1.526	.598	-.097	-2.551	.011	0.052
stigma in case of infection	-1.707	0.877	-.078	-1.946	.052	0.030

a. Dependent Variable: Anxiety Index

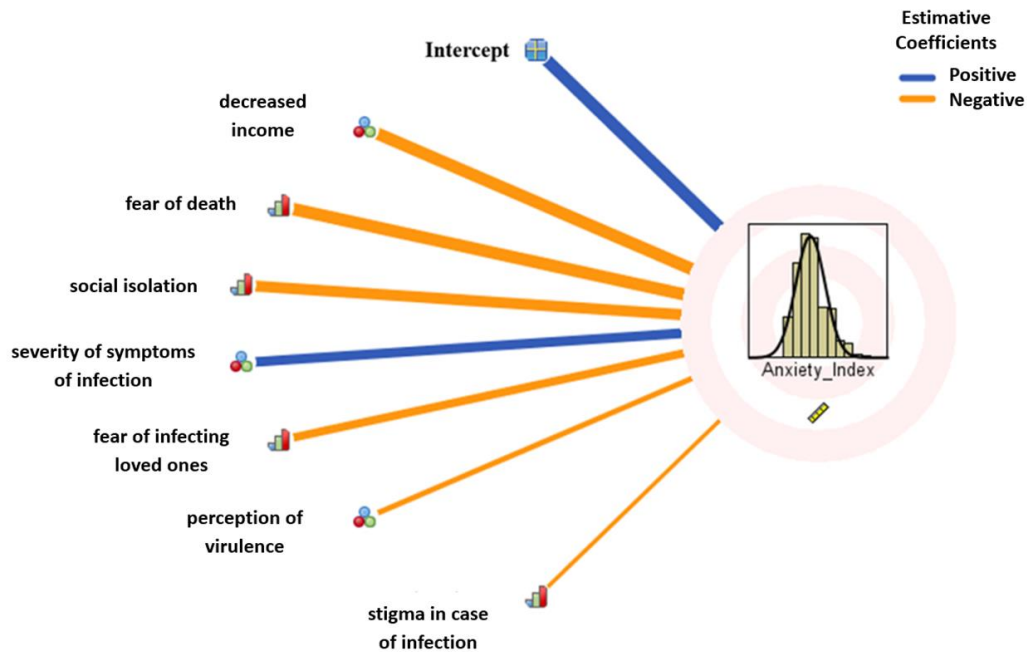


Figure 4: Multifunctional Statistical Model. Main pandemic-associated stressor predictors of anxiety levels by effect size

Those who fear for their health and the health of those close to them showed an above-average intention to vaccinate, while those concerned about job loss and economic developments, as well as those worried about possible family conflicts, showed a higher reluctance. Respondents whose primary source of information is either acquaintances, friends, or family members were more reluctant to vaccinate than those whose primary source of information was medical personnel. Those who relied on information supplied by medical professionals exhibited the strongest desire to vaccinate.

### General conclusions and personal contributions

Findings will be presented in line with the research objectives.

### Main objective

*Assessment of the prevalence of anxiety manifestations in the Romanian population in a pandemic context using the SARS-Cov2 virus as a model.*

In response to the main objective of the PhD thesis, the prevalence of anxiety symptoms in the samples studied ranged from 40.5% to 49.3% according to the studies constituting this paper, with a range of mild anxiety from 17.9% to 38.6%, moderate anxiety from 6.6% to 17.1% and severe anxiety from 0.8 to 5.5%. Comparing the results of the 4 studies (Table 4), the variations in the prevalence of anxiety in the 4

studies can be explained by the use of two different scales to measure anxiety, with the HADS scale being used in study 1, while the SAS anxiety self-assessment scale was used in the methodology of studies 2, 3 and 4. According to the results, the HADS scale seems to overestimate the severity of anxiety symptoms, although the overall prevalence is consistent. On the other hand, the use of 3 different means of data collection seems to influence the overall prevalence of anxiety, with the use of written questionnaires being associated with higher inclusion sensitivity.

Table 4: Prevalence of anxiety symptoms in the studied samples

Study	General anxiety	Mild symptoms	Moderate symptoms	Severe symptoms
Study 1 ( <i>n</i> = 620)	40.5%	17.9%	17.1%	5.5%
Study 2 ( <i>n</i> = 196)	40.8%	33.2%	6.6%	1%
Study 3 ( <i>n</i> = 440)	49.3%	38.6%	9.9%	0.8%
Study 4 ( <i>n</i> = 1552)	41.3%	31.7%	8.5%	1.2%

## Secondary objectives

1. *Identification and quantification of the main mental disorders during the pandemic (comparison of prevalence's of anxiety, depression, and insomnia - study 1).*

The prevalence of anxiety was high throughout the Phase 1 study, with over 40% of respondents reaching the clinical threshold on the anxiety scale, while the clinical threshold for depression was reached by 23.7% and for insomnia by 21.29%.

According to the results of study 1, 40.5% experienced anxiety symptoms (mild 17.90%, moderate 17.10%, severe 5.50%), 23.7% experienced depressive symptoms (mild 14.03%, moderate 8.39%, severe 1.29%), while 21.29% scored above the threshold score for insomnia and 39.03% for minor sleep disturbance.

2. *Identify population groups at risk of developing anxiety disorders in the event of a disaster.*

3. *Identify the main protective factors against anxiety during pandemic.*

The main factors that have been associated with high levels of anxiety could be grouped into two broad classes: individual characteristics (gender, age, place of residence, presence of comorbidities, occupational status, marital status) and stressors



directly associated with the pandemic (economic stability, main sources of information, infection of close ones, social isolation). In turn, these categories are modulated by regional, cultural, and legislative particularities (Figure 5).

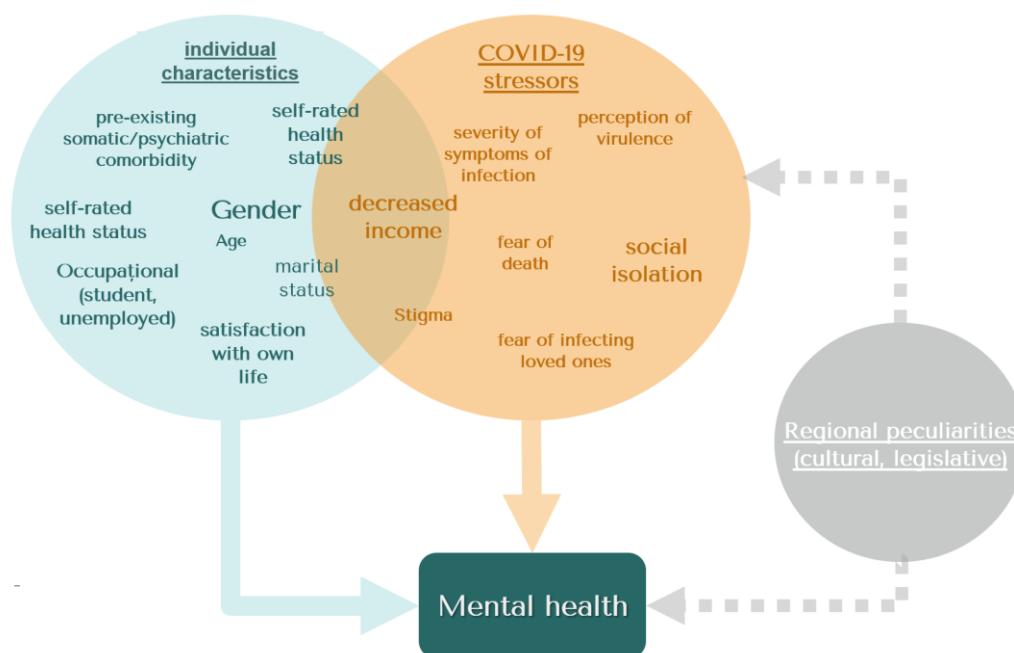


Figure 5: Main factors that were associated with high levels of anxiety

*4. Identify the main protective factors against anxiety during the pandemic.*

Regarding the correlations between anxiety, resilience and perceived stress, low levels of resilience as well as high levels of stress are predictors of the occurrence of anxiety, especially when talking about the loss of a loved one, while resilience is negatively associated with perceived stress levels.

*5. Impact of main sources of information on anxiety levels.*

Information about SARS-CoV-2 infection as well as the main prophylactic measures, mainly from the media (study 3), the internet (study 2) or non-medically trained persons such as family members, friends or colleagues (study 4), was associated with more pronounced anxiety symptoms.

*6. Perspectives on vaccine uptake.*

The highest reluctance to vaccinate was observed among women, those between 25 and 45 years old, those who declare themselves religious and those who get their information mainly from friends or colleagues. On the other hand, a higher rate of vaccination or intention to vaccinate was observed among those under 25 or over 45, those living in urban areas and those with a high economic status. The presence of somatic comorbidities as well as the existence of an infected close relative are also

good predictors of willingness to vaccinate (Figure 6).

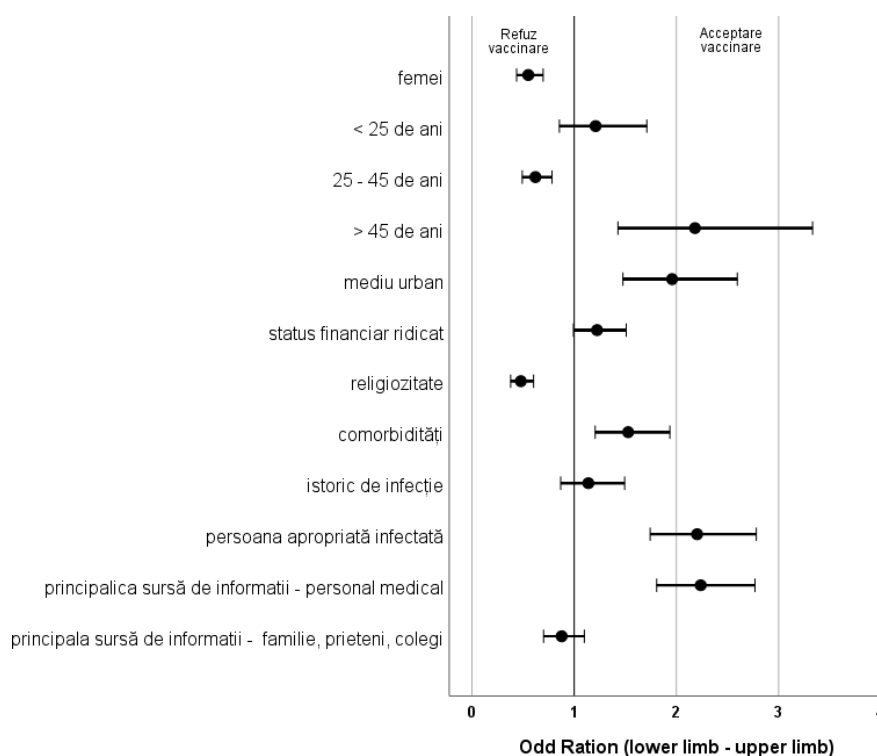


Figure 6: Perspectives on the uptake of vaccination.

### Future directions

The COVID-19 pandemic was an unprecedented global experience that affected all of humanity in multiple ways. Future research is needed to further explore the impact of the pandemic on anxiety and identify the most effective prophylactic modalities.

**Evaluation of the effectiveness of interventions:** It is essential to create structures centered around primary care clinics to support community psychiatry in the context of emergency situations such as the current pandemic. Thus, family medicine practices, following prior training, can provide screening for anxiety disorders and other psychiatric disorders, and participate in non-pharmacological interventions, within the limits of their competence.

**Crystallisation of risk and protective factors:** In order to fully understand the particularities of psychopathological manifestations of anxiety during a crisis situation, such as the COVID-19 pandemic, future longitudinal and more inclusive studies on possible modulating factors are needed.

**Studying adaptation to the new context:** the pandemic has changed the way people live and interact, and there is a need to explore how people adapt to this new reality.

**Use of technology in mental health services:** There is a need to explore the effectiveness of mobile apps or online consultations and counsellors that could be used to help people cope with pandemic anxiety and improve access to mental health services in times of crisis.

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## List of published papers

### Scientific articles published in extento in Clarivate Web of Science listed journals.

1. **Ionescu, T. C.**, Fetecau, B. I., Boscaiu, V., & Tudose, C. (2021). Anxiety, Perceived Stress, and Resilience during the COVID-19 Pandemic: Population Estimates of Persons Presenting to a General Practitioner in Romania. *Brain Sciences*, 11(11), 1541. <https://doi.org/10.3390/brainsci11111541> (F.I. = 3.394) (Capitolul 7)
2. **Ionescu, T. C.**, Fetecau, B. I., Giurgiuca, A., & Tudose, C. (2022). Acceptance and Factors Influencing Acceptance of COVID-19 Vaccine in a Romanian Population. *Journal of Personalized Medicine*, 12(3), 452. <https://doi.org/10.3390/jpm12030452> (F.I. = 4.945) (Capitolul 8)
3. **Ionescu, T. C.**, Fetecau, B. I., Zaharia, S., Mînecan, E. M., & Tudose, C. (2023). Sleepless Pandemic: A Cross-Sectional Analysis of Insomnia Symptoms among Professionally Active Romanians during the COVID-19 Pandemic. *Sustainability*, 15(2), 1191. <https://doi.org/10.3390/su15021191> (F.I. = 3.889) (Capitolul 5)

### Scientific articles published in abstract in Clarivate Web of Science listed journals.

1. **Ionescu, T. C.**, Minecan, E., Zaharia, S., & Tudose, C. (2021). Impact of covid-19 pandemic on sleep quality in students and employees. *European Neuropsychofarmacology*, 55, S135-S136. <https://doi.org/10.1016/j.euroneuro.2021.10.180> (Capitolul 5)
2. **Ionescu, T. C.**, Boscaiu V., Fetecau, B. I., & Tudose, C. (2022). Psychological resilience and anxiety in response to COVID-19. *European Psychiatry*. <https://doi.org/10.1192/j.eurpsy.2022.1232> (Capitolul 7)
3. **Ionescu, T. C.**, & Tudose, C. (2022). COVID-19-related information sources and anxiety levels. *European Psychiatry*. <https://doi.org/10.1192/j.eurpsy.2022.785> (Capitolul 8)
4. **Ionescu, T. C.**, Minecan, E., Zaharia, S., & Tudose, C. (2022). Prevalence of anxiety and depression among students and employees during the COVID-19 pandemic. *European Psychiatry*. <https://doi.org/10.1192/j.eurpsy.2022.784> (Capitolul 5)