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Foreword from the Rector of Semmelweis University

The importance of well-being and good practices at Semmelweis University during the COVID-19 pandemic

Béla MERKELY [1]



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The COVID-19 pandemic that hit Hungary in 2020 has put the healthcare system to a test we have not seen for decades, and not only in Hungary but all around the world. The unknown nature of the virus presented the initial challenge, followed by organizing protection, the care of the infected, the additional workload due to the rising number of cases, and the mass administration of vaccines. Today, we can say that the pandemic is in decline and we are winning, but this does not mean that we can sit back: post-COVID clinics have been opened in several Semmelweis University institutes and clinics, dealing with the virus' long-term effects. So, the fight against infection is not over; it has just been transformed.

Semmelweis University has been at the forefront of this fight since the virus first appeared in Hungary. On a national level, we have taken a prominent role in PCR testing, patient care, vaccination and scientific research on SARS-CoV-2, while also taking responsibility for providing credible information to the public. Our doctors, nurses, teachers and students served there at screenings, at vaccination points, at the bedside, in the labs – wherever help was needed. Moreover, students have also stood by their studies, because life at Semmelweis University has not stopped during the pandemic: education continued in a hybrid format, and thanks to our curricular reform, which aimed to make education more practice-oriented, a large number of our students were able to start work with confidence, having already gained experience in patient care. From December 2020 to April 2022, 7374 of our students became involved in the fight against COVID-19, working for the National Ambulance Service, in hospitals, clinics or alongside GPs.

However, an epidemic is not only physically but also mentally demanding. The last more than two years have been full of change and insecurity for all of us: most people have had to deal with confinement, isolation, existential dread, lack of access to services. We were unable to live our lives as we used to live them – this in itself causes stress, not to mention fear of the unknown, the pandemic's unpredictability or the fact that crowds have had to face serious, unsolvable difficulties. All of this affected health workers even

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more, because the virus existed not just as a threat that in many cases remained invisible, but as a very real enemy that they had to face every day during their work.

That is why we have done everything we can at Semmelweis University to protect the mental health of Semmelweis Citizens, not just their physical health. The strength of our institution lies in our staff and our students – as one of the largest health care providers in the country, our university community is the equivalent of a medium-sized city, and we are all responsible for them. In the weeks following the outbreak of the virus, we had already provided a number of support services to help those serving on the frontline. As part of the Family Friendly University Program, launched in 2019 to support the wellbeing of our citizens, students are helped by the University Counseling Service of our Institute of Behavioral Sciences, while staff are supported by the Employee Advisory Service in the Semmelweis Center for Health Development.

At the University, we confess that as well as healing disease, it remains just as important to maintain health, to engage in prevention – it is no coincidence that we talk about health and not disease. In this spirit, we place a high priority on supporting mental health through psychological skill-building methods, counseling, or the mindfulness and stress management group as an optional course which is also a part of the curriculum. Even indirectly, we support mental health through our Semmelweis Center for Health Development, various sports grants, and the Green University program. These initiatives converge at numerous points to improve our university citizens' well-being . The fact that our university is a founding member of EUniWell (European University Association) – which was established in 2020 and now has eight European higher education institutions; it aims to improve the physical and mental well-being of university students and staff – proves how crucial the well-being of Semmelweis citizens remains to us. In the Times Higher Education (THE) 2021 Impact ranking, Semmelweis stood ranked among the top ten universities of the world in the Health and Well-being category – another sign that we are on the right track.

The COVID-19 pandemic has focused everyone's attention on the health sector – it's important not to forget those working in this area. They are the ones who have chosen one of the most beautiful and difficult professions in the world, one that lasts a lifetime. However, in order for one to really work for the health of others for the rest of one's life, it is essential to look after one's own health – a point made in this present issue of the European Journal of Mental Health published by the Institute of Mental Health at Semmelweis University, which I am particularly pleased to see.

Béla Merkely, MD, PhD
Rector of Semmelweis University

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Foreword from the Editor-in-Chief

An issue dedicated to COVID-19 research in Europe and beyond in the renewed European Journal of Mental Health

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Welcome to the second issue of the renewed European Journal of Mental Health (EJMH), established in 2006 by the Institute of Mental Health Semmelweis University. EJMH is an international, interdisciplinary, open-access, peer-reviewed journal that publishes research in social and behavioral sciences focusing on mental health, personal and relational well-being, and quality of life. After 15 years of hard and systematic work with enduring achievements by the previous editor-in-chief and editorial board, in 2022 the Journal, for the first time, has been given all the means to attain a significantly higher-ranking position in the near future. This means that from 2022 onward, Semmelweis University – as the owner and publisher of the EJMH – assigns significant and substantial financial support to the Journal.

Amid such promising circumstances, we published our first renewed issue in June 2022, and now the second one is finally completed and ready to be published in October. This issue is dedicated to COVID-19 research in Europe and worldwide, containing a collection of articles that were submitted to our Journal during the previous two years focusing on COVID-19. We are in line with several other journals that since 2020 either deliberately or unintentionally review and publish a continuously increasing number of articles related to the pandemic caused by SARS-CoV-2. Just a glimpse to show the extent of this scientific interest: according to LitCovid, a literature hub for tracking up-to-date scientific information about the novel SARS-CoV-2, there are 288 782 (and still growing) relevant articles published in PubMed only! (https://www.ncbi.nlm.nih.gov/research/coronavirus/)

The present issue serves as a very good example of the interdisciplinary and international nature of EJMH. We can say that the eleven papers yield a worldwide representation of how different groups (age groups, professional groups, and groups with different mental illnesses) lived and experienced hardships during the pandemic. The authors and their subjects hail from Europe (Croatia, Greece, Portugal, UK, Italy, and Hungary), Russia, Asia (Malaysia, Indonesia, Philippines), and the US.

By now it is an evidence-based, well-known fact that the pandemic's impact was pervasive and quite serious to young people's

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and students' mental health and learning abilities. In this issue's first section, more than half of the papers (six out of the eleven) focus on young people: university, college, or high-school students.

Interestingly, in some way or another, in their findings based on quantitative or qualitative approach, all six papers come to the conclusion that an urgent need exists for greater accessibility of mental health care for young people.

Another important group that stayed seriously involved both mentally and physically during the pandemic while doing the everyday routine consisted of the helping professionals. From a Hungarian study (Pilinszki et al.), it turned out that the burden on health and social care workers stood significantly higher than on members of other helping professions. The Russian paper's (Korehova et al.) sample also focuses on health professionals; the authors aim to identify the features of anesthesiologists-reanimatologists' emotional states in different COVID-19 pandemic periods.

During COVID-19, resilience – the study of the protective factors; i.e. to name the keys for a successful and healthy survival – also remains in the center of research interest. Thus, in the present issue we offer two papers (Biassoni et al. from Italy and Sherman et al. from the US) focused on this. Again, it is emphasized: optimism, hope, a positive attitude and gratitude all benefit our well-being, preventing harm in times of need.

This issue of the Journal only has one review paper (Tolsá & Tolsá). This paper offers a systematic review on what we know about the relationship between the COVID-19 pandemic and obsessive-compulsive disorder (OCD). It also seeks examples on interventions carried out, their effectiveness, and the proposal of intervention in future situations similar to the one studied.

Since all papers bear recommendations for further research and/or implications for mental health professionals, I hope readers make good use of the present and all the coming articles published in this Journal. In the meantime, I also encourage both authors and readers to initiate meaningful discussions, debates, and collaborations. The Editorial Board of EJMH welcomes your contributions and looks forward to more fruitful research to come.

The EJMH staff looks forward to further renewal with a new design and new professional guidelines. After this year's third and last issue, coming out in December, we will move to continuous publication (1-3 articles per month) from 2023. On behalf of the current Editorial Office and Editorial Board, I invite you to follow the Journal's development (www.ejmh.eu).

Finally, I would like to take this opportunity to thank the former editorial board members, peer reviewers, contributing authors, new editorial office members and many others for making the EJMH into what it is now. Special thanks go to my three colleagues, Melinda Winkler, Ildiko Danis, and Balint Balazs for their enormous work and encouragement throughout these past years.

Beáta Dávid, PhD
Editor-in-Chief
European Journal of Mental Health

SECTION A:
MENTAL HEALTH OF UNIVERSITY STUDENTS

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RESEARCH ARTICLE

Affective Symptoms and Traumatic Stress Among College Students at Risk for ADHD During the Second Lockdown in Greece

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Introduction: Due to the pandemic, individuals with ADHD have been facing noticeable challenges in their daily life. Prolonged quarantine and isolation may contribute to higher affective and PTSD symptoms among college students with ADHD.
Aims: The study aimed to explore the impact of COVID-19 on affective symptoms such as depression, anxiety, stress, along with loneliness and post-traumatic stress on college students at risk for ADHD in Greece during the second COVID-19 lockdown in November 2020.
Methods: A sample of 362 students completed an online survey consisting of demographic questions and four instruments: the ADHD Self-Report Scale-V1.1 (ASRS-V1.1), the DASS-21, the UCLA Loneliness Scale, and the PTSD checklist (PCL-5).
Results: Over 18% of the students met the criteria for being at risk of ADHD, which is higher than in other studies conducted prior to the pandemic. Students at risk for ADHD reported significantly higher ($p < .05$) mean scores on all scales: depression, anxiety, stress, loneliness, and post-traumatic stress. A model to predict at-risk ADHD diagnosis indicated those who presented symptoms of depression, had low GPA, who were employed, were 46% more likely to struggle with ADHD.
Conclusions: This study indicates that the pandemic may have adversely affected individuals at risk for ADHD. Recommendations for further research and implications for mental health professionals are discussed.

Keywords: attention deficit, neurodiverse, pandemic, college students, mental health, Greece

Introduction

In December 2019, COVID-19 was identified in Wuhan, China, and spread rapidly, causing a worldwide outbreak of acute infectious pneumonia (Cao et al., 2020; Wang et al., 2020). In order to control the spread, governments implemented restrictive measures on all aspects of life – such as work, travel, and education. Those measures disrupted daily life, affected personal relationships, and caused significant emotional distress, which manifested as depression, anxiety, stress and post-traumatic stress, insomnia, worries about physical health, anger irritability, loneliness, and suicidal ideation (Hao et al., 2020; Lahav, 2020; McGinty et al., 2020; Pan et al., 2021; Wang et al., 2020). As expected, this pandemic brought unprecedented psychological pressure also on college students who reported especially elevated rates of depression and anxiety (Li et al., 2021). Initial research indicated that

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individuals with ADHD were bound to deteriorate due to the additional stress and loneliness, and there has been a call for research (Becker et al., 2020; Cortese et al., 2020; Pan et al., 2021; Sibley et al., 2021; Yao et al., 2020).

The purpose of the current study is to explore the impact of depression, anxiety, stress, and post-traumatic stress symptoms, on undergraduate and graduate college students who possessed an elevated risk for ADHD during the second lockdown in Greece.

COVID-19 and the quarantine severely affected people's mental health and resulted in elevated rates of depression, anxiety, stress, traumatic stress and sleep problems (Javed et al., 2020; Liu et al., 2021; Sheridan Rains et al., 2021). College students were unexpectedly displaced from their dormitories peer groups and were forced to abandon their college experience. They were required to suddenly leave campus – often without their belongings – while they were instructed to continue their academic work remotely (Copeland et al., 2021; Oddo et al., 2021). Soon, research indicated the effects on mental health. A study in the United States found that the majority of college students (83.8%) reported an increase in anxiety, depression, and loneliness (Lee et al., 2021). Similarly, other studies indicated that students were at a higher risk of anxiety and depression (Esterwood & Saeed, 2020; Solomou & Constantinidou, 2020). Additionally, a meta-analysis showed that during the COVID-19 pandemic, that 39% of college students reported depression, disproportionately higher as compared with the global prevalence of depression reported in 2015, by WHO which was 4.4% (Li et al., 2021). Furthermore, a study from five western countries indicated that COVID-19 could lead to PTSD-like symptomatology and worsen other related mental health problems (e.g., anxiety, depression, psychosocial functioning) (Bridgland et al., 2021).

Following the reopening of the economy in Greece during the summer of 2020, COVID-19 cases increased and a second nationwide lockdown was implemented. This lockdown included uniquely strict measures such as a curfew at 7:00 pm, and a travel ban beyond two kilometers (General Secretariat for Civil Protection, 2020). A cross-sectional study in Greece conducted in April of 2020 showed that 22.8% of the general population reported moderate to severe symptoms of depression. These rates were higher as compared to the rates reported in other countries (Javed et al., 2020; Parlapani et al., 2020). Universities in Greece were forced to reconfigure their educational programs to go online in response to health challenges and social distancing requirements (Banks et al., 2020; Morley & Clarke, 2020). These changes were particularly challenging as Greece ranks low (27th out of 28 EU member states) in the Digital Society and Economy Index (DESI), which measures digital performance and competitiveness, internet connectivity, and use of digital skills (European Commission, 2019).

ADHD and the COVID-19 Pandemic

Attention-deficit hyperactivity disorder (ADHD) is a lifespan, neurodevelopmental condition that is estimated to affect 5-10% of children, and 3-5% of adults (APA, 2013; Becker & Fogleman, 2020; Chan & Mo, 2021). ADHD constitutes a public health issue, as it can affect all aspects of life, and can even reduce life expectancy by as much as seven to nine years (Barkley & Fisher, 2019). Individuals suffering from ADHD experience challenges in several aspects of life, such as education, occupation, and relationships (Barkley & Fischer, 2019; Becker & Fogleman, 2020; Gormley et al., 2019; McGrath, 2020). Among other indicators, the symptoms of ADHD include disorganization, forgetfulness, irritability, hyperactivity, careless mistakes, and difficulties sustaining attention (APA, 2013). Due to their symptoms, individuals with ADHD struggle with low self-esteem, depression, and anxiety (Shen et al., 2020); they also tend to isolate themselves more and thus have fewer friends (Barkley, 2017).

During the COVID-19 pandemic, individuals with ADHD have been facing noticeable challenges x changes in their symptoms, such as an increase in careless mistakes, disorganization, and reduced motivation (Hamilton et al., 2021; Oddo et al., 2021; Zhao et al., 2021). Individuals with ADHD are particularly sensitive to sudden changes in routines that manifest in disruptions through all aspects of life and a deterioration in their overall lives (Çetin et al., 2020; Hollingdale et al., 2021; Sibley et al., 2021). For example, many online courses required extra attention, the use of new platforms and apps along with keeping up with the rules of social distancing (Laslo-Roth et al., 2022). In addition, they also experienced increased isolation, and initial research indicates that they also struggled academically and/or at work with forgetfulness regarding task initiation and completion, bad organization, as well as worsening mental health issues (Çetin et al., 2020; Cortese et al., 2020; Hollingdale, 2021; Laslo-Roth et al., 2022; Sibley et al., 2021). Considering the impact of the pandemic, one wonders whether they may have also experienced PTSD-like symptoms (Bridgland et al., 2021). It has been widely discussed that an increase in ADHD symptoms – even for a short time, like that of the pandemic – can lead to mental health issues such as depression, anxiety, and long term academic or professional challenges (Becker et al., 2020; Sibley et al., 2021).

Research indicates an overlap between ADHD and PTSD symptoms, such as disorganization and dysregulation (Martínez et al., 2016; Miodus et al., 2021). Although the relationship remains unclear, studies show that children and adults diagnosed with ADHD are at elevated risk for exposure to traumatic events and may develop PTSD-related symptoms (Barkley, 2010; Siegfried et al., 2016). The prolonged quarantine and isolation during COVID-19 may contribute to higher PTSD symptoms similar to those among children and adults (Bridgland et al., 2021; Çetin et al., 2020; Lahav, 2020; Liu et al., 2020).

The purpose of the current study is to explore the impact of affective symptoms – depression, anxiety, stress, traumatic stress, and loneliness – on undergraduate and graduate college students with an elevated risk for ADHD during the second COVID-19 lockdown in Greece.

First, we explored the rates of students at risk for ADHD. Next, the hypotheses put forward were:

H1: *Students at risk for ADHD as compared to students without ADHD will score higher on depression, anxiety, stress, loneliness, and post-traumatic stress symptoms.*

H2: *Depression, anxiety, stress, post-traumatic symptom stress, loneliness, age, gender, GPA, previous ADHD diagnosis, employment, living arrangements, and relationship status, will increase the possibility for ADHD diagnosis.*

Methods

Participants and Data Collecting

An online survey was conducted among a convenience sample of undergraduate and graduate students in Greece through Qualtrics, a secure web-based survey data collection system. The students from tertiary educational level were mainly from health (nursing and medicine) and social sciences (social work, sociology) from both the North and South regions of Greece. The survey took an average of 15 minutes to complete.

Following IRB approval, No. 1462021, data was collected for four weeks from the beginning of the second lockdown on November 9th, 2020. The survey was anonymous, and no data was collected that linked participants to recruitment sources. An informed consent letter was emailed to students describing the nature of the study along with demographic questions and four instruments. As a result, 371 usable surveys were collected while nine were eliminated as incomplete. The total number of the sample was 362 participants. All students identified as Greek and the mean age was 22.5 (*SD* = 5.5), the majority of the respondents identified as female (82.5%). They predominantly reported living with family during the lockdown (72%), were unemployed (78%), and had no previous ADHD diagnosis (71%) (see Table 1).

Table 1. Demographic Characteristics

Age m =22.5 SD 5.5		
Ethnicity Greek (100%)		
Year of study (n = 356)		
1st	74	(20.8)
2nd	43	(12.1)
3rd	71	(19.9)
4th	142	(39.9)
Gender (n = 362)		
Female	298	(82.5)
Male	63	(17.5)
Relationship status (n = 354)		
Single	186	(52.5)
In relationship	146	(41.3)
Engaged/Married	22	(6.2)
Employment status (n = 361)		
Full-time	35	(9.7)
Part time	44	(12.2)
Unemployed	282	(78.1)
Living arrangements (n = 362)		
Living alone	45	(12.5)
Roommate	35	(9.7)
Family	262	(72.4)
Cohabitating	20	(5.5)
Have you been diagnosed with ADHD (n = 361)		
Yes	33	(9.1)
No	259	(71.7)
I do not know	69	(19.2)

Measures

This study utilized a questionnaire that inquired into demographic characteristics, including age, year, ethnicity, gender, relationship, living arrangements, employment status, and previous diagnosis of ADHD. Participants also responded to four scales: the ASRS-v1.1, the DASS-21, the PCL-5, and the UCLA Loneliness Scale.

The Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale (ASRS-v1.1)

ASRS-v1.1 is a five-point Likert-type scale based on the DSM-IV -R criteria developed in conjunction with the World Health Organization. It is an eighteen-symptom checklist, widely used to address the main manifestations of adult ADHD (Green et al., 2018; Kessler et al., 2005). The ASRS-V1.1 has two parts. Part A consists of six items and B consists of 12 items. A score of 4 or greater (> 4) in part A indicates an elevated chance for ADHD diagnosis and part B indicates further issues related to ADHD (Kessler et al., 2005; Adler et al., 2004; Green et al., 2018; Kessler et al., 2005). ASRS-V.1 has been used before in Greece with adults and was considered adequate (Andreadaki et al., 2018). For the purposes of this study, the instrument was translated and validated in Greek using best cultural practices (Beaton et al., 2000).

The translation of the scale had a high level of internal consistency, as determined in our sample by a Cronbach's alpha of .863.

Depression, Anxiety Stress Scale - 21 (DASS-21)

Psychological distress was measured with the 21-item DASS (Lovibond & Lovibond, 1995). The DASS-21 yields three subscales, each comprising seven items scored on a four-point Likert-type scale from never (0) to almost always (3). Higher subscale scores reflect higher levels of depression, anxiety, and stress in the past week, with a higher sum score representing greater general distress. DASS has been used widely with college populations (Koutra et al., 2020). The Greek translation of the DASS is both reliable and valid, with psychometric properties close to those reported in the international literature as determined by Cronbach's alpha .97. Subscale coefficient alphas were also high ($\alpha_{depression}$ = .94; $\alpha_{anxiety}$ = .91; α_{stress} = .94) (Lyrakos et al., 2011).

Post-Traumatic Stress Disorder Checklist (PCL-5)

The PCL-5 is used for screening individuals for PTSD symptoms (Bovin et al., 2016; Weathers et al., 2013). It is a 20-item self-report measure that assesses the DSM-5 symptoms of PTSD scored using a five-point Likert scale of 0–4 for each symptom, varying from "Not at all," to "Extremely." It has demonstrated high internal consistency reliability (α = 0.94) (Bovin et al., 2016). Similar to Lahav (2020), in this study, the PCL was modified to inquire in the last month of the pandemic. Scoring over 33 is indicative of PTSD (Bridgland et al., 2021). PCL-5 has been used before in Greek and has demonstrated high reliability (.97) (Orovou et al., 2021), and similarly, in this study, it was translated using best cultural practices (Beaton et al., 2000). In our sample the scale indicated high internal consistency (a = .93).

UCLA Loneliness Scale

The UCLA Loneliness Scale consisted of 20 items testing differences in the subjective experiences of social and emotional loneliness for a range of populations (Russell, 1996). Participants rate each item on a scale from 1 (never) to 4 (often). Higher subscale scores reflect higher levels of loneliness. The UCLA revised edition scale has been translated and used in Greek before and has demonstrated internal reliability (α = .89). (Anderson & Malikiosi-Loizos, 1992). The UCLA loneliness scale was translated using best cultural practices (Beaton et al., 2000) and our sample indicated high internal consistency (α = .95).

Data Analysis

The statistical package SPSS 27 was used for data analysis. Data was cleaned to address anomalies. Frequencies and descriptive statistics were run. Next, we ran the Kolmogorov-Smirnov test for Normality of the data, as all scales and scores were not normally distributed. We therefore used non-parametric, Spearman correlations and Mann Whitney U tests to explore associations between the presence or absence of ADHD and the variables Depression, Anxiety Stress, post-traumatic stress, and loneliness scores. Finally, binomial logistic regression was used as appropriate when the dependent variable was categorical.

Results

Rates of Students at Risk for ADHD

A significant number of the participants (n = 67, 18.5%) met four out of six criteria in Part A that puts them at risk for ADHD. The mean score of the 18 symptoms reported using the ASRS-V1.1 tool was 4.8 (SD = 3.6). Interestingly in this study, a large number of students reported having received an ADHD diagnosis in the past (n = 33) 9.1%, while several did not know or said that they should have been diagnosed (n = 69, 19.1%).

A chi-square test for association was conducted between those who reported having been diagnosed with ADHD in the past and those who met the criteria for being at risk for ADHD in this study. All expected cell frequencies were greater than five. There was a statistically significant association between those who had been diagnosed with ADHD in the past and those who met the criteria for ADHD in this study, $\chi^2(1) = 21.043$, $p < .001$.

H1: *Students at risk for ADHD will score higher on depression, anxiety, stress, loneliness, and post-traumatic stress symptoms as compared to students without ADHD.*

The average loneliness score reported in this sample was 26 (SD = 14.3) and the average PTSD score was 21.7 (SD = 14.2). The average DASS score was 22.2 (SD = 14.2). Results for the three subscales were: Depression (M = 7.5, SD = 5.8), Anxiety (M = 5.7, SD = 5.1) and Stress (M = 8.9, SD=5).

Depression, Anxiety, Stress, Loneliness, and PTSD scales were not normally distributed, as assessed by the Kolmogorov-Smirnov test ($p > .05$). In order to test our hypothesis, Mann-Whitney non-parametric tests were run to determine mean differences in scores of Depression, Anxiety, Stress and Loneliness, and PTSD for students at risk for ADHD as compared to those without such risk. Statistically significant differences existed in all scores between students at risk for ADHD and those without risk (see Table 2).

Table 2. Comparing Students at Risk for ADHD to Those Without, DASS, Loneliness & PTSD

Variables	NO ADHD		ADHD				
	M	*(SD)*	*M*	*(SD)*	Mann-Whitney		*P*
Depression	6.6	(5.2)	11.6	(6.1)	*U =5346*	*z=–5.880*	<.001
Anxiety	5.2	(4.9)	8.3	(5.3)	*U =6250*	*z=–4.714*	<.001
Stress	8.2	(4.8)	12	(5)	*U =5660.5*	*z=–5.471*	<.001
Loneliness	20.2	(13.4)	28.7	(15.7)	*U =6760*	*z=–4.008*	<.001
PTSD	24.2	(14.7)	36.7	(18.1)	*U =5822*	*z=–5.197*	<.001

H2: *Depression, anxiety, stress, PTSD, loneliness, age, gender, ethnicity, GPA, previous ADHD diagnosis, employment, living arrangements, and relationship status, will increase the possibility for ADHD diagnosis.*

Categorical variables were recorded as (0) and (1) to reflect presence (1) and absence (0) for variables of employment, ethnicity, relationship status, living arrangements, gender, and a previous diagnosis of ADHD. The Spearman correlation matrix was run to determine variables that were significantly correlated ($p < .05$) with the presence of ADHD.

There was a negative association involving the lower GPA for individuals at risk for ADHD, while the presence of employment, depression, anxiety, stress, traumatic stress, and loneliness scores were positively associated with being at risk for ADHD. Those significant variables were next entered in the binomial logistic regression. Binomial logistic regression was performed to ascertain the effects of the following categorical variables of employment status and the continuous variables GPA, scores depression, anxiety, stress, PTSD, and loneliness in the likelihood that participants manifest ADHD. The logistic regression model was statistically significant, $\chi^2(9) = 40.421$, $p < .0005$. The model explained 42.9% (Nagelkerke R2) of the variance of the chance for ADHD diagnosis and correctly classified 86.5% of cases. Sensitivity was 41.7%, specificity was 96.3%, positive predictive value was 74.2% and negative predictive value was 88.2%. Of the nine predictor variables, only three were statistically significant:

Table 3. Logistic Regression for Students at Risk for ADHD

Predictors (*df* = 1)			95% C.I. for EXP(B)	
	Sig.	Exp(B)	Lower	Upper
Living with others	.357	.394	.054	2.856
Employment status	.059	.294	.083	1.045
Previous ADHD diagnosis	.238	.304	.042	2.196
GPA grades	.005	.306	.133	.702
Depression DASS subscale	.035	1.168	1.011	1.350
Anxiety DASS subscale	.157	1.126	.955	1.327
Stress DASS subscale	.111	.857	.710	1.036
Post-traumatic (PCL) scores	.561	1.017	.962	1.074
Loneliness scores	.116	1.041	.990	1.094
Constant	.020	1094.634		

Depression scores, employment status, and lower GPA. College students with higher scores of depression had 1.01 higher risk for ADHD. Lower GPA and being employed were also associated with an increased likelihood of ADHD (see Table 3).

Discussion

Most ADHD studies were conducted before the pandemic. A call has arisen to examine the pandemic's impact on children and adults with ADHD while there has been an increase in ADHD related referrals (Cortese et al., 2020; McGrath, 2020) but also in reported symptoms and diagnoses (Hollingdale et al., 2021) To our knowledge, this is the first study that explores the impact of affective symptoms – depression, anxiety, stress – and traumatic stress, on undergraduate and graduate students having an elevated risk for ADHD during the second COVID-19 lockdown in Greece.

Students reported higher rates of ADHD symptoms as compared to previous studies. More specifically, approximately 18% of the students met the criteria for being at risk of ADHD. This rate stands higher than in previous studies conducted before the pandemic where the rate ranged between 3-5% (Barkley & Fischer, 2019). Although unclear research during COVID-19 has been slowly showing an increase in symptoms, diagnoses, and medication for ADHD (Hollingdale et al., 2021). Still, caution should be employed when interpreting these results as they may be attributed to methodological selectivity.

In this study, students at risk for ADHD reported experiencing significantly more depression, anxiety, and stress. Per the DASS scoring guide (Lovibond & Lovibond, 1995), the mean scores above indicated mild depression and stress, and moderate levels of anxiety. Similarly, loneliness and traumatic stress symptoms registered higher for students at risk for ADHD as compared to those without. Students with ADHD tend to struggle with depression, anxiety, and stress (Oddo et al., 2021; Solanto, 2015) and during the first months of the pandemic isolation, difficulties initiating tasks, depression, and anxiety were also reported as the main struggles (Hollingdale et al., 2021; Sibley et al., 2021). Similarly to other studies, it could be argued that these findings also demonstrate the potential negative impact of the pandemic on individuals at risk for ADHD (Sibley et al., 2021). Students with ADHD had significantly higher PTSD scores. Individuals with ADHD have been found to have higher rates of traumatic exposure, often making a diagnosis complicated (Miodus et al., 2021). Emerging evidence indicates that the pandemic has been traumatic and may lead to PTSD symptoms (Bridgland et al., 2021; Lahav, 2020; Sibley et al., 2021), and one could argue that some of these overlapping symptoms could have been captured in the elevated PTSD scores. Although further research is needed, these results reflect that the impact of the pandemic in Greece has been traumatic for individuals at elevated risk for ADHD.

We used binomial regression to create a model that could predict the presence of risk for ADHD. Having higher scores of depression, a lower GPA, and being employed made it 46% more likely to be at risk for an ADHD diagnosis. Consistent with the literature, individuals with ADHD are at high risk of depression, as well as academic and employment struggles (Barklay & Fisher, 2019; Becker et al., 2020; Gormley et al., 2019) and

this was the case in this sample. Similarly, in another study, depression and academic struggles ranked among the main risk factors reported during the beginning of the pandemic (Sibley et al., 2021), and in our sample, changes in the routines, adjustment to online academic work and employment may have exacerbated symptoms and difficulties for individuals at risk for ADHD.

PTSD symptoms were significantly higher for students at risk for ADHD but did not contribute to our model, which may again indicate overlapping symptoms and that the escalated PTSD scores are related to the impact of the pandemic.

Strengths and Limitations

This study has several strengths and limitations. The strengths of the study include the fact that data were drawn during the second COVID-19 lockdown in Greece. This is the first study that explores the impact of anxiety, stress, depression, and PTSD, on college students, undergraduates, and graduates with an elevated risk for ADHD in Greece. Our sample size was sufficient to be able to control for several demographic and health variables that might explain the increased risk for ADHD during the COVID-19 pandemic. Another strength of the sample was the inclusion of youth and young adults as ADHD is significantly increased in these populations.

One of the limitations of this study was the sample of convenience, therefore, results cannot be generalized to the overall population. This study included more participants identifying as female, while a more gender-balanced sample would have been more appropriate. In addition, the department that each student attends should have been explored. Participants completed self-report surveys that are less valid as compared to a comprehensive assessment. The study's cross-sectional design precludes any causal relations. As we did not collect data before and during the pandemic, we are unable to measure exactly how the pandemic affected students. Finally, this study did not include measures of potentially protective factors such as social networks and support.

Conclusion, Implications and Future Directions

During the second COVID-19 lockdown in Greece, students at risk for ADHD compared to students not at risk reported higher levels of stress, anxiety, depression, loneliness, and post-traumatic stress. Additionally, being at risk for ADHD is positively associated with low academic performance, current employment, and the presence of depression. These findings can be used by universities to create psychological interventions, and improve mental health for students with ADHD post COVID-19 epidemic. Also, this study can be used to support forthcoming difficulties such as the social impact of isolation and remote learning disengagement.

ADHD is a newly treated issue in Greece. The current findings make substantive contributions to the existing literature for mental health professionals who are in the first line of helping with the assessment and management of ADHD (Chan & Mo, 2021). The survey revealed that 9% of students have a prior diagnosis and 18% of the total sample met the criteria for a diagnosis of ADHD. Issues and complexities associated with diagnosing and early detection of ADHD are crucial to finding the most effective treatments (McGrath, 2020). As discussed earlier, these elevated rates of symptoms may also be a result of the overlapping symptoms of ADHD and PTSD, thus professionals should use suitable metrics to appropriately measure and assess.

COVID-19 and the related physical distancing measures present many challenges likely to be considerably greater for those students at risk of ADHD. Based on our findings, students at risk for ADHD were struggling with depression and other mental health issues during the pandemic. Especially now, mental health services need to explore ways to access and support individuals having ADHD. As it is likely that physical distancing and other mitigating measures will continue, thus treatment of ADHD and other mental health symptoms ought to be prioritized. Universities should take additional measures to protect students with ADHD because of their increased risks for psychological and social challenges.

Overall, limited research on ADHD exists in Greece. Future research should further explore the relationship between depression, anxiety, stress, PTSD, and ADHD. In addition, more males should be included in a more representative sample. Finally, the impact of pressure resulting from employment and education should also be explored in Greece.

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All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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This manuscript is the authors' original work.
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All participants participated in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

Psychological Distress of High School Graduates During Social Distancing in Croatia

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Introduction: The COVID-19 pandemic has influenced the whole world, thus also affecting the high school graduates in Croatia.
Aims: The purpose of the study was to examine the psychological distress high school graduates experienced during the COVID-19 social distancing measures, more precisely to investigate gender and school type differences and to examine the relationship between psychological distress and self-regulated learning.
Methods: In this cross-sectional study, an online questionnaire was administered to 13,037 high school graduates across Croatia.
Results: The results show that girls exhibit higher levels of psychological distress compared to the boys, while the art school graduates show the highest distress, followed by gymnasium (i.e., secondary grammar school, prep school) graduates, and lastly vocational school graduates. Furthermore, a moderate negative correlation was found between self-efficacy and psychological distress, and significant, but small correlations were found between regulation of effort, management of work, time and environment, self-handicapping as well as elaboration and psychological distress. These results show that higher levels of self-regulation are connected to lower levels of psychological distress.
Conclusions: These findings demonstrate that a need exists for greater accessibility of mental health care for adolescents.

Keywords: high school graduates, psychological distress, COVID-19, self-regulated learning, State Matura exams

Introduction

According to the World Health Organization (WHO, 2020), "adolescence is a crucial period for developing and maintaining social and emotional habits important for mental well-being" ("Adolescent mental health" section). It is common knowledge that most mental health problems diagnosed in adulthood begin in early adolescence, and if not treated, continue through life (Knopf et al., 2008). Knopf et al., in their paper, present studies indicating that nearly 25% of youth exhibit symptoms of emotional distress, and about one in ten has moderate to severe symptomatology, most commonly depression, anxiety disorders, and attention-deficit/hyperactivity disorders as well as substance use disorders. These findings are in accordance with WHO's assertion that 10–20% of adolescents globally experience mental health conditions (WHO, 2020). Moreover, research suggests that adolescent

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girls are more likely to experience psychological symptoms and distress than boys, and are more likely to express emotional disturbance inwardly, in the form of depression or anxiety symptoms (Pomerantz et al., 2002; Wilson et al., 2005), whereas boys tend to express disturbance more outwardly, through open behavior (Ostrov et al., 1989). While the majority of adolescents experience stressful life events that can exert a negative impact on their mental health, as well as various daily stressors, such as difficulties in relationships with family, friends or romantic relationships (Low et al., 2012), the most common stressors in adolescents' lives are related to school (De Anda et al., 2000). More commonly, this type of stress is referred to as academic stress, and one of the prominent sources of academic stress for students is school tests and examinations (Kouzma & Kennedy, 2004; Kyriacou & Butcher, 1993; Putwain, 2009).

State Matura Exams

In Croatia, like in many other countries, standardized exams are carried out at the end of secondary education. Those exams are called the State Matura exams. The State Matura exams (like SAT exams), among other purposes, serve as a part of the administration process for higher education, in a way that they are a crucial part of the application for the majority of Croatian universities (Ćurković, 2019). The State Matura exams have an obligatory and an optional part. The obligatory section consists of three exams: 1) Croatian language (or another native language for foreign students), 2) mathematics and 3) foreign language (Ćurković, 2019). The optional part of the State Matura exams includes other school subjects that students choose for themselves based on their interests and requirements by the faculties they are looking to enroll in (Ćurković, 2019). All of the State Matura exams consist of multiple-choice questions and short open-ended questions, while some also have (short) essays – primarily languages (Ćurković, 2019). State Matura exams also represent the end of secondary education for students that attend gymnasium schools; more precisely, after successfully passing Matura exams, gymnasium students gain a certificate which represents the end of their high school education. In Croatia, schools are divided into gymnasiums, vocational, and art schools. Vocational and art schools prepare students for a selected field of profession, while gymnasiums prepare students for continuing education on a higher level. Banks and Smyth (2015) claim that high school graduates consider State Matura-like exams to be very important and influential in their later life. The authors also point out that these types of exams cause students additional stress added to the one they are already feeling because of their school obligations. Moreover, as State Matura exams are one of the determinants for university enrollment, they are considered high-stakes tests, which are typically related to higher stress levels (Heissel et al., 2021).

COVID-19 and Adolescent Mental Health

Besides the stress graduates experience because of the State Matura, at the beginning of the year 2020, they also had to endure difficulties caused by the COVID-19 pandemic. Qiu et al. (2020) found that almost 35% of the participants from China experienced psychological distress during the pandemic. Guessoum et al. (2020) concluded that the pandemic and social distancing have multiple effects on peoples' lives, including adolescents. Some research emphasizes that children and adolescents are under an extra amount of stress in times of social distancing (Clemens et al., 2020), as social relationships constitute a crucial part of their healthy development. Since the mental health of adolescents stands at risk, depressive and anxiety disorders, as well as PTSD, should be expected as the most common consequences (Kar, 2019; Marques de Miranda et al., 2020). Zhou et al. (2020) conducted a survey on adolescents in China and found high rates of both symptoms of depression (43%) and anxiety (37%) during the COVID-19 pandemic. Moreover, Jones et al. (2021) concluded in their research reviews that adolescents experience higher rates of anxiety, depression, and stress due to the pandemic. Similar potential pandemic consequences are highlighted in Croatian psychiatric research (Ćurković et al., 2020). Apart from the listed stressors, students also had to adjust to remote learning. More precisely, at the beginning of the COVID-19 pandemic, Croatia was under a lockdown, which included closing schools and other educational institutions. As a result, students attended online classes and were urged to stay at home and practice social distancing. According to Lazarus and Folkman's transactional theory of stress, cognitive appraisal of the event (stressor) is the key part of emotional response (Biggs et al., 2017). If the event is ascribed as stressful and coping strategies are inadequate, negative emotions and psychological distress might occur. Considering all the described difficulties, it is logical to assume that high school graduates in 2020 were under a considerable amount of stress that could have had a negative impact on their mental health. On that account, Zhang et al.

(2020) underline the need for mental health care during the pandemic as well as during the social distancing measures. Based on demonstrated research, it can be hypothesized that social distancing and the COVID-19 pandemic were an additional source of stress for high school graduates of the year 2020, aside from the usually raised levels of depressive and anxious symptoms that affect graduates as the school year is approaching its end (Smith et al., 2002).

Self-Regulated Learning

According to the definition by Goetz et al. (2013), "Self-regulated learning is a form of acquiring knowledge and skills in which the learners are independent and self-motivated. Learners independently choose their own goals and learning strategies that will lead to achieving those goals" (p. 126). In a traditional school environment, students have a structure defined by class schedule and teachers' control over the learning process in the classroom, which facilitates an external regulation of learning. Accordingly, when external regulation is reduced, such as during distance learning, student self-regulation gains in importance even more than in traditional situations. Considering the complexity of self-regulated learning and the multiple factors it consists of, various theories and models are trying to explore and explain the nature of the concept. For that reason, this paper will present only a few of the variables connected to self-regulated learning, as well as focusing on academic self-efficacy, motivational strategies, and elaboration as learning strategy.

Self-efficacy refers to a person's belief that he or she can accomplish a particular task (Lončarić, 2014). Moreover, academic self-efficacy is associated with many important outcomes, such as better academic success (Britner & Pajares, 2001; Choudhary et al., 2020), stress levels, depression, decision-making and motivation (Bandura, 2002; 2006). On the other hand, motivational strategies are activities that a student conducts to maintain or increase the effort for performing academic tasks. Two of the three strategies in this study relate to effort regulation and management of time and environment, and lead to favorable academic outcomes. The third motivational strategy is self-handicapping, and Berglas (1985, as cited in Lončarić, 2014) describes it as creating obstacles to success in order to maintain a sense of self-worth and positive self-scheme by attributing eventual failure to those obstacles. It is most often expressed by a reduced effort that leads to reduced achievement. Elaboration is the last part of self-regulated learning that falls within the scope of this research and belongs to the in-depth learning strategy. Deep learning is generally considered as desirable, and is positively associated with academic success (Lončarić, 2014).

According to Pekrun (2013), students' emotions are an important part of self-regulated learning since they are closely related to motivation for learning. Furthermore, the same author states that many negative emotions are associated with avoidance motivation and, as a result, more superficial learning strategies. While the relationship between mental health and self-regulated learning has not been extensively researched, a study of medical students by Van Nguyen et al. (2015) found significant negative associations between depression and aspects of self-regulated learning, including all of the subscales used in this paper, except self-handicapping.

Considering all of the extraordinary circumstances occurring in the year 2020, a survey for high school graduates was conducted. The goal of the survey was to gain better insight into the high school graduates' opinions about the State Matura exams, into the attributes of self-regulated learning during remote education, and the determinants of mental health. This article will present some of the collected data, mainly focusing on the mental health of high school graduates in the year 2020. The goal of this study was to take a closer look into the psychological distress of high school graduates during the social distancing measures put in place because of the COVID-19 pandemic.

This goal was further divided into two research problems:

1. to examine the differences in psychological distress levels between the genders and school types
   H1a: girls will show higher levels of psychological distress than boys
   H1b: gymnasium students will show higher levels of psychological distress than vocational students
2. to examine the relationships between self-regulated learning and psychological distress
   H2: higher psychological distress will be connected to lower self-regulated learning.

Methods

The survey was conducted during the school year of 2019/2020. The participants were graduate students of four-year and five-year high schools. The survey was administered in April of 2020, during the social distancing measures and remote learning. The survey was conducted online. It was ensured that only the graduating class of

2020 was able to access the surveys, while the students who were retaking the State Matura exams were not able to see the questionnaire. Before filling out the survey, high school graduates had to verify that they were of age and consent to participate in the research. The survey was completely anonymous.

Sample

The sample consisted of 16,620 graduates who participated in the online survey. The analyses took into account only the answers of the graduates who answered all 10 items of the YP-CORE. Hence, the overall YP-CORE scores were calculated for 13,037 participants, of which 63.2% were female. The higher response rate of female participants is consistent with previous research and gender differences in survey participation (Smith, 2008). All of the participants were of age (18 years old). About 50% of the graduates were attending gymnasiums, 48% were attending vocational schools, while 2% were attending art schools. Gymnasiums take four years to complete and they are a type of general secondary education that acts as a transition between primary school and higher education. Vocational schools take between three and five years to complete and are meant to teach students a certain craft with which they take on a profession. Art schools, like gymnasiums, take four years to complete and they are focused on various art forms.

Instruments

The YP-CORE (*Clinical Outcomes in Routine Evaluation – Outcome Measure for Young Person*) was used as a measure of psychological distress. It consists of 10 items that are designed to measure distress in adolescents. The YP-CORE is a shortened and adjusted version of CORE-OM (*Clinical Outcomes in Routine Evaluation – Outcome Measure*), which is constructed to measure psychological distress in adults (Twigg et al., 2009). The 10 items cover four domains: *risk of self-harm* (one item), *subjective well-being* (one item), *symptoms* (four items) and *problems and functioning* (four items) (Twigg et al., 2009). The Croatian version of the questionnaire was administered with the instruction to answer the questions with regard to feelings and behaviors in the past seven days. The participants answered each question by using a 4-point scale ranging from 0 (*Never*) to 4 (*Almost all of the time*). The overall scores were computed as a sum of the scores on each of the 10 items with the items 3, 5 and 10 reversely scored as the authors, Twiggs et al. (2009), suggested. Reliability of the YP-CORE was calculated using Cronbach's alpha coefficient (α = .89). Twigg et al. (2009) report reliability of the YP-CORE between .72 and .88 during the validation. Thus, the calculated reliability of the YP-CORE in this research is both expected and satisfactory.

Lončarić (2014) develops and lists scales for measuring various aspects of self-regulated learning – *Self-regulated learning component scale* (SRLC). SRLC consists of eight scales and 51 subscales. Since SRLC is a long and an all-inclusive instrument, which is just too detailed and lengthy for students to fill out in its entirety, for the purposes of this research, five subscales were taken from it. Students responded to all particles on a 5-point scale (from 1 = not applicable to me at all to 5 = fully applicable to me). The result of each subscale is obtained by summing all the items in the subscale and a higher result indicates a higher level of the measured construct.

As a measure of self-efficacy, *Self-efficacy in the learning process* was used, which is a subscale in the *Academic Self-Efficiency Scale*. An example of an item from the scale is "I solve homework easily and regularly." The subscale shows satisfactory reliability (α = .79).

The motivational component of self-regulated learning was examined using three subscales of the *Motivational Strategies Scale*.

Effort Regulation and Work, *Time and Environment Management* are strategies to encourage the learning process. *Effort Regulation* consists of five items such as "While solving a difficult task, I say to myself: 'I can do it' and keep trying." Our research shows the subscale reliability of α = .84. *Work, Time and Environment Management* is a subscale of six items, and an example of an item is "I like to always use the same place to study.", with a reliability of α = .83. *The Self-Handicapping* subscale serves as an indicator of a strategy that is intended towards self-esteem protection and consists of five items such as: "I let everyone know that I am not even trying to study at all." The subscale has a satisfactory reliability (α = .85).

The Elaboration subscale from the *Learning Strategies Scale* was used as a measure of deep cognitive processing. It consists of four items such as "As I read the material of a subject, I try to relate it to the information that I already know;" with a reliability of α = .92.

Table 1. The Descriptive Statistics for the Overall Scores on the YP-CORE and Self-Regulated Learning

	N	*M*	*SD*	*Range*	*α*
YP-CORE	13037	18.07	8.19	0 – 40	.89
Self-efficacy in the learning process	13146	12.00	3.43	4 - 20	.79
Effort Regulation	13132	15.06	4.89	5 - 25	.84
Work, Time and Environment Management	13084	23.13	5.06	6 - 30	.83
Self-Handicapping	13072	12.55	4.56	5 - 25	.85
Elaboration	13120	14.70	3.66	4 - 20	.92

Note. *N* - sample size, *M* - mean value, *SD* - standard deviation.

Table 2. Means, Standard Deviations, and Two-Way Anova Statistics for Yp-Core Between Gender and School Type

School type	Boys		Girls		ANOVA			
	M	*SD*	*M*	*SD*	Effect	*F*	*df*	η2
Gymnasium	16.01	8.38	19.99	7.61	Gender	97.41**	1	.007
Vocational	14.87	8.18	18.96	7.78	School type	44.33**	2	.007
Art	19.12	7.43	22.18	7.76	Gender x School type	0.45	2	.000

Note. $^{**}p < .01$.

Results

Descriptive Statistics

Overall scores for the YP-CORE and self-regulated learning are specified in Table 1.

The high school graduates' overall scores on the YP-CORE cover the entire possible range – from 0 to 40. The mean is 18.07 with the standard deviation of 8.19. A higher score on the scale represents a higher level of psychological distress.

Two-Way ANOVA was performed to determine differences in YP-CORE scores between genders and school types (Table 2). Both simple main effect analyses show significant simple main effects of gender and school type. Girls (M = 19.62, SD = 7.72) had significantly higher scores on the YP-CORE than did the boys (M = 15.41, SD = 8.28), meaning that girls exhibited a higher level of psychological distress. The *post hoc* analysis was conducted using the Tukey test. The analysis showed that there were significant differences in the level of psychological distress between each pair of the school types. The graduates that attend art schools (M = 19.37, SD = 7.95) achieve the highest scores on the YP-CORE, followed by the graduates that attend gymnasiums (M = 17.12, SD = 7.87), while the graduates from the vocational schools (M = 14.81, SD = 7.92) achieve the lowest scores. In both cases, partial squared eta amounts to .007 which falls into the range of small effect sizes (Olejnik & Algina, 2003). Both gender and school type can individually explain 7% of the variance in scores on YP-CORE.

The graphical representation of the overall scores depending on the gender and the type of school is in Figure 1.

Psychological distress and self-regulated learning

Pearson correlation coefficients were calculated between subscales of self-regulated learning and YP-CORE. The correlation matrix is shown in Table 3. The subscales of self-regulated learning show high to moderate correlations with each other, while with the YP-CORE they show low to moderate correlations. Higher scores on one of the self-regulated learning subscales are related to higher scores on other self-regulating scales (besides self-handicapping where higher scores mean worse self-regulation of learning.) Higher scores on YP-CORE are linked to worse self-regulation of learning. Psychological distress shows the highest correlation with self-efficacy in the learning process (r = -.36, $p < .01$).

In addition to Pearson correlations, a multiple regression analysis was conducted with the YP-CORE as the dependent variable and the subscales of self-regulated learning as the independent variables. The results of this

Figure 1. The Overall Results on the YP-CORE of the High School Graduates Depending on the Gender and the School Type They Attend

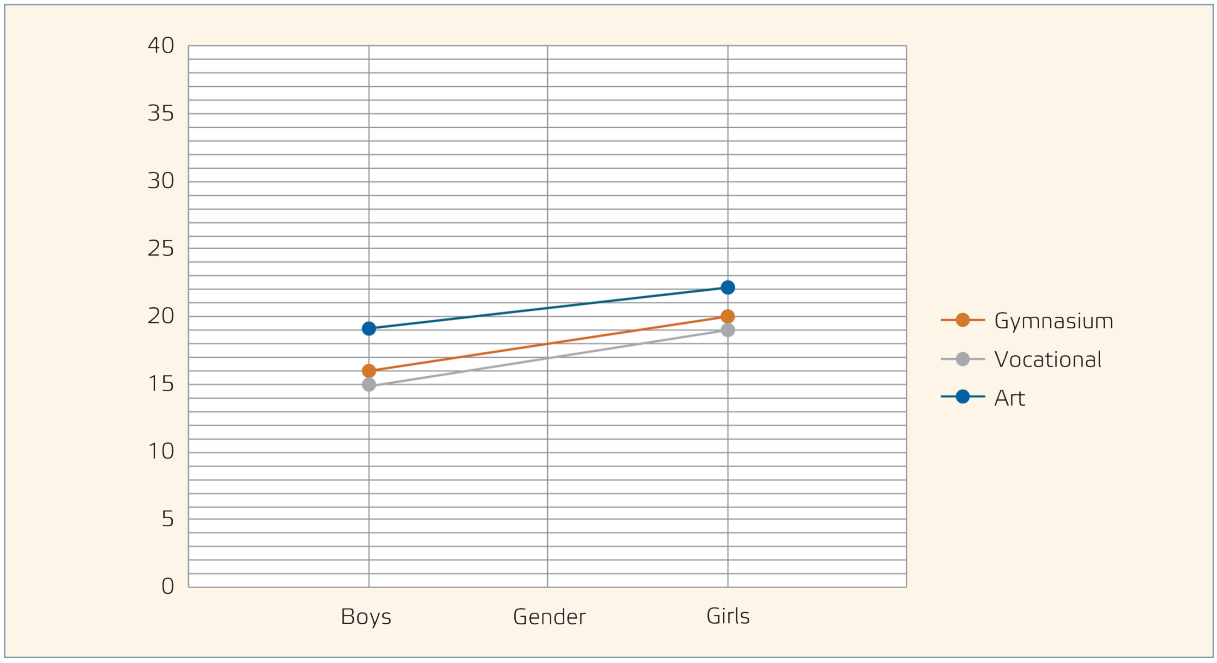


Table 3. Pearson Correlation Coefficients Between YP-CORE and Self-Regulated Learning Subscales

Subscales	1.	2.	3.	4.	5.
1. YP-CORE	–				
2. Self-efficacy in learning process	–.36*	–			
3. Effort Regulation	–.12*	.54*	–		
4. Work, Time and Environment Management	–.03*	.38*	.53*	–	
5. Self-Handicapping	.08*	–.31*	–.50*	–.42*	–
6. Elaboration	–.05*	.25*	.37*	.32*	–.18*

Note. *$p < .01$.

Table 4. Results of Multiple Regression Analysis in Which YP-CORE is Set as Dependent Variable While Self-Regulated Learning Subscales Are Set as Independent Variables

Variable	*B*	*SE (B)*	β
Constant	23.83	.55	
Self-efficacy in learning process	–1.02	.02	–.43*
Effort Regulation	.10	.02	.06*
Work, Time and Environment Management	.18	.02	.11*
Self-Handicapping	.05	.02	.03*
Elaboration	.01	.02	.00
R^2	15		
F	422.96*		

Note. *$p < .01$.

analysis are shown in Table 4. These results show that self-efficacy has the biggest individual contribution to explaining the variance of the results on YP-CORE while other subscales exhibit very low or even insignificant individual contribution. It should be noted, however, that this analysis was conducted only to examine the individual relative importance in shared variance between psychological distress and self-regulated learning, and not to imply that self-regulated learning causes less psychological distress.

Discussion

The aim of this study was to take a closer look into the psychological distress of high school graduates during the social distancing measures. The first research problem was to determine the differences in psychological distress between the genders. Girls showed higher levels of psychological distress than boys did. Prior findings in the field are generally consistent with this conclusion. It has been demonstrated that women score slightly higher on the CORE-OM than men (Connell et al., 2007); moreover, girls of both elementary and high school age score higher on the YP-CORE than boys (Mikic et al., 2012; Twigg et al., 2016). Furthermore, research shows that girls are more likely to have symptoms of anxiety and depression than boys (Chen et al., 2020; Zhou et al., 2020). Jokić-Begić et al. (2014) state that the gender differences in the non-clinical population are the result of women's tendency to express their problems more openly. This may explain some of the differences found in this study. Another explanation of the gender differences could derive from different ways girls and boys perceive academic stressors. It has been found that girls experience higher levels of stress due to academic stressors, such as exams (West & Sweeting, 2003; Schraml et al., 2011). Hence, it can be assumed that girls experience more stress because of the State Matura exams compared to boys.

Furthermore, there were significant differences in the level of psychological distress experienced by the graduates, depending on the school type they attended. The participants attending art schools demonstrated the highest levels of psychological distress, followed by the participants from gymnasiums, while the participants from vocational schools showed the lowest levels of psychological distress. Although the design of this research does not provide insight into the causes of differences between schools, it could be assumed they are related to the importance students attribute to the State Matura exams. For gymnasium students, the State Matura exams play the role of final exams; i.e., they serve as a certificate of high school completion (Zakon o odgoju i obrazovanju u osnovnoj i srednjoj školi [Law on Upbringing and Education in Primary and Secondary School], 2020). The State Matura exams also serve as a criterion for college enrollment (Ćurković, 2019). Vocational school students finish high school based on a graduation project rather than the results of the State Matura exams, but they still need to take the State Mature if they wish to enroll in a college (Ćurković, 2019; Law on Upbringing and Education in Primary and Secondary School, 2020). It can be assumed, however, that college enrollment is of greater importance for gymnasium students since they do not have a degree or a vocation after finishing high school, while vocational school students acquire a profession by graduating. Consequently, it is logical to expect that gymnasium students will be more stressed by the State Matura exams, considering that college remains necessary for them in order to enter a profession. The highest levels of psychological distress were found in art school graduates. The high levels of distress can be attributed to the small enrollment quotas for the art academies that could lead to an increased concern on the part of art school graduates about continuing their education. Moreover, it is possible that there are differences in personality traits between the school types that can contribute to different levels of experienced distress. Vedel (2016) concludes in her systematic review that art and humanities students consistently show higher scores on neuroticism in comparison with other students. If art school students in our sample are also more neurotic than students of other school types, they may be more prone to stress and hence have higher scores on the measure of psychological distress.

Lastly, relationships between self-regulated learning and psychological distress were assessed. All of the self-regulated learning measures that indicate higher self-regulation are in a negative low to moderate correlation with psychological distress, and the *Self-Handicapping* subscale that indicates lower self-regulation has a low positive correlation with distress. Among the measures of self-regulated learning, self-efficacy exhibits the highest correlation with psychological distress. Furthermore, it shows the strongest contribution to explaining the psychological distress of students, while other subscales indicate very low or even insignificant individual contributions. This means that graduates who experience more psychological distress demonstrate a poorer self-regulation of learning. Similar results have been confirmed in other studies too (e.g., Hu & Yeo, 2020; Kurtović & Živčić Bećirević, 2012). Such a result is also consistent with Bandura's theory of self-efficacy (1994), where individuals with lower levels of self-efficacy are more likely to interpret stress as a debilitating condition, and the negative effect is associated with an inhibitory system (Gray, 1990), which makes a person less likely to invest effort into changing and improving their situation. Findings like these emphasize the need for greater care regarding the mental health of adolescents. Self-regulation of learning remains also of great importance, especially in times of remote learning when students are mostly left to their own devices and external regulation is reduced. To help students in these stressful and less structured times, it would be of use to employ those programs that promote self-regulated learning strategies.

Strengths and Limitations

Nevertheless, when drawing conclusions, it is necessary to take into account this study's limitations. The first limitation of this study is the fact that we cannot be certain which factors contributed to the psychological distress of high school graduates. Even though it can be assumed that the COVID-19 pandemic and the State Matura exams were the two biggest stressors for high school graduates in 2020, the conducted survey did not assess the causes of psychological stressors.

Another limitation of this study involves the use of self-reports while measuring constructs of interest. Since this was a national research conducted at the time of lockdown, high school graduates were still uncertain whether State Matura exams would be held in the year 2020 or not (due to the COVID-19 pandemic). Furthermore, due to the possibility of State Matura exams not being held, graduates may have thought that if they represented their stress at a higher level than it really is, the State Matura exams would be canceled. That being said, possible faking is one of the limitations of this study.

On the other hand, the study generated a great turnout. The large number of students who took the survey stands as a guarantee that the drawn conclusions have a great generalizability potential.

Conclusion, Implications and Future Directions

This study aimed to obtain an insight into the psychological distress that the high school graduates of 2020 experienced during the COVID social distancing measures. The research was conducted promptly after the start of the pandemic and on a large sample (N = 13,037). The results indicate that girls, in accordance with previous research, exhibit a higher level of psychological distress compared to the boys. Art school graduates showed the highest levels of psychological distress, followed by gymnasium graduates, while vocational school graduates manifested the lowest levels of psychological distress. Higher psychological distress is linked to poorer self-regulation of the learning process. These findings demonstrate that a need exists for greater accessibility of mental health care for adolescents.

This study's results point out the importance of taking care of adolescent mental health, especially in times of crisis.

Future research should examine the long-term impact of increased psychological distress on high school graduates' mental health, and the results could be linked to other relevant constructs and measures, such as neuroticism and State Matura exam results. Lastly, the latest research (for example Pačić-Turk et al., 2020) suggests that psychological resilience should be included as a variable in the research, since it could play an important role in mediating the relationship between stressors caused by the COVID-19 pandemic and psychological consequences.

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Author contributions

Natalija ĆURKOVIĆ: conceptualization, design, methodology, funding acquisition, investigation, project administration, supervision, writing review and editing.

Jelena BUGARIN: methodology, investigation, data management, formal analysis, interpretation, writing original draft.

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All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The study was reviewed and approved by the Governing board of the National Centre for External Evaluation of Education (session No. 019, December 2020).
All participants took part in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

Some Predictors of University Students' Subjective Well-Being in Croatia During The COVID-19 Pandemic

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Introduction: Changes caused by the COVID-19 pandemic significantly altered the functioning of different social systems, including the educational one. Closing educational institutions and transferring the educational process to online platforms posed new challenges for students' academic functioning and well-being in these unexpected circumstances.
Aims: This study aimed to explore the role of university students' academic functioning and personality in predicting their subjective well-being during the online studying implemented in Croatia due to the pandemic caused by the coronavirus.
Methods: A sample of 505 university students from different Croatian faculties participated in the online survey, which included their ratings of adjustment to the online learning environment, related difficulties in learning and self-regulation, perception of the online education's quality, the level of life disruption caused by the pandemic, personality traits, and subjective well-being measures (life satisfaction, positive affect, and negative affect).
Results: Results generally revealed that certain aspects of students' academic functioning during online studying as well as their personality explained a significant proportion of the subjective well-being measures' variance. Also, the perceived level of life disruption caused by the pandemic and neuroticism were the strongest predictors of students' subjective well-being, followed by extraversion and conscientiousness.
Conclusions: Obtained results indicate that some aspects of academic functioning upon the transition to online studying could contribute to students' subjective well-being and should be considered when planning interventions to increase their well-being and enhance the quality of the online learning environment in these challenging times.

Keywords: COVID-19 pandemic, university students, subjective well-being, online studying, personality

Introduction

The pandemic caused by COVID-19 significantly changed the usual worldwide lifestyle and posed new challenges for all social systems, including the educational one. One of the measures aimed at reducing social interactions in many countries, including Croatia, was closing educational institutions and transferring the onsite educational process to various online platforms both in schools and universities. The Government of the Republic of Croatia introduced these measures and the Civil Protection Headquarters (Government of the Republic of Croatia, 2020–2021) coordinated them. After the first pandemic wave, schools in Croatia – depending on pupils' age and the disease incidence in specific country regions – are partially open in coordination with the Ministry of Science and Education (2020–2021). At the same time, most higher education institutions remained in an online environ-

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ment. Although at the beginning of the academic year 2020/2021, many faculties in Croatia tried to organize an acceptable form of onsite education in line with recommendations by the Croatian Institute of Public Health (2020), for most of them, this practice lasted very briefly. Namely, the second pandemic wave in the fall restored most of the higher education processes online throughout the academic year. Currently, Croatia is facing another unpredictable academic year due to strong indicators of the fourth pandemic wave since the numbers of newly confirmed cases in Croatia at the end of October 2021 are about the same as they were at the peak of the second pandemic wave in December 2020 (Government of the Republic of Croatia, 2021). This new reality implied fast adjustment from both educators and students to a relatively new practice (Almendingen et al., 2021; Aristovnik et al., 2020; Means et al., 2020), and the effects of these changes understandably came into the focus of researchers from various disciplines, along with the substantial increase in the number of related studies. Interest in this field becomes even more prominent considering that the pandemic and measures aimed at social distancing have lasted longer than a year and a half, and these measures can influence students' mental health (Son et al., 2020; Živčić-Bećirević et al., 2021). Hence, it seems that this pandemic has become a protracted crisis and the world is facing uncertainty about its ending due to the new virus mutations and the prolonged initial vaccination plans in many countries, including Croatia (Ritchie et al., 2021). This protracted crisis can reflect on different societal and individual levels, posing the question of its current and subsequent effects.

Various changes in everyday routines caused by the pandemic can also influence students' subjective well-being and can be associated with various mental health problems among college and university students, such as depression, anxiety, and stress (Batra et al., 2021; Cao et al., 2020; Chaturvedi et al., 2021; Elmer et al., 2020; Živčić-Bećirević et al., 2021). These reactions are assumed to be a common psychological response to the pandemic among individuals from different groups (Rajkumar, 2020). Considering the salience of the educational process for students, it seems plausible that their functioning in the online learning environment could contribute to their subjective well-being. Current studies also imply that university students' self-regulation and personality could play a significant role in adjustment to the new learning environment; i.e., online studying (Bao, 2020). Literature indicates that studies addressing psychological trajectories during the pandemic predominantly focus on depression, anxiety, and stress, while subjective well-being is less represented. For example, Hamza et al. (2021) reported a more significant increase in university students' negative affect among students without preexisting mental health problems. Also, Wang et al. (2020) point to the need to increase positive affect and regulate negative affect during the pandemic among college and university students. Although the number of studies relating various individual characteristics with academic functioning and students' well-being in present circumstances is increasing due to relatively recent pandemic incidence, there are still many research questions that can be posed to better understand the underlying mechanisms of students' subjective well-being during the pandemic. Hence, this study has attempted to provide additional insight into university students' subjective well-being concerning their online studying experience and personality.

Subjective Well-Being, Academic Adjustment and Personality

Within the context of the pandemic, children and young people are often mentioned as severely affected age groups in terms of mental health. Furthermore, the student population already undergoes many changes related to new life experiences, such as adjustment to academic life, identity exploration, and new friendships or relationships (Batra et al., 2021). Hence, this already challenging period of life has become even more challenging by downsizing or even "putting on hold" some of their essential activities primarily related to social interactions and changing their educational experiences. These additional challenges can be reflected in various aspects of college and university students' emotional and personal life and mental health (Aristovnik et al., 2020; Živčić-Bećirević et al., 2021), and recent studies also recognize the importance of exploring their well-being (Van de Velde et al., 2021).

The construct of well-being is usually conceptualized through objective or subjective indicators. This study focused on the latter perspective since it aimed to contribute to a better understanding of certain psychological aspects of university students' mental health during the pandemic. Objective indicators of well-being often include conditions such as physical health, longevity, comfort, material welfare, and educational/career success (Diener, 2009; Schueller & Seligman, 2010), while studies exploring subjective well-being generally include various indicators referring to the individual's cognitive and emotional evaluation of their own life (Baños et al., 2019; Diener et al., 2003). The cognitive dimension includes the judgment of (dis)satisfaction with life domains or life in general, reflecting the level of congruence between what one aspires to and one's actual circumstances. On the other hand, the affective dimension usually comprises two affective processes; i.e., positive and negative affect. Diener et al. (2003) point out that the studies indicate a certain level of independence between these

dimensions of subjective well-being and should be assessed separately, rather than using a single aspect of well-being or ill-being. Aside from previously mentioned studies exploring university students' well-being during the pandemic, it is important to emphasize that subjective well-being significantly contributes to the positive development and adaptation of children and youth in general (Park, 2004), as well as to their mental and physical health (Steinmayr et al., 2019). This becomes even more prominent when facing various adversities, with the current pandemic being one. For example, Schwartz et al. (2021) point to the potential mental health crisis related to the pandemic, while current studies generally indicate the adverse effects of the pandemic on well-being and emphasize the importance of protective factors (Mead et al., 2021).

Subjective well-being can be affected by various individual characteristics, including personality traits, whereby extraversion, neuroticism, and conscientiousness seem to be the most relevant across different personality measures (Anglim et al., 2020). These associations could be based on the fact that emotions are an inherent part of the personality, whereby extraversion is often linked to positive affect and neuroticism to negative affect. In addition, agreeableness and conscientiousness are also moderately correlated with subjective well-being (Joshanloo, 2017; Lucas, 2018; Lucas & Diener, 2015). Although these associations are extensively discussed in the literature, Lucas (2018) points out that no particular model provides a clear understanding of the effects of personality on subjective well-being. Within the context of the pandemic, it should be noted that personality traits are associated with mental health, and they can strengthen or diminish coping with various adversities and stressors. Rettew et al. (2021) point out that the pandemic could be a specific stressor and that associations of personality and adjustment could depart from the usual findings.

Although with somewhat weaker contribution than personality traits, life circumstances can also affect subjective well-being, including circumstances related to academic experiences and adjustment (Fakunmoju et al., 2016). This becomes even more relevant from the perspective of studying during the pandemic when educational experiences digress from the usual (and expected) ones and pose a risk factor for students' well-being and mental health (Sun et al., 2020). Recent studies also report that university students' online learning difficulties are associated with their self-regulation, personality, and academic procrastination (Bao, 2020; Hong et al., 2021). In addition, the shift to online education can increase students' workload (Al-Kumaim et al., 2021; Aristovnik et al., 2020; Armstrong-Mensah et al., 2020), students are mostly studying alone, deprived of the usual study networks (Elmer et al., 2020), and facing various challenges in the online learning environment (Barrot et al., 2021; Singh & Quraishi, 2021). Furthermore, the lack of social interactions, which are an inherent part of the educational process as we know it, increases the risk of maladjustment and learning difficulties. As studies mentioned above indicate, many issues exist regarding the adjustment to the sudden transition to online studying. Moreover, there is also a possibility of a prolonged duration of this uncommon situation due to the uncertainty regarding the pandemic's ending. However, self-regulation difficulties in the online environment were already observed before this environment became the main form of the educational process. Pedrotti and Nistor (2019) concluded that, although a higher level of self-regulation should be expected in higher education, when it comes to self-regulation in the online learning environment, university students demonstrate very limited and surprisingly poor use of self-regulation strategies. Their study explored the online learning environment as one of the course-delivery options. However, the difficulties mentioned above could be a problem for a much higher proportion of students within the current pandemic context.

Present Study

Recent studies indicate various concerns regarding university students' academic functioning and well-being related to the pandemic's challenging times, suggesting the need for further studies that could contribute to a better understanding of students' subjective well-being during these difficult times and consequently serve as a basis for interventions aimed at helping students to cope with academic demands. Sun et al. (2020) suggested that future studies should also include students' perception of how much the pandemic has negatively influenced their lives. Hence, this study aimed to explore the relative contribution of university students' adjustment to online studying, perceived level of life disruption caused by the pandemic, and personality in predicting their subjective well-being. It is hypothesized that functioning in the online learning environment and the perceived life disruption predict subjective well-being. More specifically, adjustment to online studying and the quality of online education are both expected to be positive predictors of life satisfaction and positive affects. In contrast, learning and self-regulation difficulties and the perceived level of life disruption caused by the pandemic are expected to predict the aforementioned criteria negatively. The reversed direction of prediction is expected for the negative affect as a criterion variable. Since previous studies indicate that personality is a robust antecedent of subjective well-being, the predictive

value of the predictors mentioned above in explaining subjective well-being was also examined when combined with personality traits. According to previous studies, a significant contribution of extraversion, neuroticism, and conscientiousness in explaining the variance of subjective well-being measures is hypothesized, assuming that students who have higher ratings of extraversion and conscientiousness and lower ratings of neuroticism will express higher life satisfaction and experience more positive and less negative affect. Previous findings are less consistent concerning specific associations of agreeableness and openness with subjective well-being than for previously mentioned traits (Lachmann et al., 2018), in spite of the indicators that – although somewhat weaker – the predictive role of agreeableness and openness in explaining the subjective well-being's variance could be expected.

Methods

Participants and Procedure

Participants in the study consisted of 505 university students (59.2% undergraduates and 40.8% graduates) from different Croatian faculties, 417 of whom were female (82.6%). The average age of participants was 21.86 (*SD* = 1.931; min = 18, max = 36). Data were collected via the online questionnaire in March 2021, and the study complied with the prescribed ethical standards. Participants were recruited by the snowball sampling method, and participation in the study was voluntary and anonymous. Previous to questionnaire administration, participants were acquainted with the aim of the study. If they consented to participate, they continued by clicking on the link to the questionnaire (with the possibility of opting out at any point).

Measures

General information collected by the questionnaire included students' age, gender, faculty, and study level.

Life satisfaction was examined by the Satisfaction with Life Scale (SWLS, Diener et al., 1985), including five items referring to judgments of one's own life satisfaction (e.g., In most ways, my life is close to my ideal). Participants gave their ratings on a scale from 1 (strongly disagree) to 7 (strongly agree). The total score on the scale is calculated as a sum of all items, and scale reliability expressed as a Cronbach's alpha coefficient was .86.

Positive and negative affect was assessed by the Negative and Positive Affect Scale (NAPAS, Mroczek & Kolarz, 2016), with six items for each subscale. Participants responded to how much they experienced different affective states during the past month (e.g., During the past 30 days, how much of the time did you feel hopeless/satisfied/…). The responses were given on a rating scale from 1 (not at all) to 5 (all the time). The total score on each scale is expressed as an average of associated items. Cronbach's alpha was .88 for the positive effect and .87 for the negative effect, respectively.

The Big Five Inventory (John et al., 2008) was used to assess extraversion, agreeableness, conscientiousness, openness to experience, and neuroticism (e.g., I see myself as someone who worries a lot). Participants rated 44 items on a five-degree agreement scale, and the scores on subscales are calculated as an average of related items. Cronbach's alpha coefficients for subscales ranged from .69 to .83 (Table 1).

Students' perception of the level of life disruption caused by the pandemic is expressed as an average of responses to five items related to several life domains such as family relationships, friendships, free time, and health (e.g., To what extent did the changes caused by the pandemic disrupt the quality of your family relationships). The rating scale was from 1 (not at all disrupted) to 5 (severely disrupted), and Cronbach's alpha for this composite measure was .73.

Overall adjustment to the online learning environment was measured by one item from 1 (very poor) to 5 (excellent), and students also rated the overall quality of the online education in comparison to the onsite education of their faculty on a scale from 1 (substantially worse) to 5 (substantially better).

Learning and self-regulation difficulties during online studying were assessed by five items (e.g., I have difficulties compelling myself to do my learning assignments in an online environment) on a rating scale from 1 (completely disagree) to 5 (completely agree). Since this measure was constructed for the purposes of this study, the internal validity and the postulated one-factor structure were tested by the first-order CFA, with a cut-off criterion of .50. All factor loadings were above this value (ranged from .76 through .87), and Cronbach's alpha coefficient for this scale was .87.

Statistical analyses included descriptive indicators, correlation coefficients, and hierarchical regression analyses, and SPSS 25 (an IBM software) was used to perform analyses.

Table 1. Means, Standard Deviations, and Scale Reliabilities for the Examined Variables

Variable	*M*	*SD*	α
Adjustment to online studying (one item)	3.70	1.03	n/a
Learning and self-regulation difficulties in an online learning environment	3.40	1.05	.87
Perceived quality of the online education (one item)	2.06	0.79	n/a
Perceived level of life disruption caused by the pandemic	2.45	0.82	.73
Personality			
Extraversion	3.40	0.71	.82
Agreeableness	3.66	0.54	.69
Conscientiousness	3.50	0.65	.82
Openness	3.52	0.64	.81
Neuroticism	2.69	0.77	.83
Subjective well-being			
Life satisfaction	23.71	6.38	.86
Positive Affect	3.45	0.65	.88
Negative Affect	2.36	0.78	.87

Results

The Inspection of average values (Table 1) revealed that students are relatively adjusted to online studying and experience a moderate level of related learning and self-regulation difficulties. Also, students perceive that the quality of online education at their faculties stands remarkably lower than the quality of the onsite education, as suggested by previous findings obtained on college students (Means et al., 2020), while the level of perceived life disruption caused by the pandemic is relatively low. Furthermore, students' ratings of all personality traits apart from neuroticism are somewhat shifted towards higher values. Finally, results concerning subjective well-being indicators reveal that students' average life satisfaction falls into the category that Diener et al. (1985) labeled as "slightly satisfied". This is in line with results reported in some previous studies, including college and university students (e.g., Cabras & Mondo, 2018; Pavot & Diener, 1993), and in line with findings indicating higher life satisfaction in young adulthood compared to adolescents, but lower compared to older adults (Abdullahi et al., 2019; Morganti et al., 1988; Siedlecki et al., 2014). Students also reported that they had experienced more positive and less negative affect lately.

Correlations between examined variables are displayed in Table 2. In addition, correlations between subjective well-being measures and participants' gender and age were also calculated since some studies indicated age and gender-related differences regarding the measures of subjective well-being (e.g., Abdullahi et al., 2019; Cabras & Mondo, 2018; Jacobsen et al., 2014). However, as they were not significant (possibly due to a relatively homogenous sample), they were not included as covariates in further analyses.

Table 3 shows the three hierarchical regression analyses that were calculated in order to explore the relative contributions of the examined predictors of student's subjective well-being, each for one criterion variable. Prior analyses indicated no multicollinearity bias since all tolerance values were above .05 or higher. In the first step, adjustment to the online learning environment, related learning and self-regulation difficulties, quality of online education, and perceived level of life disruption caused by the pandemic were entered. In the second step, personality traits were added.

Results of the regression analyses generally indicated that certain aspects of functioning in an online academic environment are predictive of students' subjective well-being and that the perceived level of life disruption caused by the pandemic was predictive in both steps of the analyses. More specifically, in the first step of the analyses, students' life satisfaction and positive affect were positively predicted by their adjustment to online studying (ß = .18 for both criteria). In contrast, the perceived level of life disruption caused by the pandemic was a negative predictor of life satisfaction (ß = -.22) and positive affect (ß = -.37). Effect sizes (displayed in Table 3) for aforementioned predictors ranged from small (f^2 = .02) to around medium (f^2 = .12). Positive predictors of negative

Table 2. Correlations Among Examined Variables (Including Correlations Between Gender, Age, and Subjective Well-Being Measures)

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Adjustment to online studying	−.58**	.45**	−.38**	.06	.07	.30**	.02	−.11*	.24**	.23**	−.22**
2. Learning and self-regulation difficulties		−.55**	.48**	.03	−.05	−.24**	.01	.10*	−.18**	−.15**	.28**
3. Perceived quality of the online education			−.25**	−.10*	.01	.06	.01	.06	.16**	.05	−.05
4. Perceived level of life disruption caused by the pandemic				.05	−.14**	−.17**	−.06	.26**	−.27**	−.38**	.49**
5. Extraversion					.04	.30**	.31**	−.41**	.33**	.39**	−.30**
6. Agreeableness						.24**	.20**	−.36**	.21**	.26**	−.17**
7. Conscientiousness							.19**	−.32**	.37**	.30**	−.33**
8. Openness								−.11*	.16**	.10*	−.01
9. Neuroticism									−.38**	−.59**	.63**
10. Life satisfaction										.51**	−.44**
11. Positive affect											−.65**
12. Negative affect											
Gender									.08	.01	.06
Age									.08	.05	-.08

Note. **$p < .01$; * = $p < .05$.

effect were learning and self-regulation difficulties (ß = .11; f^2 = .01), perceived quality of the online education (ß = .16; f^2 =. 02), and perceived level of life disruption caused by the pandemic (ß = .45; f^2 = .19).

Regarding the second step of the analyses, personality traits significantly increased the proportion of explained variance for all indicators of subjective well-being (in total, 29% for the life satisfaction, 45.1% for the positive affect, and 54.1% for the negative affect), whereby the introduction of personality traits partially diminished the effects of the predictors from the first step of the analyses. In both steps of the analyses, predictors explained the highest proportion of the negative affect's variance. All personality traits were significant predictors of negative affect, whereby extraversion (ß = -.08) and conscientiousness (ß = -.11) were negative predictors of negative affect (but with negligible effect sizes of f^2= .01). Agreeableness (ß = .07) and openness (ß = .10) were positive predictors of negative affect with minor effect sizes (f^2 = .01), while neuroticism (ß=.50) had a medium effect size in explaining the variance of negative affect (f^2 = .20). Further, extraversion was a positive predictor of both life satisfaction (ß = .19; f^2 = .023) and positive affect (ß = .21; f^2 = .03), and neuroticism was a negative predictor of both criteria (ß = -.19; f^2 = .02 for life satisfaction and ß = -.40; f^2 = .12 for positive affect). In addition, conscientiousness was a positive predictor of life satisfaction (ß = .21; f^2 = .03).

Discussion

Obtained results generally revealed that explored aspects of adjustment to online studying and perceived level of life disruption caused by the pandemic partially predict students' subjective well-being during the faculties' lockdown. Some of these predictive effects still persist after introducing personality traits that are previously known as very robust predictors of subjective well-being (e.g., Diener et al., 2003; Lucas, 2018). Concerning adjustment to the online learning environment, better-adjusted students experience more positive effects and are more satisfied with their lives. Also, students who experience more learning and self-regulation difficulties during online studying are likely to experience more negative and less positive affect. Difficulties regarding online learning during the pandemic were previously reported among university students (Amir et al., 2020; Armstrong-Mensah et al., 2020), implying a decreased effectiveness of online learning due to self-regulation difficulties (Bao, 2020; Hong et al., 2021) and the lack of the usual peer-to-peer motivation in an online environment which could be a potential stressor for students (Chaturvedi et al., 2021; Živčić-Bećirević et al., 2021).

Table 3. Results of Hierarchical Regression Analyses, with Adjustment to Online Studying, Related Learning and Self-Regulation Difficulties, Perceived Level of Life Disruption Caused by the Pandemic, and Personality Traits as Predictors, and Indicators of Subjective Well-Being as Criterion Variables (Life satisfaction, Positive affect, Negative affect)

	Life satisfaction			Positive affect			Negative affect		
Predictors	ß	*t*	f^2	ß	*t*	f^2	ß	*t*	f^2
Adjustment to online studying	.18	3.41**	.02	.18	3.49**	.02	–.07	–1.50	
Learning and self-regulation difficulties	.07	1.09		–.09	–1.57		.11	2.10*	.01
Perceived quality of online education	.05	1.03		–.07	–1.45		.16	3.42**	.02
Perceived level of life disruption caused by the pandemic	–.22	–4.51***	.04	–.37	–7.96***	.12	.45	10.30***	.19
	R^2 = .100 *F* = 13.80***			R^2 = .163 *F* = 24.12***			R^2 = .264 *F* = 44.44***		
Second step									
Adjustment to online studying	.08	1.67		.11	2.36*	.01	–.01	0.10	
Learning and self-regulation difficulties	.09	1.56		–.10	–1.98*	.01	.09	2.04*	.01
Perceived quality of online education	.15	3.13**	.01	.04	0.92		.05	1.29	
Perceived level of life disruption caused by the pandemic	–.14	–3.05**	.01	–.24	–6.13***	.01	.33	9.00***	.08
Extraversion	.19	4.09***	.02	.21	5.23***	.03	–.08	–2.04*	.01
Agreeableness	.06	1.43		.07	1.96		.07	2.02*	.01
Conscientiousness	.21	4.69***	.03	.06	0.16		–.11	–3.13**	.01
Openness	.02	0.35		–.06	–0.12		.10	3.01**	.01
Neuroticism	–.19	–3.97***	.02	–.40	–9.71***	.12	.50	13.19***	.20
	R^2 = .290 *F* = 22.20*** (ΔR^2=.189***)			R^2 = .451 *F* = 44.68*** (ΔR^2=.288***)			R^2 = .541 *F* = 64.05*** (ΔR^2 =.276***)		

Note. *** = $p < .001$; ** = $p < .01$; * = $p < .05$; effect sizes (Cohen's f^2) are displayed for significant predictors only.

Results obtained in this study indicate that difficulties in learning and self-regulation are related to the affective dimensions of subjective well-being. At the same time, they were not predictive of the cognitive dimension; i.e., life satisfaction. However, life satisfaction was predicted by the perceived quality of online education, implying that teachers' adjustment to the online environment may also be among the factors contributing to students' subjective well-being, as observed in the literature. Namely, college and university students' satisfaction with the online learning environment is higher among students who perceive that their teachers are more enthusiastic and skillful in presenting materials as well as interacting with students (Fatani, 2020; Means et al., 2020). Since studying experiences certainly are a salient part of students' lives, the predictive value of certain academic-related factors, apart from the effects of personality, could be expected. On the other hand, concerning the lack of some predictive effects of these variables on each indicator of subjective well-being, and very small effect sizes, it is possible that the stress level induced by the pandemic somewhat decreased; i.e., that the students partially adjusted to these circumstances that have already lasted a year, as suggested by Rettew et al. (2021).

The perceived level of life disruption caused by the pandemic predicted both cognitive and affective dimensions of students' subjective well-being. Students who perceive a higher level of disruption caused by the pandemic reported more negative and less positive affect and lower life satisfaction, implying specific difficulties in adapting to negative life events and adversities, including pandemic-related changes. The effect of perceived level of life disruption is particularly strong concerning the affective dimension of students' subjective well-being. According to the literature, it is hypothesized that the affective dimension of well-being could be more under the influence of short-term changes in life circumstances than the cognitive dimension, since the cognitive appraisal is less reactive than the emotional regulation system (Luhmann et al., 2012). From this perspective, the effects of the pandemic on students' life satisfaction could occur later in life, especially if cumulated onto other adverse events, which should be explored in subsequent studies within a temporal distance from this specific situation. Namely, longitudinal studies supported the assumption regarding the importance of situational factors, implying that their role, although not as pronounced as the role of personality, should be recognized and acknowledged (Lucas, 2018).

Personality, as expected, served as a predictor of students' subjective well-being, particularly neuroticism, while the effects of extraversion and conscientiousness were much smaller. Obtained results indicate that students with a higher level of extraversion are somewhat more satisfied with life and prone to positive affect, whereas students with a higher level of neuroticism express a lower level of subjective well-being. Previous studies demonstrated the association between extraversion and subjective well-being, indicating that individuals who are more sociable, active, and characterized by positive emotionality are more satisfied with life and prone to positive affect (Lucas, 2018). However, in this study, the effects of extraversion are rather small, which could relate to the assumption by Rettew et al. (2021), implying that the pandemic situation could be a specific situation in which associations of personality and adjustment could differ from other situations. On the other hand, students who registered higher on neuroticism; i.e., who are more anxious and more vulnerable to stress, express a lower level of subjective well-being, confirming the expected predictive effects of neuroticism on students' well-being. Further, results also revealed that students with a higher level of conscientiousness; i.e., those who tend to be organized, self-controlled, disciplined, and hard-working are, to a certain extent, more satisfied with life and less prone to negative affect. These characteristics have previously been demonstrated as predictive of good academic performance, self-regulation, and persistence when facing challenging situations and adversities (Oshio et al., 2018; Richardson et al., 2012). Hence, conscientiousness can contribute to a better adjustment and more success in fulfilling various academic demands in challenging circumstances (such as the pandemic) and consequently reflect on subjective well-being.

Results regarding other personality traits are partially in accordance with certain findings from the literature and indicate that these traits should also be considered, as also observed by some other authors (Joshanloo, 2017; Lucas & Diener, 2015; Steel et al., 2008). In this study, all personality traits were, to a certain extent, predictive of students' negative affect, whereby openness and agreeableness were, interestingly, positive predictors of negative affect. Although previous findings are not consistent (Lachmann et al., 2018), partly similar associations were reported in the literature. González Gutiérrez et al. (2005) obtained that openness was a positive predictor of both positive and negative affect, while agreeableness was not a significant predictor for either of these indicators. On the other hand, agreeableness was a positive predictor of anxiety, depression, and stress in a recent study on emotional distress during the pandemic (Margetić et al., 2021), which implies the need for a more detailed insight into these associations. McCrae and Costa (1991) discussed the complexity of openness and affect and proposed that individuals characterized by imagination and sensitivity could generally experience all types of emotions more intensely. During the pandemic, these students might express a greater sensitivity to negative emotions due to the general lack of the usual in-person interaction as one of the mechanisms relevant for maintaining quality relationships. Fakunmoju et al. (2016) indicated that peer support contributes to the perceived meaningfulness of graduate students' learning experiences. Also, according to meta-analyses conducted by Richardson et al. (2012), university students who register high in openness and agreeableness could be more inclined to regular class attendance. Keeping in mind that these findings refer to the usual (onsite) studying, obtained positive associations between these two traits and the negative affect in this study could imply that students with higher agreeableness and openness might experience more emotional stress related to the shift to online studying. Also, since positive affect is often discussed within the context of relationships with others, it is possible that more agreeable students, due to pandemic-related social distancing measures, express a greater sensitivity to negative emotions due to the lack of the usual in-person interaction as one of the mechanisms relevant for maintaining quality relationships. Finally, since openness was a somewhat stronger predictor of negative affect than agreeableness, it is possible that students who are characterized by intellectual curiosity, imaginativeness, and reconsidering new ideas and experiences, are more affected by the lack of usual onsite interactions with teachers and colleagues and by the lack of group discussions whose dynamic is changed in an online environment in terms of creative thinking stimulation. Since, according to Fakunmoju et al. (2016), peer support contributes to the perceived meaningfulness of learning experiences within higher education, the lack of usual peer support in social interaction with colleagues at the faculty could diminish students' well-being. Živčić-Bećirević et al. (2021) also point to the importance of social interactions for university students' mental health since, in their study, university students indicated social isolation as a main source of stress during the pandemic.

However, all of the assumptions above need additional verification in future studies related to specific effects of pandemic-related changes in students' academic functioning, especially keeping in mind the already mentioned observation by Rettew et al. (2021), who indicated that the pandemic might be a specific situation in which certain associations could digress more from the usual ones. It seems that this particularly

refers to the role of agreeableness and openness in negative affect. In addition, the effects of certain factors could differ depending on whether they were explored right upon the lockdown or after an extended period of the pandemic.

Strengths and Limitations

Since studies on various effects of the COVID-19 pandemic are, in the literature, still relatively new, this study could generally contribute to the recent literature that points to the importance of adjustment to changed life circumstances among students. Furthermore, raising awareness regarding the potential difficulties that young people might encounter due to social isolation and unexpected studying conditions, and reconsidering various factors that contribute to their well-being, might be helpful in planning interventions aimed at strengthening their mental health and avoiding the long-term effects of this protracted crisis.

The limitations of this study should also be considered. This study does not provide the information on students' subjective well-being before the pandemic that would allow exploring potential longitudinal changes in observed associations, and the methodological nature of this study does not allow for causal inference. Further, since the questionnaire was administered online and participation was voluntary, the sample was not random. The generalizability of these findings should also be taken with caution in terms of possible differences among various faculties/universities and among countries regarding the quality of the transition to the online learning environment during the pandemic.

Conclusion, Implications and Future Directions

Obtained results indicate that aside from personality, some aspects of academic functioning upon the transition to online studying could contribute to students' subjective well-being during the pandemic. However, these findings should be additionally explored in further studies, considering that the pandemic is still a relatively new situation with potential long-term effects on mental health and subjective well-being. Furthermore, obtained results suggest the need for a more detailed insight into the association of openness and agreeableness with students' subjective well-being in these unusual circumstances. In addition, these variables should also be explored along with a more comprehensive examination of the online learning environment's quality (including teachers' adjustment). Also, it would be helpful to additionally explore these findings from the perspective of Self-Determination (Ryan & Deci, 2000). Namely, it is possible that students' sense of basic psychological needs fulfillment may decrease due to the pandemic; i.e., within the context of higher education, students' sense of competence could be decreased in an online learning environment, as well as their relatedness with colleagues, while the pandemic can reduce their sense of autonomy in general.

Although this study has previously mentioned limitations, the obtained results provide an additional insight into students' subjective well-being during these challenging and uncertain pandemic times, which considerably changed their studying experiences. It is plausible that students' responses to online studying during the pandemic can vary concerning their individual differences in adjustment, personality, and perception of how much the pandemic disrupted their lives. These factors should be considered and included in planning interventions to increase both the quality of the online learning environment and students' well-being during and after the pandemic. In this manner, faculties could invest further efforts into additionally educating teaching staff on using various tools for more interactive and engaging online education. Namely, significant difficulties regarding technological literacy are not expected among new generations of students (Barrot et al., 2021); however, these difficulties could be more present among faculty staff, especially regarding the use of various online educational platforms and distance learning tools. Furthermore, additional support could be directed towards identifying students who experience difficulties in an online learning environment; i.e., those experiencing difficulties in meeting academic demands and at potential risk of developing mental health problems. Courses or workshops on developing self-regulation strategies could help students manage their time and learning process. In addition, counseling students on effective strategies for coping with adversities and building their resilience could also be helpful. These challenges are also related to the readiness and the capacities of different higher education institutions to raise and maintain the quality of the educational process in the online learning environment and reduce potential academic-related risk factors that could influence students' well-being and mental health.

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Author contributions
Tea PAVIN IVANEC: conceptualization, design, methodology, data management, formal analysis, interpretation, writing original draft, writing review and editing.
Iva FABIJANIĆ: conceptualization, design, methodology, investigation, data management, interpretation, writing original draft, writing review and editing.
All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Ethical statement
This manuscript is the authors' original work.
The study was reviewed and approved according to the guidelines and rules of conduct issued by The Ethics Review Committee of the Faculty of Teacher Education University of Zagreb (No. 602-04/15-01/223, 251-378-04/15/1).
All students participated in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

Feelings Related to the Academic Path in Virtue of the COVID-19 Pandemic: Testimonies from Portuguese Higher Education Students Attending Healthcare Courses

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Introduction: In Portugal, two periods of confinement were implemented due to the COVID-19 pandemic (i.e., March 2020, January 2021), and closing the educational institutions was one of the containment measures adopted. Medical students felt the impact of these confinement periods because healthcare education has a very high practical component in the context of clinical teaching: it is impossible to teach these healthcare disciplines via distance learning methodology.
Aims: This study aims to identify the feelings related to the academic path in higher education students attending healthcare courses as a consequence of confinement.
Methods: The sample included 133 students, aged between 18 and 55 years, 77 (68.1%) were female. This was a qualitative and cross-sectional study using a content analysis approach. The measurement instrument included an online questionnaire.
Results: From the results, demotivation, anxiety, insecurity and fear of being contaminated stand out as the most present and reported student feelings. All these new feelings led to a shift in the mental health status, which most students currently classify negatively as a result of all the changes experienced during this time. Most students expressed negative feelings resulting from the pandemic, asserting that confinement interfered with their academic path in a negative way regarding their mental health.
Conclusions: The decrease in practical classes led to a feeling of insecurity and fear in patient care. It is suggested that the mental health of university students be monitored during epidemics in order to try to minimize the impacts caused on their mental health.

Keywords: SARS-CoV-2, students, confinement, feelings, coping strategies

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Introduction

Due to the pandemic outbreak the coronavirus – SARS-CoV-2 – caused, in order to prevent the disease's spread, the Portuguese government has been adopting public health measures necessary to protect the entire population.

Between March and May 2020, Portugal adopted the first period of confinement, including the closure of schools (Diário de Notícias, 2020a) With the worsening of the pandemic situation, in January 2021, the Portuguese government decided on a new phase of confinement (República Portuguesa, 2021). It was not only in Portugal that these measures were verified: more than 166 countries closed their schools, affecting over 87% of the world's student population, 1.52 billion students with approximately 60.2 million teachers who no longer were in the classroom (UNESCO, 2020a).

A study carried out by the Portuguese International Labor Organization revealed that 65% of young people considered they had learned less since the beginning of the pandemic and that more than 70% who studied or combined study with work were negatively affected by the closure of schools, universities, and training centers (Caetano, 2020).

The period of confinement produced a face-to-face social distancing that itself can lead to health problems, since social support stands as a strong and consistent predictor of health outcomes, being related as it is to mental health (Smith et al., 2015) and social isolation carries association with a higher risk of mortality and morbidity due to chronic diseases (Geirdal et al., 2021).

The COVID-19 pandemic brought with it a new reality and paradigm shifts in the educational context of higher education institutions (Bloom et al., 2020). During the confinement, classes within Portugal took place again in a distance-learning regime, a phenomenon that can lead to constraints in the pedagogical methodology of disciplines having a practical nature, such as healthcare courses. In the United States, orthopedic residents are using web-based educational tools as a means of learning, and surgical simulators to ensure the continuous development of those residents (Kogan et al., 2020).

In addition to the change in the manner of teaching classes, many internships were interrupted or postponed due to this situation, causing constraints producing delays in the academic path. Another consequence resulting from the pandemic was the increase in the number of the unemployed (Mateus & Rosa, 2020), making it difficult to sustain the financial expenses imposed by completing a higher education course. In January 2021, the unemployment rate in Portugal increased to 7.2% (Mateus, 2021).

It is believed that the period of confinement resulting from the pandemic and the health consequences of the virus – such as the risk of mortality and changes in the economy – can lead to changes in the population's mental health, including students (Cao et al., 2020).

Since up to this day, very few studies exist that evaluate mental health in students, this study aimed to assess the feelings in higher education students attending healthcare courses, related to the academic path, as a result of the confinement due to the COVID-19 pandemic.

Methods

The study has a qualitative and transversal nature, using the conventional content analysis approach, and was approved by the Research in Education and Community Intervention (RECI), Piaget Institute research unit. A content analysis involves a research method that allows data to be verified systematically and reliably.

All individuals were informed about the study's objectives, having been informed that the anonymity of the answers would be guaranteed and that they could withdraw at any time during the study, without any kind of prejudice.

Sample

The study population consisted of higher education students from the Jean Piaget School of Health in Algarve, Piaget Institute of Silves.

The Jean Piaget School of Health in Algarve offers three different degree courses in the health sector, namely Nursing, Physiotherapy, and Osteopathy. In the 2020/2021 academic year, 233 students had been enrolled.

The inclusion criteria cumulatively involved students of any sex and age enrolled in this school year at this institution, and willing to participate voluntarily.

Measuring Instrument

The instrument used for data collection included an online questionnaire, which was disseminated on social networks and through messages; it contained open questions and the responses to these questions were analyzed qualitatively.

The researchers prepared the questionnaire and divided it into two parts: a socio-demographic characterization of the population and one on feelings arising from the pandemic situation.

The questionnaire's first section included multiple-choice questions about gender, age, the course the student is taking, year of the course, whether the student was attending any clinical education, whether the student had already undergone clinical education during the pandemic, whether the student performs some professional activity, and, if so, whether this profession is related to the health sector. The second part of the questionnaire included the following six open-ended questions: How do you currently feel in an academic context due to the pandemic?; How is the pandemic interfering with your academic career?; What are the consequences that the pandemic could have on your academic path and/or professional future?; How would you describe your mental state before the pandemic and at the present time?; What strategies did you find/mobilize to face the changes in your life due to the pandemic?; How has the pandemic changed you as a person?

Data Analysis

With the collected material, we built our investigation using a qualitative approach based on the Content Analysis proposed by Laurence Bardin (2011). The content analysis according to Bardin aims to obtain the contents of the indicator messages through systematic procedures and descriptive objectives, allowing the inference of knowledge related to the conditions of producing and receiving these messages (Bardin, 2011).

Content analysis, according to Bardin's perspective, consists of a methodological technique that can be applied to different discourses and to all forms of communication, whatever the nature of its support. In this analysis, the researcher seeks to understand the characteristics, structures, or models that lie behind the message fragments taken into account. The analyst's effort is, therefore, twofold: to understand the meaning of communication – as if he were the normal receiver – and, above all, to look away, seeking another meaning, another message, which can be seen through or alongside the first (Bardin, 2011).

Bardin (2011) indicates that the use of content analysis includes three fundamental phases: pre-analysis, material exploration, and treatment of results – inference and interpretation.

In the first stage, the interviews were read and reread to get a sense of the whole, to get an idea of what were the main points or ideas that the participants were expressing. The next step consisted of identifying and condensing sentences and paragraphs to formulate categories and then group these categories into subcategories. The answers were coded to the subcategories and their respective sub-subcategories.

The analysis is mainly accomplished by a content analysis of the answers given to the six open-ended questions in the questionnaire. Some main categories are made directly from the topic of each question (e.g., the category "Interference in the academic path" is made based on the question "How is the pandemic interfering with your academic career?").

Results

The sample included 133 students aged between 18 and 55 years (25.5 ± 8.4), 77 (68.1%) were female and 36 (31.9%) were male. Fifty-eight (51.3%) of the students who took part had a degree in Physiotherapy, 42 (37.2%) in Nursing and 13 (11.5%) who took part had a degree in Osteopathy.

Thirty-four (30.1%) of the students who took part had clinical education during government-imposed confinement.

Fifty-five (48.7%) students performed clinical teaching during the pandemic.

Thirty-seven (32.7%) students were employed (working students), and 28 (75.7%) of those were employed in healthcare.

Regarding the content analysis, eight categories were created, namely: Feelings towards the pandemic; Interference in the academic path; Consequences on the academic/professional path; Mental state before the pandemic; Current mental state; Mental status before and during the pandemic; Strategies mobilized; Personal changes in the face of the pandemic.



Figure 1. Word cloud of feelings experienced by students due to COVID-19

Feelings About the Pandemic

Researchers divided this category into two subcategories, which included feelings or emotions classified as positive and as negative. A feeling is considered positive when it causes a sense of well-being, generating pleasure and satisfaction. A feeling is considered negative when it causes a feeling of unease, generating discomfort and displeasure.

Within these subcategories, sub-subcategories were included, with labels assigned to each of the feelings or emotions. Most students reported negative feelings, and the main labels mentioned were: unmotivated, anxious, insecure and afraid.

Some of the answers students gave to questions regarding these feelings were:

- The feeling is a kind of conditioning the level of learning, due to constantly changing clinical teachings.
- Concerned that the quality of my learning isn't the best.
- I feel tremendous agony, since the pandemic made it difficult for students to learn from and communicate with each other.
- A little scared because things are getting worse.

Figure 1 shows the adjectives used to create the sub-subcategories of these subcategories.

Interference with the Academic Path

Students were asked how the pandemic was interfering with their academic path. The process of internalization and knowledge construction requires a quiet space without any kind of interference. The created subcategories were: non-interference in the academic path and the interferences that can harm this path.

Most students reported that this confinement was negatively interfering with their path, limiting it due to changes in the quality of classes that were no longer face to face, and the impediment to attend practical classes and clinical teaching, making it difficult to acquire important skills.

In the following, we list some responses from students that highlight this category:

- I should be doing my internship and the pandemic delayed me, so I'm going to finish my course later and enter the labor market.
- Due to the pandemic, there was a need to adapt the education, making it more theoretical.
- Regarding the quality of learning, i.e., I would like the classes to be more dynamic.
- It prevents me from having practical knowledge.

Consequences on the Academic/Professional Path

This new period of confinement brought some negative consequences on the academic path for students, since the teaching-learning methodologies were conditioned, moving from face-to-face to distance learning. We moved from face-to-face teaching, in the classroom, to distance learning, due to the obligation of social distancing. Increasingly more practical classes and clinical teachings had to be adapted to be taught at a distance or postponed, delaying the academic path and/or compromising the acquisition of practical skills.

In addition, the number of patients seen at the health services was also reduced, which implies a smaller number of patients that students had contact with during the clinical teaching period. This lack of practical knowledge application during the course may harm students when completing their studies, making them more insecure professionals.

The manifestations of these feelings are perfectly visible through the following expressions:

- Related to the university, many consequences result: not being able to touch harms immensely, having a face mask makes it difficult to pronounce the words for those who have a difficulty being heard, the lack of qualified internships for these purposes, and much more...
- Difficulties in clinical internships due to a lack of manual practice.
- Probably having too few practical classes and having little contact with my colleagues/teachers. Communication is extremely important in nursing.
- I can have poorer learning, in clinical practice, due to the lack of face-to-face moments and a shortage of patients, as well as due to conditioned learning in theoretical-practical classes.

When asked about "How would you describe your mental status before the pandemic and at the present time?", some students did not answer how their mental status stood before the pandemic, referring instead only to the current status. That said, three distinct categories were created and described below. Regarding mental health status, there were responses about the health status *before* the pandemic, responses only about the *current* health status (during the pandemic), and then another category that included the responses wherein students compared their health status before the pandemic to their current one. A mental state consists of a characteristic involving a person's mind and forms several classes, including perception, pain experience, belief, desire, intention, emotion and memory.

Mental State Before the Pandemic

The majority of students rated their mental health status before the pandemic positively, including good, stable, safe, healthy, motivated, happy, and positive states.

Some of the phrases used to classify this state were:

- Before the pandemic I felt happy and fulfilled for having entered the university.
- Before the pandemic: stable.
- Before I was more positive.

Current Mental State

The overwhelming majority of students classified the current mental state negatively, with adjectives such as anxious, nervous, impatient, tired, afraid, insecure and worried included in the sub-subcategories of the negative subcategory.

Some of the phrases used to classify this current state of health were:

- It's certainly worse now.
- I feel more psychologically tired and sad.

Mental State Before and During the Pandemic

This category was created from students' responses when they compared their mental state before and during the pandemic, and included phrases such as:

- Before, reasonably well; since the pandemic, a deep depression to the point that it affected personal, academic and professional life.
- Happy and with expectations before the pandemic, then tired and without courage for the future.

Strategies Mobilized

At the time of the study, we were in a second period of confinement. Students had to readjust to this new reality and create strategies to overcome this moment in the best way possible. Most students resorted to physical exercise, others strictly adhered to the established protection measures, some students started a type of hobby or new activity, and others invested in training.

Below are some answers that illustrate this category:

- I started taking walks, exercising at home and cooking more. These activities kept me busier and more positive.
- As I have more free time, I exercise and study.
- More accentuated cleaning of hands and care in general.
- Doing things I normally wouldn't have time to do because I'm not at home so much.
- I found and developed new hobbies when it wasn't necessary to study.
- More hours devoted to studying.

Personal Changes in the Face of the Pandemic

For this category, three subcategories were created, which included changes classified as positive, negative, and no change. Most students reported positive changes due to this pandemic situation. For positive changes, sub-subcategories were included, and the most mentioned were: being more careful, valuing the moment and people, personal and professional development, being calmer and being open to change. As for negative changes, the sub-subcategories included anxiety, stress, less socialization, insecurity and fear.

The expressions that evidence this category are:

- More respect for human life and valuing the moment more.
- It changed me in terms of thinking about my actions and what I really want for my life.
- It taught me how to learn to be patient, develop more empathy, and think about others.
- It made me give importance to things that I didn't care so much about before.
- Revolted. Furious at people's mindset.
- It made me insecure, afraid to be with other people, afraid to risk my life and others' lives.
- It made me more anxious and a little afraid of the future.

Discussion

The COVID-19 pandemic caused several changes in people's daily lives, including changes in the educational sector. Face-to-face classes were suspended, and educational establishments adopted the methodology of distance classes. In this second confinement period, only theoretical evaluations were allowed to be held face-to-face.

Health courses have a very high practical component, and thus distance teaching is difficult. Some subjects had their practical component adapted to distance learning, with video viewing as a teaching strategy, training techniques with individuals who lived in the same house, among others. Despite teacher efforts, distance classes also present constraints related to internet connection, where sometimes the network is not available, making it difficult to keep up with classes.

E-learning teaching provides a flexible model of student-centered learning, in contrast to the didactic transmission of education models. Despite all the constraints mentioned above, this new type of teaching has shown evidence of good academic results in health care courses (Carolan et al., 2020).

Attending higher education also involves aspects other than just learning. Socializing with colleagues and teachers is also part of it. Communicating in a face-to-face classroom is different from communicating in a virtual classroom**.**

Ma et al. (2020) verified that students who had low perceived social support were 4.84–5.98 times more likely to have symptoms of anxiety and depression compared to students who had high perceived social support.

The clinical teaching period remains another very important aspect in health courses: it is where students can apply, in a real context, the theoretical and practical knowledge they acquire in the classroom. Some clinical teachings suffered interruption or cancellation, thus delaying the academic path. Where clinical teaching was allowed, due to confinement rules imposed by the Portuguese Government, the number of patients was reduced depending on the space, reducing the amount of time for real context practice. Another situation regarding the internships concerns the proximity with the patient during care activities, which can bring feelings of contamination fear despite the care taken, and the fear of risking virus transmission to closer, older family members with

co-morbidities. Many health professionals who were student tutors were mobilized to care for patients with COVID-19 and, in another phase of the pandemic, others started the vaccination process, and, only recently, the nursing students, who were carrying out clinical education, were expected to receive the vaccine; the same did not occur for the physiotherapy and osteopathy students who, in the course of this study, were not expected to be vaccinated. Even though all students were exposed to the same risks as health care professionals, they were not being vaccinated and no provisions existed for vaccination.

Eweida et al. (2020) evaluated the mental health of 150 nursing students in a clinical teaching context and the data revealed that 77% of the students felt under pressure, 65% considered themselves useless and 63% depressed, and the factors that generated the most stressful situations were the possibility of contracting COVID-19 infection and transmitting it to family members.

All these changes, which the pandemic brought about in terms of teaching, generated some feelings of demotivation in students since these courses imply a proximity in the relationship with the patient, either through manual techniques or through communication, and both aspects had to be discontinued or adapted.

Students felt that their learning was impaired. Anxiety, insecurity and fear of being contaminated were other feelings that the students mentioned, since the uncertainties of when this situation would return to normality were many. Son et al.'s (2020) study revealed that 91% of students felt fear and worry about their own health and of their loved ones during the pandemic.

All these new feelings led to a change in mental health status, which most students currently classified negatively as a result of all the changes experienced at the time.

Teixeira et al. (2021) evaluated 656 Brazilian medical students during confinement and the results revealed that 63% of the students displayed signs of psychological distress and 81.4% reported having experienced some type of psychological or behavioral change during confinement.

Ma et al. (2020) evaluated 746,217 Chinese higher education students during the COVID-19 outbreak (in February 2020) and found that 45% of the participants had mental health problems involving stress, as well as depressive and anxiety symptoms.

Changes in mental health were also verified in a study by Cao et al. (2020), who evaluated 7,143 medical university students in China. The results indicated that 0.9% of respondents had severe anxiety, 2.7% moderate anxiety and 21.3% mild anxiety.

Son et al. (2020) evaluated the effects of the COVID-19 pandemic on United States student mental health and showed that 71% of the students indicated increased stress and anxiety due to the COVID-19 outbreak.

These previous studies present quantitative data, used in the discussion only to illustrate that students' mental health constituted a worldwide problem. The qualitative studies found referred to health professionals, not students in this area.

The interruptions of some practical classes, the distance learning, the impediment to perform practical techniques, hindering the acquisition of these skills, the delay in carrying out clinical teaching – among other factors – interfered with the academic path, delaying it. Final year students felt this delay more strongly, experiencing a setback in the completion of their course and in their possible entry into the labor market.

In order to try to overcome this situation, minimizing damage to their mental health, some students used strategies to adapt to this new reality. Because they had a longer idle period at home, due to confinement, some students chose to practice physical exercise since their individual practice was allowed outdoors. It served as a way to get out of the house without suffering reprisals, in addition to the benefits at the hormonal level that the exercise practice presents. Other strategies used during confinement involved a greater concern for complying with distancing and hygiene standards established to prevent virus transmission. More idle time at home also allowed initiating or returning to some other activities or hobbies, as well as training.

UNESCO (2020b) states that the practice of meditation and yoga serve as tools that focus on controlled breathing; this can help control anxiety and confusion during the period of confinement, yoga also functions as a practice of physical exercise, which can bestow even more benefits for the mind. In addition, the report states that healthy eating, other physical exercises, using online games or social media to stay connected with friends and colleagues, and a proper sleep routine are all tools that can protect mental health.

This whole panorama, which already spans more than one year, promoted reflections and positive personal changes in the students, providing a greater sense of empathy as well as valuing each moment experienced and the people who were close, feelings that in the rush of daily life were not otherwise considered.

Strengths and Limitations

The data obtained in this study may have practical benefits for the field of student mental health, revealing a need for increased attention to the mental health of students who themselves will be future health professionals in the coming epidemics.

A limitation of this study was the use of a double question ("How would you describe your mental state before the pandemic and at the present time?"), in which some students tend to answer only a part of the question, as it occurred in this research. This study also did not compare possible groups of respondents based on their demographic characteristics. Future studies are recommended to understand the differences concerning sex, age group and working-non working status with regard to the results in this content-analysis.

Conclusion, Implications and Future Directions

The epidemic brought not only the risk of death from infection, but also a great psychological pressure on the students evaluated in this study sample. The majority of the students expressed negative feelings, such as a lack of motivation, anxiety, and insecurity.

The period of confinement imposed by the COVID-19 pandemic interfered with the academic path in a negative way, and may have contributed even more to the worsening of mental health, classified by most students as negative.

The reduced training of professional techniques also led to a feeling of insecurity and fear related to patient care.

This study reinforces the importance of monitoring the mental health of university students and suggests that the mental health of university students should be monitored during epidemics, voluntarily and with consent; it also promotes the creation of support mechanisms in order to try to minimize the impacts caused on their mental health by the pandemic.

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Author contribution

Beatriz MINGHELLI: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, writing original draft, writing review and editing.
Elsy TAVARES: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft.
Teresa PINHEIRO: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft.
All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The studies involving human participants were reviewed and approved by the Research in Education and Community Intervention (RECI), Piaget Institute Research Unit.
All participants engaged in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

"This doesn't feel like living": How the COVID-19 Pandemic Affected the Mental Health of Vulnerable University Students in the United Kingdom

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Introduction: Concerns about student mental health have been rising globally. The COVID-19 pandemic triggered unprecedented disruption in higher education as universities were forced to close and adapt their education delivery. Understanding the impact of this on vulnerable students can inform higher education's response to future similar events.
Aims: To understand the lived experience of first year university students studying in the United Kingdom, who had a history of poor mental health and lived on a low income, we examined the inter-relatedness between mental health, financial strain, remote learning and engagement, and well-being.
Methods: At the start of their first year of study, whilst the UK was in periods of lockdown, we conducted in-depth semi-structured interviews with 20 diverse first-year university students. We analyzed data using interpretative phenomenological analysis.
Results: The pandemic's impact on student mental health, engagement and learning remained pervasive and serious. Key themes conveyed how isolation triggered past mental health difficulties and a perception that the universities – and government – had forgotten about them. Students also experienced greater difficulty in navigating the liminal threshold between being a child and an adult, and having the additional worry of financial instability left students with fewer coping resources.
Conclusions: To mitigate the impact of future pandemic responses, constant and effective communication is needed between faculty and students to safeguard against isolation and low motivation. Vulnerable students need guidance in coping skills to manage mental health risks when they are away from family and familiar support networks.

Keywords: COVID-19 pandemic, mental health, university, socioeconomic, qualitative

Introduction

In response to the COVID-19 pandemic, the World Health Organisation in January 2020 declared a Public Health Emergency of International Concern (WHO, 2020). During lockdowns, educational institutions, including universities, were required to "close their doors" and find alternative ways to deliver education and to support students online. When lockdowns were lifted, many UK universities did not permit students back on campus and continued to deliver degrees remotely. Anticipation of future pandemic waves partly drove this, along with inadequate teaching spaces to permit social distancing (Burns et al., 2020). Whilst some universities reopened

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their campuses for the 2021–22 academic year in October, the majority adopted a hybrid approach with lectures online and small-group teaching in person. In late 2021, many UK universities began preparing for another full campus closure due to the emergence of another virus variation (Omnicron). Whilst the impact of the pandemic on adolescent mental health and educational attainment is being examined (e.g., Azevdo et al., 2021), we know less about pandemic-related mental health experiences, and their impact, on students in tertiary education.

Globally and in the UK, student mental health was already of concern pre-pandemic (Klepac et al., 2021; Thorley, 2017), as the start of the university coincides with the mean age of onset for many psychiatric disorders (Reavley et al., 2012). A WHO survey by Auerbach et al. (2016) reported that, globally, approximately 20% of college students had a mental health disorder, and evidence exists that mental health can deteriorate over the course of university (Andrews & Wilding, 2004). Young people's mental health appears to have been particularly affected by the pandemic; Kumar and Nayar (2021) report that the 25% increase in anxiety and depression is mostly in the under 25s. Additionally, Cao et al.'s (2020) survey of Chinese university students reported that 25% of participants (n = 7,143) had experienced anxiety and rising worry about the academic interruption, economic impacts and effects on daily living. Bland et al. (2021) reported that isolation and virtual communications were associated with sadness, disconnectedness, fear and anxiety among UK university students. However, we still know relatively little about the impact of the pandemic, and universities' responses, on student mental health and even less about the most vulnerable people in this population.

COVID-19 research is showing that people who have experienced poor mental health pre-pandemic are more likely to experience negative psychological and physical health impacts (Daly et al., 2020). Young people appear to be particularly vulnerable in this area. In a UK survey of 3,077 members of the public during the first six weeks of the UK lockdown, young adults (aged 18–29y) and people with pre-existing mental health problems, experienced the greatest increase in depression, anxiety and feelings of loneliness (O'Connor et al., 2020). Furthermore, a worldwide survey of students reported that 83% of the 2,011 participants, aged 15–25y, felt that the pandemic had worsened their pre-existing mental health conditions. Reasons cited include university closures, lack of routine, and lack of social interaction (YoungMinds, 2020).

Yet poor mental health bears not the only dimension of vulnerability, as this often intersects with other adversities such as financial hardship. A meta-analysis of 65 global papers found that 41.7% of students with a mental health disorder are in debt, compared to 17.5% without, and that significant associations exist between debt and depression, and suicide completion or attempt (Richardson et al., 2013). A longitudinal study of 454 first-year British students by Richardson et al. (2017), reported that more severe financial difficulties predicted greater depression, stress and anxiety, which in turn predicted a worsening financial situation; this suggests a vicious cycle of financial struggles and mental health. In the UK, student fees are approximately £9,250 per year, with government subsidized loans on a sliding scale according to household income. However, these loans are typically inadequate to cover most student living expenses (National Union of Students, 2021) and many students from low-income households must get part-time work to survive. Economic concerns quickly converge with psychological and health risks for students in the pandemic as most students work in industries where infection risk and associated anxiety are high; e.g. catering, retail, warehouses (Trueblood et al., 2020).

The Present Study

Being a student in financial hardship and with prior or existing mental health difficulties can constitute a double-whammy of vulnerability during the pandemic (Liu et al., 2020). We do not yet know how this cohort of vulnerable young people have experienced the pandemic, nor how their prior or existing mental health difficulties, financial context and changes to university provision have intersected.

The present study brings attention to university students who often fall between the cracks of youth and adult research (Ketchen et al., 2015; Thorley, 2017; Copeland et al., 2021). This study's aim was to understand the lived pandemic experience of particularly vulnerable students, namely first-year students who had a history of poor mental health and who were on a low income.

Our research question asked "What is the experience of first-year students with prior or ongoing mental health difficulties who are on a low income?" Investigating the impact of the pandemic on vulnerable students can contribute to an understanding of student mental health, and the ways that institutions and mental health services can work towards mitigating the legacy of the pandemic. As university education remains unlikely to return to its pre-pandemic form for some time, if ever, higher education institutes and associated professionals must have a good understanding of whether this new form of education exacerbates inequalities by disproportionately affecting some student groups compared to others (Burki, 2020).

The present study reports Time Point 1 (October 2021) from a longitudinal study (October 2021 – June 2022). The very nature of a pandemic is longitudinal and at present, no cut-off exists at which to measure "an impact". Our study responds to calls for qualitative, longitudinal research to detail the longer-term impacts of the pandemic (O'Connor et al., 2020).

Methods

Design

This was a qualitative study involving semi-structured interviews with university students, analyzed via Interpretative Phenomenological Analysis (IPA). IPA affords an in-depth analysis of lived experience where each IPA participant represents a perspective, not a population (Tuffour, 2017).

Ethics and Recruitment

Ethical approval was gained from the University of Leeds ethics committee, number PSYC-147, 23/11/2020.

The target sample size was 20, which is suitable for an in-depth, longitudinal qualitative study given the potential for participant attrition (Mason, 2010). The inclusion criteria for the study were that participants: (1) be first-year university students at a UK university; (2) self-report as having experienced a period (between 3–12 weeks) of poor mental health since March 2020, compared to their usual levels of mental well-being, constituting mental health difficulties prior to starting university; (3) be entitled to the full UK student maintenance loan; (4) be able to take part in an interview in English; (5) feel well enough to take part. As per Keyes (2002), this study conceptualized "poor mental health" as part of a continuum from flourishing through to mental health disorder. We did not define "poor mental health" in recruitment material as it involves the subjective experience of feeling one's mental health being poor compared to the usual state that mattered (as per Peters, 2010). Participants with a mental health diagnosis or receiving ongoing professional support were excluded for safety reasons. Entitlement of the full UK student maintenance loan was our criterion for "low-income". The government provides maintenance loans to assist in student living costs (rent, bills, food, etc.). To be eligible for this study, students had to be in the lowest income bracket of £25,000 per year or less, leading to a yearly loan of £9,488 if living away from home (Student Finance England, 2020). Participants were recruited through social media posts in September-October 2021, as they remotely began their first year of university education. They were invited to contact the researcher if they wished to find out more or to sign up for the study, with monetary incentives set at £25 after the first interview (with all necessary information obtained) and £30 after the final two (Time Points 2 and 3).

Participants

Participants were 20 university students attending university in the UK; 15 were female and 5 were male. Fourteen identified as White/White British, 4 as Asian/Asian British, and 2 as "other". Four identified as heterosexual, two as homosexual, three as bisexual and 11 as other. All participants self-reported having experienced poor mental health for between 3–12 weeks prior to the interview, compared to their usual level of well-being. This was assessed by initial interview questions that established the individual's view on their mental health (e.g. "[The researcher] asked people to come forward who had past experience of poor mental health… Could you tell me a bit about how that applies to you?"). All were entitled to the full UK student maintenance loan. Participant mental health symptoms as self-reported in the interview were wide-ranging, including symptoms of depression (n = 19), anxiety (n = 17), eating disorders (n = 1), anger (n = 2), and attention regulation difficulties (n = 2).

Procedure

The first author, an experienced interviewer of students on mental health topics, conducted semi-structured interviews in October 2021. Given pandemic restrictions for face-to-face interviews, these were carried out and recorded via Microsoft Teams. Participants could choose whether they preferred a text-based or video (camera on) interview. Text-based meant using only the typing space on Teams, without the use of cameras or microphones. Prior to the interview, participants were asked to generate a safety plan to detail people, places, and organizations they could go to for support, if needed. Such plans in mental health research can limit risk, particularly when

participants might be suicidal (Hill et al., 2019) or are undergoing counselling (Ortiz & Levine, 2021). It was anticipated that interviews would last approximately one hour. Interviews began by rechecking consent (initially obtained via consent forms prior to interview) and outlining the interview schedule. Demographic information was obtained prior to the interview.

Interviews explored four main areas: (i) how their mental health was impacted by the pandemic; (ii) how the pandemic impacted their financial situation; (iii) how they managed remote and online education; and (iv) how they had coped during the pandemic. At the interviews' end, participants were reminded of their safety plan and asked whether they felt well settled to exit the interview.

Data Preparation

For text-based interviews, data was copied onto a word document in a format suitable for analysis. Video calls and automatically generated transcriptions from MS Teams were downloaded via Microsoft Stream and deleted from online storage. Transcription was improved to playscript standard (Gibson & Hugh-Jones, 2012) and data was anonymised. The mean interview length was 76.05 minutes.

Method of Analysis

We utilized IPA, which is a systematic, idiographic approach to the analysis of rich, lived experience data, including the meaning that participants give to those experiences (Smith et al., 2021; Smith & Osborn, 2008). Analysis progresses from individual cases to an exploration of similarities and differences in themes across the dataset. Our authors included the primary researcher (CH), a support analyst (CSS) who was an experienced mental health support worker in university settings, a third experienced qualitative analyst (SHJ) and a further independent supervisor (EJS). A team approach is common in IPA studies; it can create a supportive unit to enrich the analytic process and be an early form of accountability and sense checking in the analysis process (Guest & MacQueen, 2008).

The analysis followed five steps, based on Miller, Chan and Farmer (2018). The driving analytic question was "What are the lived experiences of students in relation to mental health and financial strain?" All aspects of the data were coded for completeness. Initial stages involved researchers familiarizing themselves with the data before open-coding to capture either semantic (e.g., "difficulty budgeting") or latent (e.g., "shadow of anxiety") meaning (Smith, 2011). We worked with primary and secondary coders for each transcript, where the secondary coder was a challenger/developer of primary coding proposals, and jointly they worked up themes per transcript. A final list of themes was generated after the input from the supervisory team. The above steps were repeated across all transcripts and then patterns were explored across the dataset to develop a final set of themes (Smith & Shinebourne, 2012).

Results

We present analytic outcomes in the form of themes and sub-themes that represent the mental health experiences of our participants, namely: (i) Trapped With Too Much Time and Too Many Thoughts, (ii) The Challenge of Liminality, and (iii) Conflict of Health vs Wealth (see Table 1 for a theme map). In general, the pandemic appeared to have a multi-faceted impact on participants' mental health, and in turn, their mental health influenced how they responded to the pandemic. Negative internal and external factors appeared to dynamically intensify each other, meaning the overall experience of participants was extremely challenging.

Theme 1: Trapped with Too Much Time and Too Many Thoughts

Being alone and unable to leave their room, the students' usual coping mechanisms were not available, and they had few ways of distracting themselves from the often overwhelming sense of *Feeling Isolated, Lonely and Forgotten (sub-theme 1a)*. As the lockdown kept students within their student accommodation, they were unable to do what normally helps their mental health, thus leading to a sense of *sliding back (sub-theme 1b)* into negative ways of thinking. Additionally, participants struggled with being *sapped of drive (sub-theme 1c) in* their environment; being in the same, uninspiring place on a daily basis made it difficult to summon motivation for challenging work, which intensified challenges to their mental health.

Table 1. Participant Characteristics and Theme Mapping

		Theme Presented		
ID	Gender	Too Much Time, Too Many Thoughts	Challenges of Liminality	Health vs Wealth
F573	Male	✓	✓	X
S621	Female	✓	✓	✓
B662	Female	✓	✓	✓
D678	Female	✓	✓	✓
M388	Female	X	✓	✓
G554	Male	✓	✓	✓
H065	Female	✓	✓	X
N859	Female	✓	✓	X
H349	Female	✓	✓	X
R852	Female	✓	✓	✓
B456	Female	✓	✓	✓
M918	Male	✓	X	✓
J213	Female	X	✓	✓
S974	Female	✓	✓	X
S256	Male	✓	✓	✓
M240	Female	✓	✓	✓
H422	Female	✓	X	✓
G997	Female	✓	✓	✓
M993	Female	✓	✓	X
A135	Male	✓	✓	✓

Sub-theme 1a: Feeling Isolated, Lonely and Forgotten

A frequent experience was that of loneliness and isolation as a result of lockdowns, with some students finding it especially difficult to cope with the lack of social energy and support that they would otherwise access: "I'm a very sociable person so it's very essential for me to stay in touch with people […] And this year I've been almost completely deprived of that" (#N859 F). Isolation was distressing for all participants as they felt caught in a cycle of sadness and loneliness. Many felt that the world around them, including their university institute and the UK government, had forgotten them, and this led to losing confidence in themselves and in their ability to learn and succeed at university. Some felt "left alone" with their spiraling negative thoughts, without the distraction or help of people nearby: "I tend to… to just be like… over thinking, I'm thinking about stuff over and over again" (#G997 F). The isolation also caused many students to feel disconnected from their university community and stuck by the lack of reinforcing feedback about their abilities as students:

> I've felt lonely as I haven't been able to see or make friends. It feels like everything is on hold and I'm not making progress because the outcome of my time studying and engaging with university resources online is intangible… I feel like I've been forgotten. The feeling of not being able to make a friend is really isolating. (#H349 F)

Sub-theme 1b: Trapped and Sliding Back

Worsening mental health was reported by most participants, often via the metaphor of "sliding back", suggesting their pre-pandemic climb to recovery had been voided as they now regressed into their previous difficulties. One

participant explained how "Not being able to live at all right now" (#F573 M) meant *a "slide back into all of the issues I used to have".* He explained that feeling trapped and prevented from the usual form of help was a major driver of this "sliding": "The biggest things that helped me get better and stay better after I had been ill before I haven't been able to do". This had knock-on effects via his ability to study as his slide back "into all the negative ways I was thinking before […] destroyed any motivation I've had" (#F573 M). Others talked about the impact of being prevented from managing their anxiety through social challenges. Lockdown gave them a reason to not leave their home, meaning their avoidance behaviors went unchallenged: "To be honest, I think I always looked for reasons to not leave the house so COVID-19 was a good excuse" (#M993 F). Thoughts of social re-engaging became harder the longer they went without social contact. For others, unhelpful habits resurfaced as mental health worries grew stronger and they were prevented from enacting their usual coping mechanisms. For example, one participant began to obsess over their weight as they were prevented from going to the gym: "[I] did gymnastics and swimming since I was a kid. But I can't do any of that, and gained weight […] and really hate it, so I stopped eating anything apart from dinner now" (#A135 M).

Sub-theme 1c: Sapped of Drive

Being trapped in the same small space made motivation a challenge for many, and they felt a lack of purpose regarding getting up and working. Most student accommodation involves one small room with a bed and desk as well as a communal kitchen and washroom. Living, eating, sleeping and working in the same place was not a healthy environment for mental health, nor for academic engagement and productivity: "Doing lectures and assignments, etc., all in my one tiny bedroom hasn't been great […] I feel like I never really have the chance to enjoy […] the day because I'll be holed up in my room" (#D678 F). The lack of daily distinctiveness and structure affected energy, focus and motivation.

> Because I'm not walking into uni, I have no motivation to do work. I pretty much stay in this one room all the time. I sleep, I work, I hang out. So when I get up and do work… it's mindless, I'm just sitting through the lecture… It's all pre-recorded. I could watch it at midnight if I wanted… it's quite hard 'cause there's no motivation to work, but that's all I have to do. (#H063 F)

Being isolated from social and academic guidance also affected their confidence which also sapped their motivation to work: "I get up to do this thing but think I'm going to do it wrong. Or, I don't know how to do it and I think, yeah, and then it turns into, like, more lower mood" (#G99). This sense of being static, without drive and confidence cut through many other aspects of the student experience, as their low mood and anxiety about finances were additional burdens which made self-motivation more difficult: "… wishing that I could be in their situation and not have to worry (about money), and like… having better self-esteem and feeling better about myself" (#R852 F).

Theme 2: The Challenge of Liminality

Liminality can describe the psychological process of transitioning across life stages or rites of passage, and involves experiences of being in limbo or in transition between old and new identities, including being an adolescent to a student to an adult.

Our participants talked about difficulties related to two liminalities, namely feeling *In-between Child and Adult Mentalities* (*sub-theme 2a*) and being *Denied Space* (*sub-theme 2b*).

Sub-theme 2a: In-between Child and Adult Mentalities

Given that this period was often the first time participants lived away from their family home, the disruption caused by the pandemic left many students exhausted as they struggled in-between their child and adult identities and associated mind-sets. We use these terms to loosely capture a sense of being young and in need of care versus feeling independent and able to cope. Students spoke about wanting to "Go home and have someone take care of [them]" (#H422 F) as a form of a reprieve from having to continuously be an adult. Participants had expectations about being self-reliant and responsible, but the pandemic made this more difficult than they anticipated as they had to be more self-reliant in uniquely challenging circumstances. Financial worries contributed to this feeling as the pandemic impact on job/wage security left students with no alternative than to ask parents for support – but this was anxiety-provoking for some: "I've been worried my mom and dad don't have enough money, so I hate

asking them for help" (#R852 F). This period of life represents a difficult period during which the participants weren't fully an adult or a child, occupying an awkward middle ground where the desire for independence clashed with the need for support and care. Overall, this lack of space in needing to be an adult leaves these students in an uncomfortable middle ground where they are expected to begin adulthood, without the stability and resources to do so.

> I feel like a very lazy and demotivated person at the moment and it's just like I'm just trying to power through and wait for me to fly home … I'm 20 and probably shouldn't say that I want someone to take care of me, but I just want to come home… it just feels like I've had a lot of responsibilities lately, and if someone could take [them] away from me… it would be so nice. (#N859 F)

Sub-theme 2b: Denied Space

Studenthood as liminal psychological space occurs in the transitional space of university campuses and towns. Participants had ventured to new cities and campuses, but as much of that space was shut down, they felt disoriented, with a sense that nothing was moving and their lives were static. They felt awkward and disconnected from their course and the world around them, only able to watch things unfold as "helpless passengers" (#N859 F). These experiences were very unsettling and participants found it hard to tolerate this sense of unreality that sapped motivation and affected their mood. The level of disconnectedness between student and university (as a place and community) intensified isolation as well as made it harder to access support. A sense of not making any progress was common among participants as they lacked any way of being in a space with other students to calibrate their progress and performance. The "stuckness" of this liminal space contributes to a sense that "nothing is really happening", when they should be experiencing a transition to greater educational confidence. For some students, this stuckness was disorientating, and even frightening:

> I think it's the online that's making me feel disconnected. I'm a university student but I've never actually been on campus, or met my lecturers or other students. It feels like nothing is really happening and like I'm just watching it, so I can't get involved or really get behind actually being at university. Because I'm not there. (#F573 M)

Theme 3: Conflict of Health vs Wealth

Financial strain during the pandemic made student life extremely challenging for most participants. The ever-present worry over money led to *More Risk and More Danger* (*sub-theme 3a*) as students had no choice but to risk infection to earn a living. This caused a great deal of *Comparison to other students (subtheme 3b)* who did not have those concerns, resulting in *Feelings of frustration and helplessness (subtheme 3c)* at the perceived unfairness of the situation.

Sub-theme 3a: More Risk, More Danger

Job opportunities for students had become severely curtailed for our student sample. They talked about their work hours being drastically reduced, or employment made impossible due to lockdown in hospitality and other sectors. Most participants could not rely on parents / guardians for financial assistance and had no option but to put their health at risk by going to work. What stood as unique about students with prior mental health struggles was that anxious thoughts were often in conflict with this; participants felt anxious about going out but also about staying in. The thought of putting their family at risk (for those students who had returned home) was always weighed against the reality of needing a living wage, and this put a great strain on many participants' mental health:

> If I want more hours, they would have to be in person. So there is this balance between putting myself and my family at risk of getting COVID… It definitely makes me more anxious as I have to weigh my decisions to go out against my safety to do so, etc. My anxiety is definitely linked to wanting to keep family safe, but also wanting to support myself. (#M240 F)

Sub-theme 3b: Compared to Other Students

Many participants compared themselves to their peers (on their course or in student accommodation) and felt a strong sense of injustice and under-appreciation. An "us and them" mentality formed where students from more

privileged backgrounds were observed not having to worry about food or rent, which led to a great deal of frustration in participants who were struggling: "Full-time work and uni has taken a bit of a toll […] I get a bit stressed, like I can get really snappy." (#B456 F). This constant comparison stemming from their unfair circumstances also led to a heavier burden on participant mental health as they struggled to manage these feelings by themselves, experiencing an increased feeling of marginalization and otherness, surrounded by peers who could not understand their points of view or the additional struggles they faced:

> Literally not one person 've made friends with at uni has a job… either because their parents are funding everything… They're like, "Oh my God, you work?" And I'm like, "Yeah" like, surely that's something that people do, but people are like, "Why are you working again?" And it's because they just don't get it. (#B456 F)

Sub-theme 3c: Feeling Frustrated and Helpless

Many participants spoke at length about the high cost of their course. Their low income combined with long work hours urged them to reflect on how much they were paying, and the question of whether it was ultimately worth it, leading to an additional stressor on their mental health: "It's like that saying, you don't live to work. You work to live. It feels like I'm living to work at the moment and I'm like, is it even worth it?" (#B456 F). Most participants thought it was unfair that they were paying the usual fees, but could only access online material, and were only being taught remotely: "I am paying £9000 a year for what feels like YouTube videos" (#H063 F). This also led to feelings of hopelessness, and an overwhelming sense that there was nothing these students could do to help their financial situation, which only added to their pre-existing vulnerability to poor mental health. The clash of how much students were paying with the delivery of online material also caused frustration: "Having a large workload from university was something I expected, but personally I'm not great at learning online and I was really hoping for something better, like for the cost as well...which I think added to the general work stress" (#M388 F). Given that these students had pre-existing experiences of poor mental health, feeling down or prone to more critical/negative thoughts, the strong emotions of disappointment, frustration, worry, etc. were very difficult to process. Moreover, some students spoke about occasions where they had tried to seek help from lecturers, only for the response to be wholly inadequate and upsetting:

> I said to the lecturer, […] can you please direct me to some online resources that can help with this? [She said] YouTube it. I just found it so insulting […] I get angry just thinking about it because here I've come to you, said I'm struggling. I need support and all you're saying is go find that support yourself elsewhere […] I'm not paying £9,000 a year for that. Like I'm getting into debt for this. (#S621 F)

Discussion

This study found that first-year UK university students with prior experience of poor mental health, and living under financial strain, experienced multifaceted and intersecting difficulties during the first wave of the COVID pandemic. We discuss three key issues (isolation, liminality and wealth comparison) before considering the implications of our findings.

Isolation

The study highlighted how being isolated in an unchanging, confined space led to many of their pre-existing mental health experiences resurfacing, and made university life difficult. In particular, students who lacked social support within their isolated world, and for whom their usual coping strategies (e.g. going to church or the gym) were not possible, found life under lockdown hard to bear. Many students felt they had "slid back" into old, negative thoughts and emotions, largely because they lacked distraction from their negative thoughts. In line with previous research into productivity and one's environment (Basit et al., 2018), the present study highlighted how such preoccupations with one's thoughts can intensify in an isolated, unchanging environment. Having structure as well as space for time out, relaxation, enjoyable activities and a sense of safety are protective of mental health (Gilbert et al., 2008). Without these, our participants found it difficult to manage their vulnerabilities to impair negative thoughts and moods, to rally the mental drive and focus for work when pitted against solitude and lockdown.

While some of our participants found the lockdown to be a reprieve, the longer anxiety and low mood go unchallenged, the more detrimental the impact on the individual in the short-and long-term in terms of their social confidence (Kodal et al., 2018). The end of lockdowns does not necessarily become the end of reduced social interaction. Many countries and campuses retain some distancing and remote teaching, and many are considering a long-term hybrid model of delivery that will mean more time studying alone than in lecture halls. This means that students who struggle with isolation could continue to struggle even after the initial lockdown stages have officially ended.

This increased anxiety beyond lockdown is echoed in findings by the Office of National Statistic (2020), which found more than two-thirds of adults in the UK (69%) reported feeling somewhat or very worried about the effect lockdown was having on their lives, with the most common issues being worry about the future (63%), feeling stressed or anxious (56%) and feeling bored (49%). These three well-being issues are exacerbated by living in isolation, where such worries are able to flourish (Vasileiou, 2019). Anxieties related to lockdown are likely to persist in future years, making the overall impact all the more pronounced.

The study also highlighted how the anticipated experience of young people coming together for a shared purpose (such as studying together in a library, or socializing) was lost to this cohort, along with the potential benefits this might have afforded, such as developing a sense of camaraderie and group culture (Loy & Ancher, 2013), improvements in knowledge acquisition and application (McVicar et al., 2006), and broader social skills, such as team-working (Franklin, 2010). The mental health benefits of such group cooperation were also lost, as important social contacts and friendship groups were unable to be properly formed.

While some degree of worry remains understandably widespread, some groups experience more severe mental ill-health. An IFS analysis of longitudinal data from the Understanding Society study found that, taking account of pre-pandemic trajectories, mental health has worsened substantially (by 8.1% on average) as a result of the pandemic. Groups have not been equally impacted; young adults and women – groups with worse mental health pre-pandemic – have been hit hardest.

Liminality

Liminality represents a threshold between different periods of life, and these "threshold concepts" (Rattray, 2016, p. 67) have often been used as a lens through which to explore student experience. Meyer and Land (2005) state that the conceptual space of students attending higher education, particularly where circumstances are abnormal or troublesome, are "akin to states of liminality" in which students may find themselves "stuck" (p. 377).

Our study brings new insight here by highlighting the unique nature of a dual-liminality during this period. Both university life and the pandemic constitue periods of "in-between" and change – namely between being a child and adult and between freedom and full lockdown. Such non-physical liminal spaces leave people feeling uncomfortable and less able to flourish (Perez-Murcia, 2019), making starting university during a pandemic "a perfect storm" of transition and disruption.

Additional discoveries were made regarding the concept of liminality within an extreme circumstance such as a pandemic, as this state of being stuck is over-emphasised during a state of lockdown wherein the student is unable to live freely. How well a student can navigate these thresholds of adulthood depends largely on the resources at their disposal; a person who has already struggled through poor mental health would arguably have fewer cognitive resources with which to manage the trials of liminality than those who have not, having already exhausted much energy coping with their mental health (Son et al., 2020). Similarly, financial hardships can greatly increase the burden of liminality on students, as people from poorer households lack the funding to access certain assistance such as therapy, and have additional worries over everyday expenses (Montacute & Holt-White, 2020).

The experiences detailed in our study show how unsettling and difficult this period was for first-year students in the UK, as their motivation and mood were greatly diminished. What should have been a period of personal growth and confidence became instead a time of languishing and worry as students felt stuck in their environment – both physically and psychologically. This loss of confidence has the potential for a long-lasting impact, as experiences in young adulthood can have cascading effects on future years. For example, Trzesniewski et al., (2006) found that lower self-esteem during adolescence (19 years old) can predict negative outcomes in adulthood, including limiting economic prospects. This, in turn, draws attention to the financial struggles that these students were already facing – a potentially vicious circle of poor mental health resulting in less income, which in turn leads to worse mental health (Richardson et al., 2017).

Wealth Comparison

Our findings show that students receiving the full student loan often compared themselves to peers in terms of finances, and that this comparison seemed to increase the burden they felt. Given that university is already a competitive space where a student vies for grades and opportunities, adding a wealth disparity can exacerbate a sense of inequality that is already felt in higher education (Browman et al., 2019). While the COVID pandemic has doubtlessly affected all students, there have been disproportionate effects on those with low incomes (Montacute & Holt-White, 2020). Students not under financial strain may have fewer worries about navigating illness versus earning.

This issue has been further compounded by the perceived unfairness of university costs. Many participants felt that fees were not amended in line with the altered educational provision during the pandemic, with students perceiving themselves to be getting a much-diminished provision compared to previous cohorts. They questioned whether attending university was a wise choice and this had a detrimental effect on their mental health. Their worry grew over mounting debt that felt very real, echoing findings from Beal et. al., 2019, and the lack of confidence that their investment will pay dividends in their adult life (Cook et. al., 2019) made the lockdown even harder to cope with.

Strengths and Limitations

Whilst this study benefits from an in-depth qualitative analysis of lived experience, a number of limitations exist. Although using participant self-reports of mental health experiences meant that we captured diverse and personally meaningful experiences of poor mental health, we also cannot define, in standardized ways, the mental health status of participants. The pool of ethnic minority participants was small as there were no respondents from Black-British students. Additionally, the exact institutional responses or provisions for each participant were not known, meaning there could be some variability in each experience.

Conclusion, Implications and Future Directions

The present study has highlighted key themes reported by vulnerable UK university students during the COVID-19 pandemic. The intersecting burdens of isolation, liminal states and financial strain appeared to affect mental health by creating the perfect environment for pre-existing mental health conditions to re-emerge. Isolation can trigger an increase in negative thoughts and feelings, which become difficult to control without the distraction and balance of social interaction. Our data showed that these powerful negative states can, in turn, make it more difficult to navigate the threshold between being a child and an adult as students felt abandoned and left with no other choice but to fend for themselves. Additionally, having an increased anxiety regarding financial uncertainty left students with fewer coping resources and a sense of being inadequate when compared to their more financially stable peers.

Future work should study isolation in greater depth; exploring the types of mental health conditions and comorbidities students experience during such times, as well as documenting the struggle of using learned, psychologically-based coping strategies during periods of isolation. Motivation – and how this intersects with mental health – also should be an area of future study since this has been highlighted as a serious barrier; particularly the misconception that some students are "not trying" when in reality they remain unable to. To that end, tracking the attainment and experiences of this cohort would enable research to explore future impacts.

To mitigate the long-term impact of past and future pandemic responses for university students, it is suggested that more communication be facilitated between faculty and students, as communication could help students in their liminal states, being responsive to their need for structure, certainty and "adult" reassurance. Greater transparency and openness to engagement with students would foster more confidence in responses to future challenges, as supported by previous literature (Bice & Coates, 2016). Universities should be very cautious about over-claiming concerning the effectiveness and suitability of online or hybrid learning. It will be vital to work closely with students who have lived experience with mental health difficulties in forming future provisions to protect against the potentially harmful effects of feeling disconnected from a community of learners and from social energy. Additional support should also be prepared for economically disadvantaged students as research by Ketchen et al. (2015) highlights that these groups are less likely to access mental health services and do so at a later time than those on moderate to high incomes.

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Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

Cross-Cultural Differences in Psychological Health, Perceived Stress, and Coping Strategies of University Students During the COVID-19 Pandemic

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Introduction: COVID-19 has affected the entire world, including university students. Students are likely to experience COVID-19 related stress that might adversely affect their psychological health and result in various coping strategies.
Aims: This study's objectives were to examine cross-cultural differences and the relationships between stress, psychological health, and coping among university students during the pandemic. Furthermore, the study explored whether coping strategies mediated the relationship between psychological health and perceived distress for this population.
Methods: University students (n = 703) were recruited via convenience sampling from Indonesia, Malaysia, the Philippines, Thailand, the United States, and the United Kingdom. Participants completed an online quantitative questionnaire consisting of demographics, the Perceived Stress Scale, the General Health Questionnaire, and the Brief-COPE.
Results: Perceived psychological distress was significantly associated with poorer general psychological health and both were associated with dysfunctional coping. For all countries, psychological health mediated the relationship between perceived distress and dysfunctional coping. Students from individualistic cultures reported higher stress and poorer psychological health when compared to those from collectivistic countries. The latter tended to engage in more emotion-focused and problem-focused coping and used more dysfunctional coping strategies than the former.
Conclusions: Future research should explore other mediators and moderators that affect university students' responses to pandemics and should include longitudinal studies with larger samples. Findings emphasize the need for providing university students with mental health support during and after COVID-19. It is important to develop and research empirically based strategies for reducing their stress and psychological distress through effective and culturally appropriate coping strategies.

Keywords: coping, cross-cultural, COVID-19, psychological health, university students

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Introduction

As the world learns to cope with the changes brought on by the COVID-19 pandemic, it is likely that some people will experience significant pandemic-related psychological distress (see Inauen & Zhou, 2020, and Robinson et al., 2022 for reviews). Universities and university students around the world have experienced major impacts of the COVID-19 pandemic (Sahu, 2020). Many universities closed their campuses (Foresman, 2020), canceled in-person teaching and activities and started distant learning (Sahu, 2020). They creatively continued classes via various methods and technologies online (Calonge et al., 2021); however, not all universities and professors were prepared, and some students may not have possessed adequate facilities such as computers and internet (Sahu, 2020). Being unable to interact well with professors and peers may have a negative effect on grades (Sahu, 2020) which could, in turn, contribute to psychological distress. Whilst research on the current pandemic is limited at this point in time, initial studies appear to suggest that it can cause significant psychological distress among university students (John, 2020; Liu et al., 2020) and young adults (Qiu et al., 2020) including anxiety, depression, and stress associated with the uncertainties and frustrations related to COVID-19. During a previous outbreak of Severe Acute Respiratory Syndrome (SARS), many university students experienced elevated psychological distress (Main et al., 2011). Therefore, exploring how the COVID-19 pandemic is affecting this population's psychological health and coping appears to be necessary.

The unusual circumstances brought on by the pandemic might directly affect students. Some may have had to return to their hometowns; some may have been locked down on their campuses or in university halls due to the sudden nature of governmental lockdowns. Students may rely on their universities for pertinent information and support during these uncertain times (Calonge et al., 2021). However, universities have not always been consistent in communicating expectations (Zhou, 2020) possibly contributing to additional stress.

Many university students were already prone to stress that affects their coping abilities and psychological well-being (Böke et al., 2019; Fasoro et al., 2019; Ganesan et al., 2018; Ribeiro et al., 2018). With the potential mental health consequences of COVID-19 likely to be high for university students, it becomes important to explore stress, psychological health, and coping among this population. Yet, to date, no empirical study has been conducted looking at stress, psychological health, and coping skills among university students. Eighteen to thirty-year-olds, the age group most college students belong to, are among the vulnerable groups that Qiu et al. (2020) recommend further investigating in terms of COVID-19 psychological distress. This study contributes to filling that gap by exploring the above factors. It is hoped that the study will produce a knowledge base and offer ideas on how mental health professionals might help reduce and prevent the longer-term more severe effects by treating university students during the peritraumatic phase of the COVID-19 pandemic, as primary prevention public health interventions are paramount during the critical phase of any pandemic (Mukhsam et al., 2020). Furthermore, since SARS survivors have experienced or even continue to experience significant psychological distress (Gardner & Moallef, 2015), the study might help mitigate the possible negative mental health consequences for university students who have experienced the COVID-19 pandemic.

The high prevalence of psychological distress possibly related to the effects of the COVID-19 pandemic is a global concern as it may impair psychological and mental-health wellbeing. Because there are many intersecting risks and protective factors that either protect an individual or make them more vulnerable to developing psychological disorders during stressful times (Masten & Garmezy, 1985), some individuals will have a greater chance of suffering distress during the pandemic than others. Social isolation, anxiety, fear of contagion, uncertainty, chronic stress and economic difficulties may lead to the development or exacerbation of depression, anxiety, substance use and other psychiatric disorders in vulnerable populations including individuals with pre-existing psychiatric disorders and people who reside in high COVID-19 prevalence areas (Sher, 2020). A study conducted by Patsali et al. (2020) that investigated mental health among university students in Greece indicated that during lockdown, major depression was present in 12.43% of their sample with 13.46% experiencing severe distress. These findings indicate that university students may be vulnerable to possible adverse mental health consequences in relation to the COVID-19 outbreak. At the time of this study, the research on university students' well-being during the pandemic was limited in many countries, or not available. Hence, it seems important to assess university students' psychological well-being during this pandemic.

The central idea for the current study's authors was therefore to survey the psychological health of a cross-section sample of university students' studying in the following countries: Malaysia; the Philippines; Thailand; Indonesia; the United Kingdom; and the United States of America, during the pandemic. The main objective was to examine cross-cultural differences in psychological health, perceived distress, and coping during the COVID-19 pandemic in university student populations. It was hypothesized that cross-cultural differences would exist between university students from stereotypically collectivistic countries and students from stereotypically individualistic countries (Hofstede, 2001; Triandis, 1995) in terms of their psychological health, perceived distress, and coping styles in reaction to the COVID-19 pandemic. People from individualistic societies tend to be more focused on individual

goals and well-being; this is in contrast with those from collectivistic societies, who tend to be more focused on the goals and well-being of their group (Triandis, 1995). The former emphasizes independence while the latter emphasizes interdependence. The second objective was to determine the relationship between perceived distress, psychological health and coping strategies among university students. It was predicted that both perceived distress and maladaptive coping would be negatively related to psychological health while adaptive coping would be positively related. The third objective was to examine whether adaptive and dysfunctional coping strategies mediate the relationship between perceived distress and psychological health among university students. It was hypothesized that the type of coping strategy would mediate the relationship between psychological health and perceived distress.

Methods

The study employed a cross sectional method by using multiple mediational models. The sample population consisted of university students studying in six countries: Malaysia, the Philippines, Thailand, Indonesia, the United Kingdom, and the United States of America. The inclusion criteria required the participants to be undergraduate university students who were 18 years old and above and were able to give consent. The survey link was sent out in April 2020 to students at various universities by their professors who offered a small amount of extra credit for voluntary participation. Data was collected from April 6, 2020 (1st survey collected) to April 24, 2020 (the last survey collected in the current sample). There was no penalty for non-participation. There were no formal exclusion criteria except for non-consent or the inability to answer the questionnaires. The sampling method was convenience sampling from all six countries concerned. Randomization of sampling was difficult to perform as students in most universities were under varying forms of national Movement Control Orders, hence the researchers had to rely on students volunteering themselves. The sampling frame was all undergraduate students in all six countries.

Instruments

Demographic Questionnaire

Information on students' demographic characteristics consisting of questions regarding age, gender, citizenship, education, employment status, internet accessibility, and satisfaction with online learning, was obtained. Three psychological instruments were completed (PSS-10, GHQ-12, and Brief COPE-28) via Google Forms.

Perceived Stress Scale (PSS-10)

A widely used measure for assessing stress is the Perceived Stress Scale, which consists of 10 questions that measure feelings and thoughts in the past month associated with life events and out of control events (e.g., "In the last month, how often have you felt nervous and 'stressed'?"). The scale is a 5-point Likert-type scale (1 = Never; 5 = Often) with higher scores indicating greater perceived levels of stress (Sandhu et al., 2015). Statistically, its internal reliability is reasonable, with a Cronbach's alpha >.70 in 12 separate studies and the test-retest reliability of the PSS-10 was found to be >.70 in four studies (Lee, 2012).

General Health Questionnaire (GHQ-12)

The 12-item version of the General Health Questionnaire (GHQ) measures psychological health (e.g., "Please indicate how often you have been able to concentrate on what you are doing") (reverse coded). The questions are on a 4-point Likert-type scale (1 = Less than usual; 4 = Much more than usual). Despite originally being devised in Britain (Goldberg et al., 1997), it has been shown to be effective cross-culturally, especially in the vital domains of depressive and anxiety symptoms (Abubakar & Fischer, 2012; Araya et al., 1992; Padrón et al., 2012; Patel et al., 2008). It is categorized into three separate factors: Anxiety and Depression, Social Dysfunction, and Loss of Confidence. The maximum score is 36, with higher scores directly correlating to worse psychological outcomes.

Brief COPE (Brief COPE-28)

The Brief COPE is a 28-item self-report questionnaire that measures multiple coping strategies for adapting and reacting to life events (e.g., "I've been turning to work or other activities to take my mind off things"). The questions

are on a 4-point Likert-type scale (1 = I haven't been doing this at all; 4 = I've been doing this a lot). This scale assesses the frequency of 28 different coping strategies (Carver, 1997). The scale contains the following separate two-item subscales: (1) self-distraction, (2) active coping, (3) denial, (4) substance use, (5) use of emotional support, (6) use of instrumental support, (7) behavioral disengagement, (8) venting, (9) positive reframing, (10) planning, (11) humor, (12) acceptance, (13) religion, and (14) self-blame. These 14 subscales are further categorized into three overarching coping styles: dysfunctional (avoidant), problem-oriented, and emotion-oriented coping (Dias et al., 2012).

Data Analysis

IBM SPSS was used for all data analyses. Data were analyzed descriptively and measures of skewness and kurtosis were employed to determine whether data fulfilled normality assumptions. Cronbach's alpha was calculated on all study scales to ensure internal consistency. Multiple regressions were performed to examine whether stress responses were predicted by coping styles and general psychological health subscales. Pearson correlations were used to establish correlations between continuous variables. *T*-tests were used to determine whether any significant difference existed for bivariate independent variables. A series of multiple regressions were performed, using the Baron and Kenny method, to assess if dysfunctional coping styles were mediators of the relationship between perceived stress and psychopathology. Sobel's test was performed to assess whether the mediation relationship was statistically significant. Multivariate Analysis of Variance (MANOVA) was performed to assess if there were any significant differences between collectivistic and individualistic countries for scores of perceived stress, psychological distress, and coping styles. The Bonferroni correction was performed as appropriate.

Results

Data was gathered from 703 participants and screened for outliers using a repeated measures design, dependents together with boxplot method. Eighteen participants were identified as having given responses outside of acceptable limits, so data from these participants were removed from the dataset. Of the remaining 685 participants (Malaysia = 98; Thailand = 25; Indonesia = 209; Philippines = 92; United Kingdom = 67; United States of America = 86; Other/No country indicated = 108) 488 (71.2%) identified as female and 194 (28.3%) as male, with three participants not specifying a gender. Reliability analyses were run on the three scales used in the study; the 10-item PSS (Cronbach's α = .80), the 12-item GHQ (subscales of 6-item Social Dysfunction α = .84; 4-item Anxiety and Depression α = .73; the 2-item Loss of Confidence α = .78), and the 28-item Brief COPE (subscales of 10-item Emotion-focused α = .81; 6-item Problem-focused α = .78; and 12-item Dysfunctional strategies α = .80). Therefore, all measures were considered to provide robust levels of reliability within the study.

Multiple Regression Analysis

To examine whether scores on the GHQ and Brief COPE could predict participant responses on the PSS, a multiple regression analysis was carried out using the subscales as predictor variables. This analysis included data from 366 participants who completed all measures of the survey. Descriptive statistics for the subscales (Table 1) and correlations between measures (Table 2) are presented below, alongside collinearity test results (Table 3).

Table 1. Subscale Mean Total Scores for Questionnaire Measures

Measure	Mean Score *(SD)*
PSS	3.14 (.61)
GHQ Social Dysfunction	2.79 (.67)
GHQ Anxiety and Depression	2.45 (.66)
GHQ Loss of Confidence	2.31 (.84)
Brief COPE Emotion-focused	2.57 (.60)
Brief COPE Problem-focused	2.63 (.64)
Brief COPE Dysfunctional Strategies	1.88 (.43)

Note: Standard deviations in parentheses.

Table 2. Correlations Between Subscale Measures

	1	2	3	4	5	6	7
1. PSS	–						
2. GHQ SD	.46**	–					
3. GHQ AD	.60**	.30**	–				
4. GHQ LC	.59**	.35**	.65**	–			
5. BC EF	–.10*	–.45**	–.05	–.04	–		
6. BC PF	–.09*	–.47**	–.03	–.06	.75**	–	
7. BC DS	.31**	–.09*	.30**	.38**	.50**	.46**	–

** Significant at .001 level.
* Significant at .05 level.

Table 3. Tests of Collinearity for Subscale Measures

Measure	Collinearity Tolerance
GHQ Social Dysfunction	.64
GHQ Anxiety and Depression	.56
GHQ Loss of Confidence	.49
Brief COPE Emotion-focused	.39
Brief COPE Problem-focused	.40
Brief COPE Dysfunctional Strategies	.57

Table 4. Regression Coefficients for Questionnaire Subscale Measures

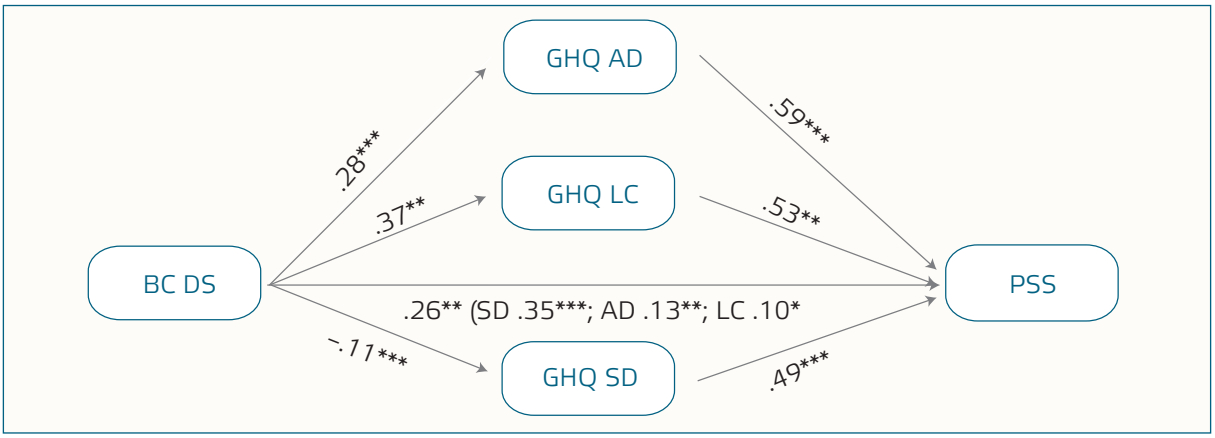
Variable	*B*	SE *B*	β	*p*
GHQ SD	.48	.07	.31	< .001
GHQ AD	.81	.12	.35	< .001
GHQ LC	.55	.20	.15	.006
BC EF	–.07	.06	–.06	.29
BC PF	.06	.10	.04	.54
BC DS	.20	.05	.19	< .001

As each predictor appears to not correlate highly with other predictors, these were entered into a multiple regression using the standard method. A significant model emerged: $F(6,359) = 58.97$, $p < .001$. The model explains 49% of the variance in perceived stress (adjusted R^2 =.49). Table 4 provides regression coefficient data for the predictor variables entered in the model. The three subscales of the GHQ (SD; AD; and LC) emerge as significant predictors of PSS, whilst only the Dysfunctional Strategy subscale of the Brief COPE appears as a significant predictor. To examine the relationship between scores on the GHQ subscales and the Brief COPE Dysfunctional Strategy subscale (as the only subscale to emerge as a significant predictor from that scale; see Table 4) and their prediction of scores on the PSS, a mediation analysis was carried out, first on the overall model and then individually by culture type (individualistic or collectivistic).

Mediation Analysis: Overall

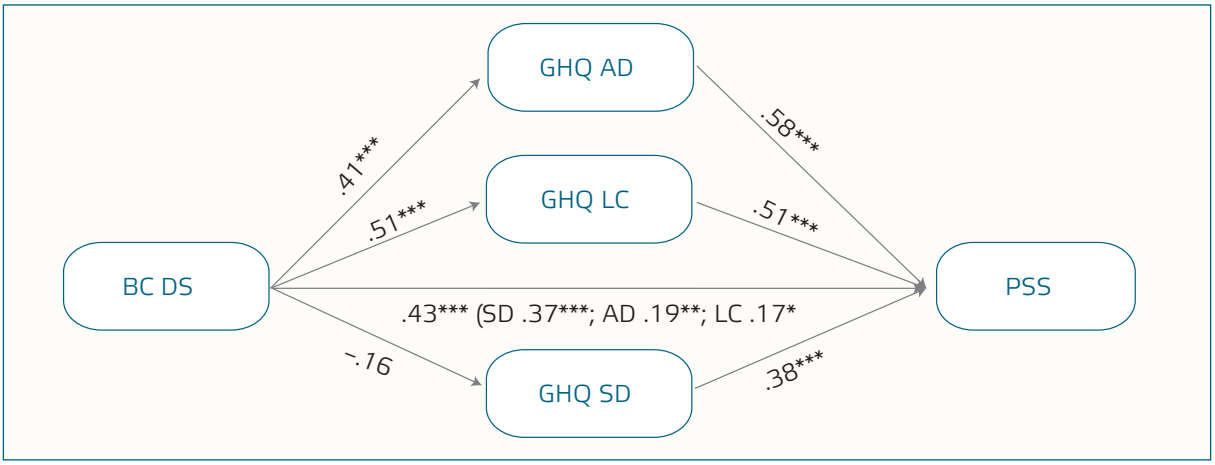
As the demographic information (age, gender, citizenship, education, employment status, internet accessibility, and satisfaction with online learning) contained a number of missing responses, it was decided to focus the mediation analysis upon those that had completed the core instruments of the study. The relationship between scores on the Brief COPE Dysfunctional Strategy (BC DS) subscale and Perceived Stress Scale (PSS) was mediated by scores on the General Health Questionnaire Social Dysfunction (GHQ SD), Anxiety and Depression (GHQ AD) and Loss of Confidence (GHQ LC) subscales. The standardized regression coefficient between BC DS scores and GHQ SD scores was statistically significant, as was the standardized coefficient between GHQ SD scores and PSS scores. The standardized indirect effect was (–.11) (.49) = –.05, with a Sobel test of the mediation effect found to be significant (–2.78, $p < .01$). The standardized regression coefficient between BC DS scores and GHQ AD scores was statistically significant, as was the standardized coefficient between GHQ AD scores and PSS scores. The standardized indirect effect was (.28) (.59) = .17, with a Sobel test of the mediation effect found to be significant (5.13, $p < .001$). The standardized regression coefficient between BC DS scores and GHQ LC scores was statistically significant, as was the standardized coefficient between GHQ LC scores and PSS scores. The standardized indirect effect was (.37) (.53) = .2, with a Sobel test of the mediation effect found to be significant (2.94, $p < .001$). Figure 1 displays the overall model.

Figure 1. Overall mediation of BC DS by GHQ measures on PSS



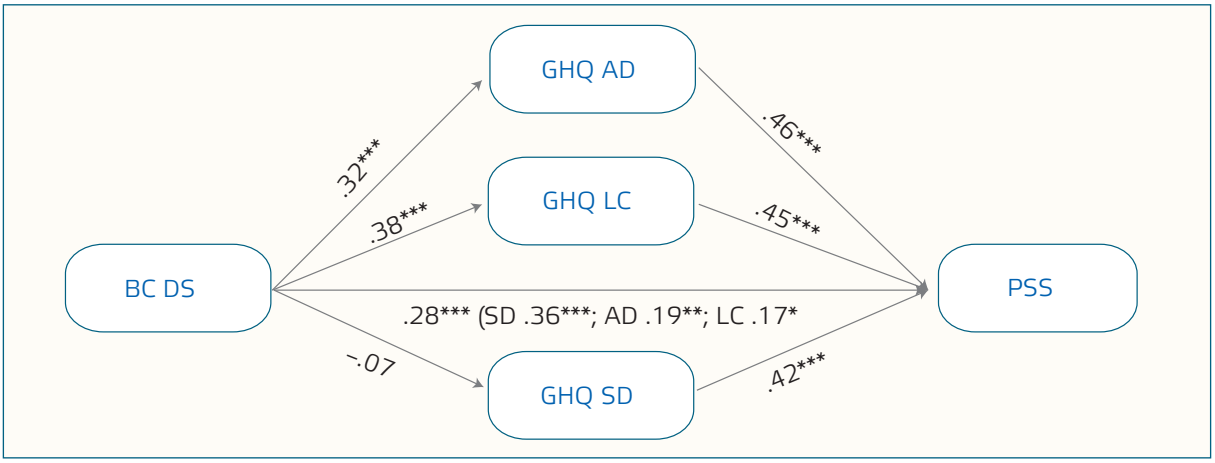
Note: Standardized regression coefficients for the relationship between scores on BC DS and PSS as mediated by scores on GHQ subscales SD, AD and LC. The standardized regression coefficients between BC DC and PSS, controlling for GHQ subscale scores, are in parentheses.
*<.05 **<.01 ***<.001.

Figure 2. Individualisctic culture mediation of BC DS by GHQ measures on PSS



Note: Standardized regression coefficients for the relationship between scores on BC DS and PSS as mediated by scores on GHQ subscales SD, AD and LC. The standardized regression coefficients between BC DC and PSS, controlling for GHQ subscale scores, are in parentheses.
*<.05 **<.01 ***<.001.

Figure 3. Collectivictic culture mediation of BC DS by GHQ measures on PSS



Note: Standardized regression coefficients for the relationship between scores on BC DS and PSS as mediated by scores on GHQ subscales SD, AD and LC. The standardized regression coefficients between BC DC and PSS, controlling for GHQ subscale scores, are in parentheses.
*<.05 **<.01 ***<.001.

Mediation Analysis: Cultural Differences

To examine whether individualistic and collectivistic countries differed in their responses, mediation analysis explored the relationship between scores on the Brief COPE Dysfunctional Strategy (BC DS) subscale and Perceived Stress Scale (PSS) for participants from the UK and USA (Individualistic; n = 153) and Malaysia, Thailand, Indonesia and the Philippines (Collectivistic; n = 180) were mediated by scores on the General Health Questionnaire Social Dysfunction (GHQ SD), Anxiety and Depression (GHQ AD) and Loss of Confidence (GHQ LC) subscales. Statistical analyses for indirect effects and mediation effects for each culture type are indicated below. Figure 2 displays the individualistic model and Figure 3 displays the collectivistic model.

For individualistic cultures, the standardized regression coefficient between BC DS scores and GHQ SD scores was not statistically significant, whilst the standardized coefficient between GHQ SD scores and PSS scores was significant. The standardized indirect effect was (.16) (.38) = .06, with a Sobel test of the mediation effect found to be significant (4.08, p < .001). The standardized regression coefficient between BC DS scores and GHQ AD scores was statistically significant, as was the standardized coefficient between GHQ AD scores and PSS scores. The standardized indirect effect was (.41) (.58) = .24, with a Sobel test of the mediation effect found

to be significant (3.67, $p < .001$). The standardized regression coefficient between BC DS scores and GHQ LC scores was statistically significant, as was the standardized coefficient between GHQ LC scores and PSS scores. The standardized indirect effect was (.51) = .26, with a Sobel test of the mediation effect found to be significant (3.56, $p < .001$).

For collectivistic cultures, the standardized regression coefficient between BC DS scores and GHQ SD scores was not statistically significant, whilst the standardized coefficient between GHQ SD scores and PSS scores was significant. The standardized indirect effect was (-.07) (.42) = -.03, with a Sobel test of the mediation effect found to be nonsignificant (-0.77, *ns*). The standardized regression coefficient between BC DS scores and GHQ AD scores was statistically significant, as was the standardized coefficient between GHQ AD scores and PSS scores. The standardized indirect effect was (.32) (.46) = .15, with a Sobel test of the mediation effect found to be significant (3.23, $p < .001$). The standardized regression coefficient between BC DS scores and GHQ LC scores was statistically significant, as was the standardized coefficient between GHQ LC scores and PSS scores. The standardized indirect effect was (.38) (.45) = .17, with a Sobel test of the mediation effect found to be nonsignificant (0.97, *ns*).

Cross-Cultural Comparisons

To examine whether differences in student PSS, GHQ, and Brief COPE scores exist between individualistic and collectivistic cultures, a Multivariate Analysis of Variance was performed on the subscale scores. Mean scores for each dependent variable were used as opposed to total scores to allow for a direct comparison across Subscales. Levene's Test for subscales showed breaches for the SD and LC subscales of the GHQ across cultures, so these were removed from the subsequent analysis, and moderate correlations were found among the dependent variables. A significant difference existed between cultures on the combined measures, $F(5,327) = 23.04$, $p < .001$; Wilks' Lambda = .74. The analysis of each individual dependent variable, using a Bonferroni adjusted alpha level of .01, showed that there were significant differences among countries on *GHQ AD*, $F(1,331) = 15.12$, $p < .001$; *BC EF*, $F(1,331) = 69.08$, $p < .001$; *BC PF*, $F(1,331) = 68.64$, $p < .001$; *BC DS*, $F(1,331) = 26.34$, $p<.001$; and *PSS*, $F(1,331) = 17.96$, $p < .001$. Mean scores for each of the MANOVA measures are provided in Table 5.

Finally, independent samples *t*-tests were calculated for each of the measures (*PSS*, *GHQ subscales* and *BC subscales*) and the results are presented in Table 6. Apart from *GHQ LF*, which differed at a significant difference level of $p = .005$, all results showed significant differences $p < .001$.

Table 5. Mean Scores on Questionnaire Items by Country for Questionnaire Subscales

Measure	Country	Mean *(SD)*	*N*
GHQ AD	Individualistic Collectivistic	2.60 (.64) 2.32 (.66)	153 180
BC EF	Individualistic Collectivistic	2.84 (.50) 2.32 (.59)	153 180
BC PF	Individualistic Collectivistic	2.92 (.60) 2.36 (.61)	153 180
BC DS	Individualistic Collectivistic	1.77 (.39) 1.98 (.44)	153 180
PSS	Individualistic Collectivistic	3.29 (.66) 3.01 (.52)	153 180

Note: Due to each questionnaire and subscale having different numbers of items the mean item score is preferred here to the total score as this allows for a direct comparison across subscales, since each item is scored on a four-point scale.

Table 6. Individualistic Versus Collectivistic Culture Scores on Measure Subscales

Measure	Individualistic Mean *(SD)*	Collectivistic Mean *(SD)*	Independent samples *t*-test statistic
PSS	3.29 (.66)	3.01 (.52)	$t(224) = 4.58$, $p < .001$*
GHQ SD	3.12 (.54)	2.50 (.63)	$t(331) = 9.47$, $p < .001$
GHQ AD	2.60 (.64)	2.32 (.66)	$t(331) = 3.89$, $p < .001$
GHQ LC	2.45 (.83)	2.19 (.84)	$t(331) = 2.83$, $p = .005$
BC EF	2.84 (.50)	2.32 (.60)	$t(317) = 10.31$, $p < .001$*
BC PF	2.92 (.60)	2.36 (.61)	$t(569) = 9.66$, $p < .001$
BC DS	1.77 (.39)	1.98 (.44)	$t(566) = -5.06$, $p < .001$

* Levene's Test breached so alternate df and t statistic provided.

Discussion

Multiple key findings result from this study. There was some indication that the college student sample from the current study may have been experiencing somewhat elevated distress compared to pre-pandemic samples. While scores on the GHQ measures for the current study are similar to a previous sample (e.g., Patel et al., 2008), the mean scores for the Brief COPE and PSS in the current study are higher than has been reported in previous studies on university students (e.g., Poulus et al., 2020; Roberti et al., 2006 respectively); however, this may not be surprising given the context of the situation that participants found themselves in during the pandemic.

Firstly, perceived psychological distress during the COVID-19 pandemic was shown to positively correlate with higher levels of disturbance in college students' general psychological health, which stands consistent with previous literature (Demakis & McAdams, 1994; The American College Health Association, 2007). As expected, significant negative correlations emerged between both the perceived stress and the social dysfunction (GHQ-SD) subscale with problem- and emotion-focused coping strategies. These results may be in line with the pre-pandemic context: nursing students who took the GHQ and Brief COPE were also found to exhibit a positive association between dysfunctional coping and psychological distress, with health habits mediating that relationship (Tada, 2017). Perceived stress and unstable psychological health were also positively correlated with the use of dysfunctional coping strategies. This corroborates existing interrelations between dysfunctional coping behavior and poorer psychological health (Holahan et al., 2005; Mahmoud et al., 2012; Main et al., 2011; Meyer, 2001; Mohr et al., 2014; Penley et al., 2002).

Secondly, poor psychological health and coping strategies explained almost half (49%) of the variance in perceived stress in this current study. Three psychological health factors (social dysfunction, anxiety and depression, and loss of confidence) and specifically "dysfunctional" coping strategies were statistically significant ($p = < .05$) in explaining the variance. Such psychological health factors are part of overarching theoretical models explaining students' perceived stress. Social isolation due to prolonged mass quarantine or lockdown thus appears to escalate anxiety and loss of control (Rubin & Wessely, 2020; Usher et al., 2020) particularly among college students (Wang et al., 2020). The evidence is unanimous that avoidant coping approaches increase psychological distress and thus, teaching coping skills could decrease psychopathology (Böke et al., 2019; Ghalechi & Movahhed, 2013; Pang, Shoesmith et al., 2020). Teaching coping skills in the unique context of a global and uncontrollable pandemic, however, presents equally unique difficulties (Salvaraji et al., 2020).

Thirdly, the relationship between dysfunctional coping strategies and perceived distress was mediated by all subscales of psychological health *(GHQ-12).* While this relationship may have been exacerbated by the pandemic, it is also likely that such a relationship already existed pre-pandemic. In fact, active coping previously has been found to positively relate to psychological health (Tada, 2017). The relationship between dysfunctional coping and perceived stress mediated by psychological health remained the case when the six countries were divided into collectivistic and individualistic cultures, with the level of both perceived stress and psychological health found to be higher among students from individualistic cultures or countries than in collectivistic cultures (see also Delfino et al., 2015; Zhao & Zhang, 2018).

These findings regarding individualistic versus collectivistic countries merit further discussion. Participants from collectivistic countries in this study successfully used more emotion- and problem-focused coping, but also used more dysfunctional coping strategies. This tallies with limited and sometimes contradicting empirical studies related to culture and coping in the present literature (Kuo, 2011; Lee & Mason, 2014; Main et al., 2011). The latter finding is easily explained as dysfunctional coping is more prevalent when collectivist cultures "control or suppress their emotions and behaviors, often changing themselves in order to fit into the group rather than confront and modify the external stressors (Hofstede, 2001; Shulruf et al., 2007)" (as cited in Lee & Mason, 2014, p. 442). The former finding that collectivistic cultures better use problem and emotion-focused coping, however, yields mixed support from the literature (Bjorck et al., 2001; Cole et al., 2002), which may be indicative of a Hawthorne effect (McCambridge et al., 2014). Collectivist countries value collective and community wellbeing, place much less value on personal choice, value adaptation to others, even with significant self-sacrifice (Hofstede, 2001; Kuo, 2011; Shulruf et al., 2007), and have higher levels of groupthink (Koh et al., 2020). Hence, college students in individualistic countries may perceive more stress and suffer from negative psychological health compared to students from more collectivistic cultures, because they may perceive an extreme lack of control, as they may have been given limited choice in the decision-making process during lockdowns imposed amid the COVID-19 pandemic. On the other hand, students from more collectivistic countries may be less resistant and adhere to rules set by their governments so as to ensure their communities' wellbeing. Collectivist cultures may also "deny, sup-

press, or repress the experience and expression" (Hwang et al., 2008, p. 215) of open displays of emotional distress because of the "strong stigma associated with mental illness (Chun et al., 1996)" (as cited in Hwang et al., 2008, p. 215) and because "displays of psychological symptoms are perceived as characteristic of personal or emotional weakness" (Hwang et al., 2008, p. 215), resulting in lower levels of perceived psychopathology.

Strengths and Limitations

This study had a number of strengths. Considering how quickly and unexpectedly the pandemic manifested, the first strength was the pre-established relationships between the researchers based in different countries allowing them to be able to conceptualize and organize the study and quickly collect data at a time when much of the world roiled in chaos. Next, the researchers were able to collect data from six different countries allowing for cross-cultural comparisons that are often lacking in psychological research. Furthermore, while the sample remained small, it was large enough to have sufficient statistical power to show significant results, even when comparing across groups. Lastly, the study used pre-established quantitative measures that have respectable psychometric properties.

This study naturally had limitations. First, it is just a cross-sectional study that only recruited participants from the beginning of the pandemic. Next, the study looked at a limited number of participants. These participants were further divided into collectivist and individualistic countries, thereby making the comparison groups relatively small. Furthermore, while students were currently studying in a stereotypically collectivistic or individualistic country, we did not measure their level of this variable. Indeed, it seems likely that some participants studying in an individualistic country may be more collectivistic and vice versa (Parker et al., 2009).

Conclusion, Implications and Future Directions

In conclusion, the take-home messages of this study are as follows: Among university students, social dysfunction, anxiety and depression, and loss of confidence are key mediators of the relationship between dysfunctional coping and perceived distress, while cross-cultural variations exist in these psychological process variables. Hence, this study serves as a clarion call to university administrators – and certainly mental health practitioners – to design easily accessible, high quality, evidence-based interventions that are multiculturally appropriate to the context in order to help reduce university students' psychological distress during and after the COVID-19 pandemic.

This elucidation of theoretical mechanisms translates into crucial clinical lessons and may have relevant implications for university students' mental wellbeing. University students clearly require additional, timely, crisis-oriented mental health services and monitoring, which extant literature echoes (Liu et al, 2020; Horesh & Brown, 2020; Qiu et al., 2020). Moreover, reducing dysfunctional coping strategies during pandemics is essential as it can reduce depressive symptoms (Pang, Masiran, et al., 2020). Of course, all of the above are likely to be relevant for university students before, after, and despite the pandemic. If we perform interventions to tackle our established mediators, namely social dysfunction and loss of confidence, it will likely significantly dampen the effect of pre-existing dysfunctional coping styles on stress levels. Such interventions have already been developed specifically in ultra-brief format, adapted for COVID-19 specific stress, and appear helpful to frontline hospital workers (Pang, Shoesmith, et al., 2020). As cultural perceptions of stress and mental health issues converge, it is hence imperative that governments, universities, and healthcare sectors act quickly to prevent this potential "second pandemic" involving mental health issues. University students coincidentally fall into the age group in which the prevalence of depressive and anxiety disorders stands highest (Böke et al., 2019; Ribeiro et al., 2018); hence, developing timely and continuous online screening tools and COVID-19 related psychological instruments (Pang, Kamu, et al., 2020) to identify "students with insufficient coping skills under chronic stress and at risk for mental health problems" needs to be prioritized (Delfino et al., 2015; Mohr et al., 2014, p. 235). In addition, cultural differences need to be considered, as they can affect illness behavior and have subtle effects on when, how, and how late people report to mental health services (Main et al., 2011; Pang, Shoesmith et al., 2020). Hence, since universities tend to be multicultural with students from many different cultures, such young people may have varied distress and coping responses to pandemics. Interventions may need, therefore, to be designed to adapt to the specific needs of students from different cultures and studying in different places.

Based on this study, there are a number of directions that future researchers can consider. While collecting data at the beginning of the pandemic was an important moment to understand the pandemic's effects, follow-up and

longitudinal studies might help further understand how university students might be coping with the pandemic, or not. It is further recommended that future researchers replicate this study with much greater sample sizes, more countries, and many different cultures. Future researchers could measure the participants' level of collectivism/individualism in order to be more certain that the results are indeed related to this cultural variable rather than another variable.

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Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The studies involving human participants were reviewed and approved by Universiti Malaysia Sabah: jawatankuasa etika penyelidikan perubatan UMS = UMS Medical Research Ethics Committee. Authorization number = JKEtika 4/20 (4).
All students participated in the research voluntarily and anonymously and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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SECTION B:
MENTAL HEALTH OF HEALTH CARE PROFESSIONALS

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RESEARCH ARTICLE – SHORT COMMUNICATION

Features of Anesthesiologists-Reanimatologists' Emotional States in Different COVID-19 Pandemic Periods in Russia

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Introduction: The COVID-19 pandemic is one of the most stressful events in recent times. Medical professionals, including anesthesiologists-reanimatologists, suffered the main blow in this difficult and stressful environment.
Aims: This study aimed at identifying the features of anesthesiologists-reanimatologists' emotional states in different COVID-19 pandemic periods.
Methods: The study was conducted through an anonymous questionnaire among anesthesiologists-reanimatologists in two periods. In the First stage – which was carried out in May 2020 (during the first COVID-19 pandemic wave) – 58 anesthesiologists-reanimatologists in the Arkhangelsk region took part. During the Second segment – which took place in October 2020 (in the second COVID-19 pandemic wave) – 43 anesthesiologists-reanimatologists were examined. Repeated questioning was carried out among the same participants.
Results: In October 2020, compared to May, the number of doctors who noted a high intensity of professional activity increased. Regardless of the study period, one-third of the subjects experienced constant pronounced anxiety. Anesthesiologists-reanimatologists, whose professional activity was directly related to the patients in COVID-19 care, noted a poorer emotional state more frequently in October, accompanied by anxiety, depressed mood, irritability and a high burnout level, which may indicate a depletion of internal resources in this group.
Conclusions: The study results showed that for anesthesiologists-reanimatologists, a further depletion of emotional resources accompanied the second pandemic wave. The anesthesiologists-reanimatologists' emotional state was mediated by a number of social and gender factors, as well as specific labor organization features.

Keywords: COVID-19 pandemic, anesthesiologists-reanimatologists, mental health, emotional state, anxiety

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Introduction

The issue of coronavirus infection consequences is currently one of the most discussed in the media and scientific circles (Bolobokina et al., 2020; Correia et al., 2020; Pervichko & Konyukhovskaya, 2020; Raudenská et al., 2020; Wu et al., 2020), and the COVID-19 pandemic remains one of the most stressful events in recent times (Di Tella et al., 2020; Kühlmeyer et al., 2020). Medical professionals bore the main blow in this difficult and stressful environment. Many medical workers, including anesthesiologists-reanimatologists, labored in conditions that actually qualified as extreme conditions. They had an increased risk for infecting themselves and their relatives, and also worked in increased physical and emotional stress conditions, bearing responsibility for severely ill patients' lives (Almeida & DeCavalcante, 2021; Galbraith et al., 2020; Korehova et al., 2020; Ornell et al., 2020; Petrikov et al., 2020). Intensive care unit doctors experienced additional stress when dealing with elderly and/or severely ill patients (Neto et al., 2020). Working in such difficult conditions places increased demands on the personal character and stress resistance of anesthesiologists-reanimatologists, whose professional activity is considered as one of the most stressful, saturated with harmful health factors (Lebedinsky et al., 2004). They needed to quickly make responsible decisions affecting the patients' lives, often had to work in information and emotional overload and uncertain conditions, as well as in situations accompanied by painful ethical difficulties (Koshkin et al., 2015; Mamas & Kosarevskaya, 2010; Nyssen et al., 2003).

During the COVID-19 pandemic, the anxiety and stress disorders frequency among medical personnel stood quite high, and in women it registered higher than in men (Zhou & Panagioti, 2020). Medical professionals who treated patients with COVID-19 were most likely to develop psychological distress and post-traumatic stress disorder (PTSD) symptoms. According to the results conducted in 34 hospitals in China in January-February 2020, it was found that a significant proportion of nurses and doctors reported depression (50.4%), anxiety (44.6%), insomnia (34.0%) and distress (71.5%) symptoms (Lai et al., 2020). In China, intensive care physicians showed burnout signs in 82.1% and severe burnout in 38.8% (Wang et al., 2021). Studies conducted in Russia during the pandemic confirmed that a significant percentage of medical workers experienced high professional burnout rates, depression symptoms, increased anxiety and suicidal orientation levels (Kravchenko et al., 2020; Matyushkina et al., 2020).

Selye's stress theory (Selye, 1974) had already described stress development dynamics decades ago. In the first stage (the anxiety stage), all the body resources were mobilized and adapted to helping the stressor action. However, with an increase in the exposure to the stressor duration, the body's strength became depleted and a risk existed for pathological consequences. For medical professionals, the need to stay in stressful conditions for an extended time during the COVID-19 pandemic, in the personal and external resources case shortage, was highly likely to lead to chronic exhaustion and long-term psychological consequences. There were studies analyzing PTSD symptom prevalence and mental disorders in health care workers during other disease outbreaks, such as SARS in Asia, in four temporary, *a priori*, phases: the acute phase – i.e., (1) during the pandemic and up to 1.5 months after it; (2) 1.6–5.9 months after it; (3) 6–11,9 months after it; (4) 12 months after it and later. Clinical PTSD manifestations became less frequent over time: in the acute phase, the prevalence estimate was 23.4%, and in the "12 months plus" window it was 11.9%. Interesting data were obtained on the general psychiatric morbidity among medical workers: in the acute phase 34.1%; after 6–12 months 17.9%; and after 12 months plus 29.3% of medical workers reported psychiatric symptoms (Allan et al., 2020). In a study conducted in the United States among medical workers during the COVID-19 pandemic, compared with the pre-pandemic period, there was a significant decrease in overall well-being, life satisfaction, and a significant increase in difficulties of falling asleep, and a sense of fear concerning their work (Fitzpatrick et al., 2020). Practically no studies exist on emotional states in different COVID-19 pandemic periods in the same professional group.

In that regard, this study's aim focused on identifying the features of anesthesiologists-reanimatologists' emotional states in different COVID-19 pandemic periods: in May 2020 (during the first pandemic COVID-19 wave) and in October 2020 (the second COVID-19 pandemic wave).

Methods

Study Design and Selection of Participants

The study was conducted via an anonymous survey among doctors, specifically anesthesiologists-reanimatologists in the Arkhangelsk region. Only about 200 anesthesiologists-reanimatologists serve in this region. The questionnaire was sent to all the region's anesthesiologists-resuscitators, and 58 people responded.

The prospective longitudinal study was conducted in two periods: in May 2020 (during the first pandemic COVID-19 wave) and in October 2020 (in the second COVID-19 pandemic wave). The repeated questioning was carried out among the same doctors.

Table 1. Socio-Demographic Characteristics of the Sample

Socio-demographic characteristics of the sample	First period (*n* = 58)	First period (*n* = 58)
Age	32.7 ± 1.7	28.0 ± 1.2
Sex		
Male	29 (50.0%)	26 (60.5%)
Female	29 (50.0%)	17 (39.5%)
Professional experience		
Up to 5 years	37 (63.8%)	31 (72.1%)
From 5 to 10 years	6 (10.3%)	5 (11.6%)
Over 10 years	15 (25.9%)	7 (16.3%)
Marital status	Second	Second
Married	26 (44.8%)	16 (37.2%)
Single	27 (46.6%)	27 (62.8%)
Divorced	4 (6.9%)	–
Widowed	1 (1.7%)	–
Number of children		
No children	32 (55.2%)	30 (69.8%)
1 child	18 (31.0%)	5 (11.6%)
2 children	4 (6.9%)	7 (16.3%)
3 or more children	4 (6.9%)	1 (2.3%)
City of residence in the Arkhangelsk region		
Arkhangelsk	49 (84.5%)	41 (95.3%)
Novodvinsk	1 (1.7%)	2 (4.7%)
Severodvinsk	4 (6.9%)	–
Kotlas	4 (6.9%)	–
City in the Arkhangelsk region where you work		
Arkhangelsk	50 (86.2%)	41 (95.3%)
Severodvinsk	4 (6.9%)	2 (4.7%)
Kotlas	4 (6.9%)	–

Sample

In the First period (May 2020), 58 anesthesiologists-reanimatologists in the Arkhangelsk region were examined. In the Second period (October 2020), 43 of the 58 participants took part in the survey again. Socio-demographic characteristics of the sample are shown in Table 1.

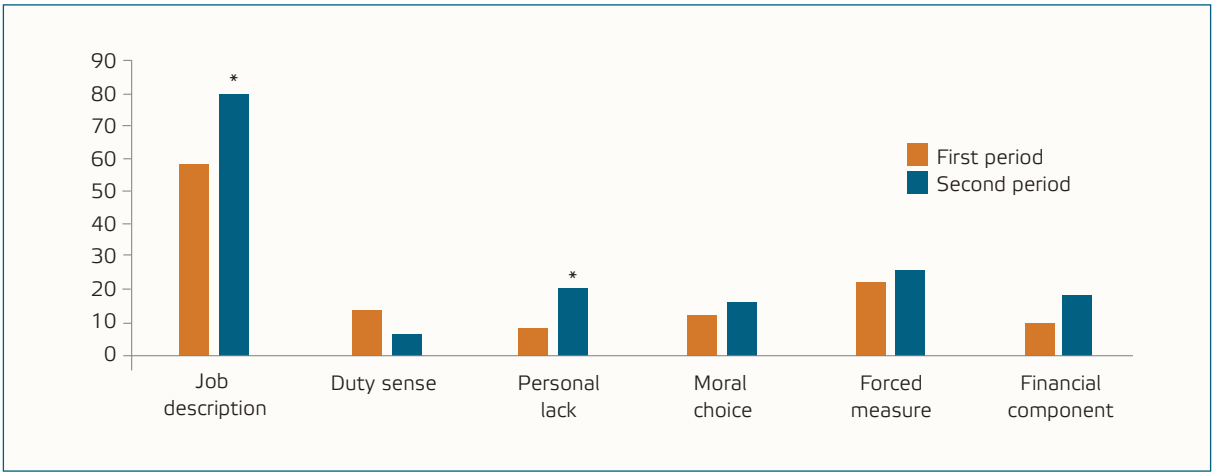
In addition, the survey data were analyzed depending on whether the professionals provided direct assistance to patients with COVID-19 or not. A group of doctors (DIP) was associated with providing daily care to patients with coronavirus infection (DIP – 27.6 % and 39.5% at Stages 1 and 2, respectively). The other group of doctors (NIP) did not participate in providing care to patients with coronavirus infection on a daily and direct basis (NIP – 72.4% while 60.5% were involved at Stages 1 and 2, respectively).

Measurements

In the study, we used an anonymous survey form, distributed among doctors, specifically anesthesiologists-reanimatologists, including several question blocks. In Block 1, questions were related to socio-demographic characteristics. In Block 2, questions were asked about the facts, causes, and characteristics of working conditions with COVID-19 patients. In Block 3, questions were used to measure some features of the doctors' emotional state and mental health.

When answering a number of questions in the questionnaire, an 11-point rating scale was proposed to assess the severity of a particular characteristic (0 meant the absence of the characteristic, 10 meant a very strong

Figure 1. Prevalence of the Reasons why Anesthesiologists-Reanimatologists Worked with COVID-19 Patients in Both Study Periods, %



Note: The differences are significant at * p – ≤ .05 (conjugacy tables).

presence of the characteristic). For some other questions, multiple choice answers were offered from which the respondents were required to choose only one. The second survey conducted later on the same sample of anesthesiologists-reanimatologists contained the same questions.

Research Ethics

All participants were clearly explained the study's goals and methods, and they signed a consent form for participation in the study. They were told about the right to stop participating in the study without providing an explanation. All information received was encrypted and kept secret. The study was anonymous, each subject identified himself with a certain nickname that remained the same during both study periods.

Research Hypotheses

- The emotional state of anesthesiologists-reanimatologists worsens with prolonged exposure to a stressor, such as in the form of a prolonged unfavorable epidemiological situation due to the COVID-19 pandemic.
- The emotional state of anesthesiologists-resuscitators during the COVID-19 pandemic is associated with a number of social and gender factors, as well as peculiarities of labor organization.

Statistical Analysis

The analyses were processed using the SPSS Statistics application software package (version 23.00, license Z125-5301-14). We used the descriptive statistics parameters, the Wilcoxon T-test for dependent samples, because some distributions of the variables were different from normal. Frequency tables and chi-square statistics were used to assess differences in occurrence frequency. The differences were considered significant at $p < .05$.

Results

In the First period, one-third of anesthesiologists-reanimatologists' professional activities were related to providing care to patients with COVID-19; at the second stage of the study, the number of doctors working with such patients increased.

One of the reasons why anesthesiologists-resuscitators provided care to patients with COVID-19 was an official duty, regardless of the study period (Figure 1). In the First study term, a greater number of doctors believed that they were working with such patients out of duty.

The comparative results of the survey for the study's different periods are presented in Table 2. The proportion of male doctors' care activity directly related to COVID-19 patients was approximately the same in both periods, while among women, this number increased three times. As we introduced above, official duty and forced

Table 2. Categorical Indicators According to the Survey Data Among Anesthesiologists-Reanimatologists at Different Stages of the Study (in %)

Indicators		Period 1 (*n* = 58)	Period 2 (*n* = 43)	Chi² statistics	Women			Men		
					Period 1 (*n* = 29)	Period 2 (*n* = 17)	Chi² statistics	Period 1 (*n* = 29)	Period 2 (*n* = 26)	Chi² statistics
Professional activity is related to providing care to patients with COVID-19		27.6	39.5	1.209 *p* = .272	13.8	35.3	2.912 *p* =.088	41.3	42.3	0.109 *p* = .741
High risk degree of COVID-19 infection during professional activity		48.3	74.4	6.156 *p* = .013	31.0	88.0	14.053 *p* = .000	68.9	65.4	0.080 *p* = .778
Very high degree in severity and intensity of professional activity		48.3	69.8	4.665 *p* = .031	24.1	64.7	7.405 *p* = .007	68.9	73.1	0.112 *p* = .737
Feeling unwell		8.6	23.5	4.182 *p* = .041	6.9	11.8	0.320 *p* = .572	10.3	30.8	3.574 *p* = .054
You experience anxiety every day, almost every day		31.0	32.5	0.026 *p* = .871	30.9	35.2	0.088 *p* = .766	30.9	30.7	0.000 *p* = .983
Sleep up to 6 hours a day		51.7	60.5	0,374 *p* = .541	34.5	64.5	3.946 *p* = .047	62.1	50.0	0.812 *p* = .368
Sleep up to 6 hours a day	Insufficient provision of personal protective equipment	74.1	41.9	10.755 *p* = .001	72.4	47.1	2.957 *p* = .085	75.9	38.5	7.882 *p* = .005
	Organizational difficulties	44.8	20.9	6.227 *p* = .013	41.4	0	9.517 *p* = .002	48.2	34.6	1.051 *p* = .305
	Concern about the possibility of transferring the infection home	87.9	25.6	40.498 *p* = .000	82.7	76.5	0.269 *p* = .604	93.1	69.2	5.252 *p* = .022
There is hope that everything will end soon		67.2	62.7	0.577 *p* = .447	62.1	88.2	10.619 *p* = .001	72.4	46.2	3.293 *p* = .070
There are concerns about the insecurity of professional activity with COVID-19 patients from a legal point of view		91.4	62,7	12.254 *p* = .000	96.6	58.8	10.619 *p* = .001	86.2	65.4	3.293 *p* = .070
The COVID-19 situation has greatly changed the values of life		13.8	20.9	0.708 *p* = .400	24.1	11.8	1.043 *p* = .307	20.7	26.9	6.078 *p* = .014
They believe that after resolving the COVID-19 situation, life will be completely different		18.9	41.9	6.324 *p* = .012	17.2	35.3	1.920 *p* = .166	20.7	46.2	4.038 *p* = .044

measures counted as the most common reasons for both male and female doctors working with COVID-19 patients. Among women, for the Second study period, the prevalence of such reasons for working with these patients significantly decreased (official duty: 88.2% and 51.7%, respectively, $\chi^2 = 6.298$, $p = .012$; personnel shortage: 23.5% and 3.4%, respectively, $\chi^2 = 4.461$, $p = .035$). Female doctors estimated the infection risk degree during their professional duties in the First period to be lower than in the Second period (5.6 ± 2.4 and 7.5 ± 1.9, respectively, $Z = -2.047$, $p = .041$). At the same time, it was with women, in the First study period, that a higher emotional burnout level with physical and mental exhaustion signs was noted (4.3 ± 2.4 and 2.6 ± 2.4, respectively, $Z = -2.236$, $p = .025$).

Interestingly, in the Second period, the proportion of women who believed that the situation with COVID-19 would soon be resolved and they would live the same life as before increased, unlike with the men, where the reverse change was observed ($p \leq .05$).

A comparative analysis of the results, depending on whether the respondents directly assisted patients with COVID-19, is presented in Table 3.

Anesthesiologists-reanimatologists who were directly involved in providing care to patients with COVID-19 (DIP), compared to doctors who were not directly involved in this (NOP), and regardless of the study period, more often noted a higher work severity and intensity degree ($\chi^2 = 4.376$, $p = .036$ and $\chi^2 = 4.546$, $p = .033$, at Periods 1 and 2, respectively) and a higher infection risk degree during their professional duty performance ($\chi^2 = 9.621$, $p = .002$ and $\chi^2 = 2.919$, $p = .093$, at Period 1 and 2, respectively).

In the DIP group, more than half of the doctors reported poor health during the Second study period, and during the First, this indicator was found only in every tenth patient ($p < .05$).

Among anesthesiologists-reanimatologists in the NIP group at the Second study period, we observed an improvement of well-being and mood, reduction of anxiety ($p < .05$).

Interestingly, in the First period, the DIP group was less likely to have a bad emotional state, anxiety, low mood, irritability, compared with the NIP group. In the Second period, the situation was already changing: the doctors in the DIP group were more likely to experience anxiety, have a high emotional burnout level, and poor health.

Discussion

In the study based on a sample of anesthesiologists-reanimatologists in October 2020, the number of doctors involved in providing care to patients having COVID-19 increased compared to May 2020; the number of doctors quarantined due to contact with COVID-19 patients grew almost three times. In the Second study period, the number of doctors who considered their professional activities very difficult, stressful, with a high risk for COVID-19 infection, increased. One-third of the doctors during both periods very often experienced anxiety, almost daily. Our data on anxiety was similar to the study results conducted in the United States during the COVID-19 pandemic, in which 33% of health care workers showed anxiety symptoms (Shechter et al., 2020). However, our study showed that, in general, among anesthesiologists-reanimatologists, the level of concerns regarding professional contact with COVID-19 patients had significantly decreased. Concern about possibly transferring the infection to the family and loved ones in October 2020, compared with May, decreased by more than three times. Concern about their health, and their loved ones' health, due to the high risk of SARS-CoV-2 infection, remained among the main concerns among various medical specialties professionals during the COVID-19 pandemic (Krasavtseva et al., 2020; Ovsyanik, 2020). According to foreign authors (Almaghrabi et al., 2020), almost 94% of health care workers believed that sufficient personal protective equipment provision for employees increased their readiness for work, reduced psychological stress and concern for family members' safety.

The results obtained correspond to the other authors' results (Alnofaiey et al., 2020), proving the COVID-19 pandemic's negative impact on medical workers' sleep quality and duration, in which the prevalence was 43.9% during the pandemic.

Anesthesiologists-reanimatologists involved in COVID-19 patient care in October 2020 more often noted a poor emotional state, anxiety, reduced mood, irritability and a high burnout level compared to May, which may indicate the depletion of these doctors' group resources. The data obtained at the Second period confirmed the study results of Di Tella as well as Chen (Chen et al., 2020; Di Tella et al., 2020), which revealed that respondents working in departments with an increased infection risk have higher anxiety and depression rates.

Table 3. DIP and NIP Groups, Anesthesiologists-Reanimatologists' Survey Results at Different Study Periods (%)

Indicators		DIP			NIP		
		period 1 (n = 16)	period 2 (n = 17)	Chi^2 statistics	period 1 (n = 42)	period 2 (n = 26)	Chi^2 statistics
Feeling unwell		6.3	50.0	6.920, p = .009	9.5	7.7	0.067, p = .796
Being quarantined, due to contact with a COVID-19 infected person		12.5	41.2	4.258, p = .039	7.1	15.4	1.181, p = .277
High intensity of activity in relation to the care of patients with Covid		68.8	88.2	1.873, p = .171	38.1	57.7	2.486, p = .115
High COVID-19 infection risk during professional activities		81.3	88.2	0.313, p = .576	35.7	65.4	5.674, p = .017
Reasons for working with COVID-19 patients	Professional duty	87.5	88.2	0.004, p = .948	47.6	73.1	5.693, p = .017
	Sense of duty	25.0	0	4.284, p = .038	9.5	11.5	0.071, p = .790
	Personnel shortage	25.0	11.8	0.971, p = .325	2.4	26.9	9.318, p = .002
	Moral choice	25.0	11.8	0.971, p = .325	7.1	19.2	2.260, p = .133
	Forced measure	25.0	41.2	0.971, p = .325	21.4	15.4	0.379, p = .538
	Financial component	25.0	23.5	0.010, p = .922	4.7	15.4	2.252, p = .133
Very bad emotional state		12.5	23.5	0,674, p = .412	19.0	7.7	1.651, p = .199
A bad mood prevails		6.3	11.8	0.303, p = .582	21.4	7.7	2.235, p = .135
Every day, almost every day, you experience anxiety		25.0	64.3	3.860, p = .049	33.3	11.5	4.068, p = .044
They believe that after resolving the COVID-19 situation, life will be completely different		18.9	41.9	6.324, p = .012	17.2	35.3	1.920 p = .166
Concerns about professional contact with COVID-19 patients	Insufficient personal protective equipment provision	81.3	41.2	5.544, p = .019	71.4	42.3	5.688, p = .017
	Organizational difficulties	43.8	17.6	2.659, p = .103	45.2	23.1	3.392, p = .065
	Poor relationship with hospital management	0	11.8	2.004, p = .157	4.8	0	1.276, p = .256
	Worry about your health	25.0	35.3	0.414, p = .520	42.9	19.2	4.005, p = .045
	Worry about your financial situation	18.8	41.2	1.963, p = .161	21.4	15.4	0.379, p = .538
	Worry about possibly carrying the infection home	93.8	64.7	4.160, p = .041	85.7	76.9	0.854, p = .355
	I'm not worried	0	11.8	2.004, p = .157	2.3	11.5	2.432, p = .119
There is hope that everything will end soon		66.7	76.5	0.248, p = .619	61.5	53.8	1.118, p = .290
Concerns exist about professional activity-related insecurity regarding COVID-19 patients from a legal view point		75.0	58.8	0.971, p = .325	97.6	65.4	13.303, p = .000
They believe that after the COVID-19 situation's resolution, life will be completely different		18.8	35.3	1.137, p = .286	19.0	46.2	5.683, p = .017

Conclusion, Implications and Future Directions

Due to the prolonged COVID-19 pandemic, it can be noted that anesthesiologists-reanimatologists were already working at their capabilities' limit, mobilizing their internal resources to carry out long-term work in such stressful conditions. Long-term work in stressful conditions could lead to functional capability depletion leading to impairment not only in the emotional state, but also in physical health. The study results should be taken into account when organizing the prevention and negative emotional state correction for anesthesiologists-reanimatologists in the course of their professional activities.

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Author contributions

Maria KOREHOVA: conceptualization, design, methodology, funding acquisition, investigation, project administration, data management, formal analysis, interpretation, writing original draft, writing review and editing.
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All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The Ethics Committee of the Northern State Medical University, Arkhangelsk, Russia, license number: 07/11-20, 25.11.2020 reviewed and approved the study.
All participants took part in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

The COVID-19 "First Lockdown" Experience in Italy: The Role of Hope and Optimism and Their Impact on Psychological Well-Being and Risk Perception

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Introduction: The present study investigates the lockdown experience in Italy during the COVID-19 pandemic within a positive psychology framework, focusing on the protective role of the positive anticipatory states: optimism and hope.
Aims: The aims were to verify if and how optimism and hope influenced people's psychological wellbeing and their risk perception of the situation, addressing how individuals portrayed the present and how they imagined the future after the lockdown.
Method: Based on the differences between the two constructs, as from the literature, the hypothesis is that individuals with higher levels of optimism would report positive but hazy future scenarios and lower levels of risk perception about the future. Therefore 1,471 participants received an online survey, which was administered as a set of questionnaires investigating three areas: demographic information, psychological wellbeing, and risk of contagion perception.
Results: The results showed that positive anticipatory states are positively associated with psychological wellbeing. Moreover, the results highlighted the relationship between optimism and risk perception regarding future scenarios.
Conclusions: The presented predictive model demonstrated that positive anticipatory states, sex, and age had a central role in determining the psychological wellbeing during the first wave of the pandemic events in Italy. Practical implications are discussed.

Keywords: hope, optimism, wellbeing, risk perception, COVID-19

Introduction

The COVID-19 Pandemic and the Lockdown

The 2020 Coronavirus (COVID-19) pandemic quickly developed from being a local crisis into a severe global health and economic crisis, affecting both the physical and psychological wellbeing of humanity with a currently unclear time horizon (Counted et al., 2022; Fore, 2020; Rajkumar, 2020).

Assuming a medical and sociological perspective, the COVID-19 pandemic can be considered a unique stressor incomparable to any previous traumatic events, such as tsunamis or earthquakes (Morganstein & Ursano, 2020). Indeed, while in the cited events the traumatic factors generally affected a specific and limited area for a circumscriptive time, and people knew they had the possibility to avoid the event or escape from it, in the case of

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the COVID-19 pandemic, the risk of being infected exists everywhere and everyone could potentially be contagious (Giallonardo et al., 2020), resulting in perceiving a boundless range of possibly risky situations.

Analysing those past events (Brooks et al., 2020) when humanity had to face pandemics, authorities often reported that adopting quarantine served as the best and most effective solution to contain an infection. The term *quarantine* – used for the first time in Venice, Italy, with regard to the Black Death – describes the isolation of people who had potentially been exposed to the contagious disease by distancing them from the rest of the active population, reducing their possibility to move about and therefore meet other people, so as to limit the risk of them spreading the infection. Before the occurrence of COVID-19, psychological literature regarding the quarantine experience remained scant. The main contributions come from the analysis of severe acute respiratory syndrome (SARS) in 2003, in which citywide quarantines had been imposed in different areas of China and Canada, and from the Ebola outbreak in 2014 that required the quarantine of entire villages in many West African countries.

The common aspect of these different situations is the fact that quarantine, physical distancing, and isolation had been established by national and international institutions in order to reduce the viral spread. Similarly, quarantine also remained the main solution adopted to cope with the COVID-19 pandemic.

In Italy – the second country after China hit by the virus, and where the pandemic exploded and dramatically increased abruptly and unexpectedly – the government declared the status of lockdown nationwide from March 8 until May 4, 2020. This lockdown came with prescriptions of specific containment and quarantine measures, such as the interdiction of all public meetings and strict movement restrictions. In more detail, the so-called "first lockdown" in Italy was characterised by the restriction of all mobility – except for basic necessities and work that could not be done remotely and that authorities considered fundamental for community and health circumstances – and the temporary closure of non-essential activities and businesses. Authorities closed schools and universities; teaching was done via distance learning, working from home was strongly recommended, and all meetings, both for personal (family and friends) and professional reasons, were forbidden.

Lockdown constitutes a very unnatural and disruptive condition, and recent studies emphasize how frustration, loneliness, and worrying about the future are proved to represent risk factors for several mental disorders, including anxiety, anger and confusion, affective disorders, post-traumatic stress symptoms, and psychoses (Brooks et al., 2020; Fore, 2020; Giallonardo et al., 2020). Brooks et al. (2020) identified several major stressors as risk factors for psychological diseases, specifically: longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma. More generally, surveyed people who had been quarantined reported a high prevalence of psychological distress and disease symptoms. Namely, people reported to have experienced the fear of falling sick or dying, increased levels of self-blame, depression, and the feeling of helplessness and despair (Fiorillo & Gorwood, 2020).

Among the various aspects of the subjective experience affected by the lockdown condition, the human perception of time deserves specific attention. Time perception is not just a physical phenomenon, but it stands open to psychological interpretation (Drake et al., 2008). People are endowed with a natural ability to accurately estimate time, since it is vital for them from the adaptive viewpoint (Droit-Volet, 2013); nonetheless, people may misjudge the passage of time, due to different variables, such as emotion (Droit-Volet & Gil, 2009). From the time dimension point of view, some peculiarities characterize the lockdown condition. First of all, the impossibility of maintaining people's own daily routines due to the suspension or alteration of many activities and formats (some jobs were temporarily suspended and many were converted into the work-from-home modality, the same as with school activities; most of the social and leisure activities were stopped or moved online). Many people, particularly in urban areas, had limited or no access to the external environment. Technology mediated most of people's interactions, while at the same time face-to-face interactions within the family environment increased dramatically compared to the previous routines. For all these described reasons, during the lockdown, people had to face the challenge of restructuring their daily routines within the in-house environment, with no contact if mediated with the external natural and social environment. Literature shows that such challenges represent a risk factor for mental diseases such as depression (Choi et al., 2020; Kong, 2019); several studies' research reported that temporal frames have implications as protective factors for psychological wellbeing: evidence exists of positive relationships between present orientation and general happiness (Kammann & Flett, 1983), present orientation and life satisfaction (Diener et al., 1985), temporal routines and optimism (Lennings, 2000) and future perspective was found positively associated with subjective wellbeing (Zaleski et al., 2001). Moreover, research showed that in everyday life, time perception is characterized by fluctuations according to emotional states (Droit-Volet, 2013). For example, depression is linked with experiencing a slowing down of time, such that "a day feels like a year" (Ratcliffe, 2012, p.1). In healthy people too, the emotional flavor of the moment commonly alters the sense of time: time seems to fly when we are comfortable and having fun; it drags when we are bored and uncomfortable. The "internal clock" models of time perception have highlighted that the interaction of

emotional arousal and valence produces speedups and slowdowns in the clock speed (Droit-Volet & Meck, 2007). Hence, in a situation as unique as the COVID lockdowns, featured by various and contrasting emotions and by the disruption of daily routines, individuals' relationship with time necessarily underwent a deep reorganization.

Most of the psychological research concerning the COVID-19 pandemic has focused on the problems posed to personal wellbeing created by the lockdown experience, at the same time leaving unexplored the possible variables protective of wellbeing during the lockdown period (Giallonardo et al., 2020). Conversely, analyzing the possible role of protective factors can provide useful data that both decision makers and mental health professionals can utilize to deal successfully with a stressful situation, such as a lockdown period. Literature reviews indicate that researchers have conducted several studies on the role of resilience (Giallonardo et al., 2020), while there remains a lack of studies focusing on the positive anticipatory states, particularly hope and optimism. Recent studies investigate the role of hope, wellbeing, and religious coping in Colombia and South Africa (Counted et al., 2022), as well as the relationships between hope and resilience in families (Walsh, 2020) and hope and anxiety (Gallagher et al., 2021). Studies concerning optimism during pandemic events occur less frequently. Other studies focused their attention on the relationships between optimism and positive emotions (Leslie-Miller et al., 2021) and optimism and risk perception (Dolinski et al., 2020; Gassen et al., 2021; Kuper-Smith et al., 2021). No studies exist that investigate the positive anticipatory states and their relationships to wellbeing or risk and safety perception during the first experience of lockdown. The present study addresses such a lack of research, focusing on the influence of hope and optimism as protective factors during the lockdown experience.

Hope and Optimism: Their Impact on Psychological Wellbeing and Risk Perception

According to a positive psychology paradigm, hope and optimism bear a central role in determining personal wellbeing regarding expectations about the future, with a protective role in the present (Satici, 2016). Hope and optimism are therefore defined as positive anticipatory states (Fowler et al., 2017).

According to Snyder (Snyder et al., 1991; Snyder 2000), hope constitutes a cognitive state that helps people achieve their goals. To experience hope, therefore, the individual needs a goal: something not immediately available in the present yet something they aspire to achieve in the future, even though such achievement remains uncertain (Lazarus, 1999).

According to Snyder's work, the essential components of hope are *agency* and *pathways*. Within this framework, *agency* refers to a motivational component; it reflects the ability to imagine defined pathways toward a person's goals and preserve such images during the journey. Snyder (2000) defines agency or agency thoughts as the motivational component to propel people along their imagined routes to goals. According to Snyder, *agency* reflects the *person's perception* that he or she can begin the movement along their imagined pathways to goals. Note that within this framework, *agency* can also reflect one's appraisal of the capability or the ability to persevere along the path to reach the goal. Pathways can be considered as the ability to plan the journey to the desired goals. In more detail: the mindset of hope stands characterized by having a goal and the ability to plan a way to achieve that goal. At the same time, when driven by hope, people feel motivated to follow their plans and they are able to cope with obstacles on their way to the goal (Snyder et al., 1991; Snyder, 2000). In brief, hope fosters an accurate and detailed representation of the steps needed to achieve the goal and the possible risks and obstacles on the pathway.

A strong link between hope and wellbeing has been highlighted, since hope is proved to be a cognitive set that helps people achieve their goals in the future (Snyder et al., 1991; Snyder, 2000). Literature suggests that people who report a high level of hope and the expectation to be successful in achieving their goals are more likely to experience a state of wellbeing (Erez & Isen, 2002). Lazarus and Launier (1978) demonstrated that hopeful people are more likely to perceive stressful situations as a challenge, and this mindset supports them in reducing stress levels. On such a basis, the disposition for hope is also considered as a protective factor in chronic anxiety (Michael, 2000). Noticeably, hope proved to be negatively associated with stress and negative emotions, as well. For example, a work by Glass (2009) examined the emotional reactions exhibited by the survivors of Hurricane Katrina, providing evidence that experiencing hope moderated the relationship between avoidant coping and general psychological distress. Gilman et al. (2012) conducted a study with 164 veterans diagnosed with post-traumatic stress disorder (PTSD). Their results revealed that higher levels of hope were related to decreased PTSD and depression symptoms, thus supporting the idea that hope constitutes a nonspecific device towards symptom reduction. In general, hope demonstrates a protective role during a health crisis: people with high levels of hope tend to be more accepting of the situation (Miller-Smedema et al., 2010).

Optimism can be defined as a positive attitude towards the future. According to an evolutionary perspective, Tiger (1979) considers optimism as a mechanism of natural selection based on the ability to develop positive expectations towards the future – a powerful tool in helping people manage difficulties in the present.

The adaptive role of optimism is also theorised by Taylor (1989), who deems optimism to be a cognitive bias named *positive illusion*. In Taylor's view, the individuals make use of positive illusions to cope with future scenarios featuring ambiguous, inadequate, or emotionally complex sets of information. Hence, optimism has an adaptive role because it promotes the ability to be careful, self-confident, and persistent while facing difficulties, and it fosters a creative and proactive attitude in pursuing the desired goals, even though it does not support accurate and defined representations of future scenarios nor of the risk factors. In brief, optimism can be seen as a powerful promoter, able to mobilise the energy that supports the individual in facing a challenge (Taylor, 1989). Dispositional optimism has a positive effect on wellbeing: optimistic people report better physical and mental health (Scheier et al., 1994). Indeed, optimistic people report lower levels of cortisol, higher levels of antioxidants, and better cardiac functionality (Räikkönen & Matthews, 2008; Rozanski et al., 2019).

When promoting an unrealistic vision on the world, optimism could lead to negative consequences, namely optimistic bias (Jefferson et al., 2017; Sharot, 2011; Shepped et al., 2015). The definition "optimistic bias" refers to the mistakes that people make when they reason about the future, overestimating the possibility that positive events will occur and underestimating the possibility of negative events. This kind of illusion – and the relative illusion of invulnerability – are strongly connected with the attitude of assuming risks in the health domain and the consequent risky behaviors (Van Der Pligt, 1996). Unrealistic optimism also occurs when individuals falsely believe that their personal outcomes will be more favorable than others' in the same risk category (Gassen et al., 2021). Several studies highlighted that the phenomenon of unrealistic optimism is widespread, applying to a variety of situations from health behaviours to stock market trading (Makridakis & Moleskis, 2015; Reyes-Velázquez & Sealey-Potts, 2015). In particular, in the context of health risk behaviours, the optimistic bias may lead to behaviors that contribute to morbidity and mortality and to complacency (Jefferson, 2017). Likewise, in the pandemic context, optimism about COVID-19 might have two different effects on the population (Kuper-Smith et al., 2021): adaptive effects (e.g., protection from detrimental levels of anxiety) or maladaptive consequences; e.g., defiance of regulations and accelerating the pandemic's spread (Kuper-Smith et al., 2021). For example, recent studies conducted during the pandemic pointed out that men remained unrealistically optimistic about the likelihood of their SARS-CoV-2 infection, despite having a higher risk of infection and mortality from COVID-19 than women (Dolinski et al., 2020). Optimistic bias may therefore provide some short-term psychological benefits, such as protecting from overwhelming anxiety and consequent paralysis, as well as fostering resilience. On the other hand, unrealistic optimism may lead to improper assessment of hazardous situations, in particular when individuals face novel sources (or scales) of risk, such as a global pandemic (Gassen et al., 2021).

To our knowledge, research about the influence of hope on risk perception is scant and results are often inconsistent. An interesting contribution comes from Ojala's work (2012), in which a distinction is drawn between constructive hope and hope based on denial. Constructive hope that is based on trust in others and on positive reappraisal may increase behaviors aimed at mitigating risks, while denial may drive one to underestimate risks. Research in the field of pro-environmental behaviour illustrated that hope exerts an important influence on risk perception (MacInnis & Mello, 2005) and in particular suggested that hope may lead to a decrease in risk perception. Hornsey and Fielding (2016) found that messages of hope based on partial information about the progress made in climate change mitigation decrease risk perceptions and distress about the climate, which in turn may reduce motivation for pro-environmental behavior. In the field of economic behavior, Barros and Botelho (2012) found that higher levels of hope predicted an increase in the propensity to accept the mortgage loan and to become indebted, independently of actual risks; however, a first study suggested that hope may lead to a decrease in risk perception, which, however, the second study did not confirm.

Despite that both optimism and hope refer to the future and its positive representation, as Bruininks and Howington (2019) suggest, hope and optimism should be considered as different constructs. While both are addressed to the future (Lazarus, 1999; Seligman, 1990; Snyder, 2000), yet different emotions elicit them (Carver et al., 2010). The emotional stimuli for hope are uncertain and so is the possibility to achieve the desired goal (Lazarus, 1999; Snyder et al., 1991; Snyder, 2000). Instead, optimism has – at its birth – trust and confidence that in the future, things will be fine (Carver et al., 2010; Taylor, 1989; Tiger, 1979). Furthermore, both hope and optimism carry, though differently, a role in motivation: i.e., hope drives individuals to plan their actions so as to successfully achieve their goals whereas optimism lacks such a direct connection to action-planning. Those similarities and differences between hope and optimism could impact risk perception and the ability to evaluate hazard situations (Slovic, 1987). Slovic (2001) highlighted risk's subjective and value-laden nature. More specifically, in particular regarding the context of health and safety, the concept of risk involves value judgments that reflect much more than the raw probability and consequences of an event's occurrence and are rather affected by the representation of the future and the consequent action plans.

Starting thus from the outlined theoretical framework, the present study aims to investigate the influence of hope and optimism on psychological wellbeing and risk perception during the COVID-19 related lockdown experience. The survey was administered during the sixth week of the first lockdown period (11 to 20 April 2020).

Namely, the research presented here aims to explore different aspects related to psychological wellbeing and risk perception in two different time scenarios: the present moment and the future. Regarding the present situation, researchers examined subjective wellbeing, challenges in dealing with time, and risk perception. Regarding the future, they examined risk perception.

According to the literature-highlighted differences between the hope and optimism outgrowths, our hypotheses are:

– Positive anticipatory states influence psychological wellbeing and the challenge to deal with time during the lockdown experience (Satici, 2016). Our expectation is that higher levels of both hope and optimism are related to higher levels of psychological wellbeing (Erez & Isen, 2002; Lazarus & Launier, 1978; Scheier et al., 1994).
– Positive anticipatory states influence risk perception about the present and future scenarios. Our expectation holds that individuals reporting higher levels of optimism hold a lower level of risk perception and a more positive – but hazy – representation of the future (Scheier & Carver, 1985) (See the optimistic bias, Sharot, 2011). Conversely, individuals reporting higher levels of hope (as defined by Snyder et al., 1991, and by Ojala, 2012, when distinguishing constructive hope) perform a more accurate risk analysis and hold a more defined representation of future scenarios based on their goals' specificity (Sharot, 2011; Snyder et al., 1991) and on positive reappraisal strategies (Ojala, 2012). More specifically, in the present study we focused on the risk of contagion perception.
– Moreover, we are interested in investigating the relationship between psychological wellbeing, risk perception, and the challenges in dealing with time during the lockdown experience. Our expectation holds that higher levels of psychological wellbeing are related to lower levels of challenges in dealing with time and risk perception.

Table 1. Socio-Demographic Information for the Sample

Socio-demographic information	
Sex (%)	
Female	1051 (71.4%)
Male	418 (28.5%)
Age (%)	
	Min = 18; Max =81 40.43 ± 13.19
18–29	396 (27.0%)
30–39	361 (24.6%)
40–49	298 (20.3%)
50–69	389 (26.5%)
70–81	22 (1.5%)
Regions	
Lombardy	724 (49.2%)
Other regions with high levels of contagion and deaths	342 (23.2%)
Other regions	405 (27.5%)
Did you contract COVID-19? (%)	
Yes	72 (7.0%)
No	688 (66.6%)
I don't know	273 (26.4%)
COVID-19 Diagnosis (%)	
Yes	13 (.9%)
No	326 (22.2%)
I'm waiting for results	3 (.2%)
I know people who developed COVID-19 (%)	
Yes	959 (65.2%)
No	512 (34.8%)

Methods

Sample

Participants were recruited via an announcement published on popular social networks (Facebook, Instagram, and LinkedIn), which advertized an invitation to participate in a survey about the lockdown experience. Prior to accessing the survey, participants had to provide their informed consent for data treatment of this research scope only, according to the General Data Protection Regulation (GDPR n.679/2016).

A total of 1,471 Italian participants (women = 1,051; 71.5%) completed the survey. The sample characteristics are reported in Table 1. Inclusion criteria required participants to be at least 18 years old (M = 40.43, DS = 13.19) and to be spending the COVID-19 lockdown in Italy. Of the respondents, 49.2% were from Lombardy, the region in Italy hardest hit by COVID-19 regarding contagion and death rates.

Instruments

All the participants completed a set of questionnaires designed to investigate five areas:

1. *Social and demographic information*
2. *Positive anticipatory states*: The *Adult Hope Scale* (Snyder et al., 1991) and the *Life Orientation Test – Revised* (LOT-R) (Scheier et al., 1994) were administered.
   a. *The Adult Hope Scale* remains the most common measure of hope in literature (Fowler et al., 2017). According to Bryant and Cvengros (2004), much evidence supports the construct and external validity of this scale. It is composed of 12 items organised in two subscales: agency (four items) and pathways (four items). The remaining items are fillers. The respondents are asked to give their answers on a scale from 1 to 4, with 1 corresponding to "definitely false" and 4 to "definitely true".
   b. The LOT-R (Scheier et al., 1994) is considered the most reliable and valid measure of dispositional optimism. The LOT-R is composed of ten items, evaluated on a 5-point Likert scale from "strongly agree" to "strongly disagree" (Scheier et al.,1994).
3. *Psychological wellbeing*
   a. To obtain a global measure of wellbeing, the *Psychological Wellbeing Scale* (short version) was used (Ryff & Keyes, 1995), which provides a trait view of personal wellbeing. The scale, composed of 18 items divided into six different subscales, has three items in each subscale: self-acceptance, positive relationships with others, autonomy, environmental mastery, purpose in life and personal growth. The respondents were asked to provide their answers on a six-point Likert scale.
   b. *Challenges in dealing with time* (Likert scale from 0 "totally disagree" to 7 "totally agree", $\alpha = .817$). Since, to our knowledge, there are no scales in literature created to grasp the specific experience of time perception and management during a lockdown, we designed an ad hoc pool of items, aiming to grasp how people felt about the flow of time and how they managed their time during the lockdown period. Inspired by the work of Drake et al. (2008), in the present work, we chose to consider the time perspective as a central variable during the lockdown. The overall score of this scale was calculated adding all the items. The items were: It seems to me that this time doesn't ever pass. I live this time like it doesn't pass. I feel the mastery of my time. It seems to me that the days are equal to one another. It seems to me that I don't have enough time to do everything. I feel petrified in this time. It seems like I have more time. I believe that time passes faster than before. I check the calendar more often than before. I'm frozen in this time. It seems that I have more time available. I feel how time passes with the help of the activities done. I often check what time it is. I live this time as an opportunity. I live in time still thinking about something that happened before this. I feel that I live in a suspended time. I remember easily which day of the week we are in. I feel like I am trapped in this time. I live in this time waiting for what will happen later.
4. *Risk of contagion perception:* To measure the risk of being infected perception, we created a pool of items investigating such risk perception both in the present (Likert scale from 0 to 7, with 0 = no perceived risk and 7 = high perceived risk, $\alpha = .800$) and in the future (Likert scale from 0 to 7, $\alpha = .898$), with specific regard to the risks perceived in relation to possible COVID-19 contagion during various daily routines. We calculated the overall score of this scale by adding all the items. The items consisted of: go shopping, go walking or running alone, sharing space with unknown people (e.g., standing in line at post office, supermarket, pharmacy, etc.); attend crowded places, not having the opportunity to wash/disinfect your hands often; take public transport; shake hands with someone you know little about and attend the hospital.

Moreover, a second pool of items was purposely created (Likert scale from 0 to 7, $\alpha = .918$) to investigate when people thought they would regain a feeling of safety in the future. This scale, named "safety perception", comprises three subscales: physical presence ($\alpha = .836$) – that is, the possibility to meet people in person – sociality ($\alpha = .894$), and stigma about COVID-19 ($\alpha = .699$). We calculated the scoring by averaging all the items.

The physical presence and sociality areas have been mostly affected by the restrictive measures to contain COVID-19. Logie and Turan (2020) hypothesise that in the case of COVID-19, stigma can trigger acts of discrimination and mistreatment, underestimation of community norms, negative perspectives towards specific groups, and anticipated stigma towards what will happen. For this reason, items like "how long will it take for you to feel safe again when appearing in public with symptoms like a fever or cough" or "… when coming into contact with people who had the COVID-19" were included.

The items included: shake hands with someone, celebrate a degree, wedding, birthday and so on; have contact with old people or vulnerable people, go to a concert or the stadium; hug someone that is not in quarantine with

you; have contact with people without a facial mask; go to the cinema or theater; go to the gym; have contact with people displaying symptoms like a cough or fever; have contact with someone who had COVID-19; show yourself in public with symptoms like a cough or fever; go to a public space without a facial mask; talk about people who you know had COVID-19.

Table 2. Descriptive Statistics of the Scales Included in the Presented Study

Scale	*M*	*SD*	α
The Adult Hope Scale	24.48	3.57	.588
LOT-R (Optimism)	14.90	5.10	.780
Psychological Wellbeing Scale	69.55	8.00	.566
Challenges in dealing with time	50.94	20.22	.817
Risk of contagion perception in the present	43.47	7.47	.800
Risk of contagion perception in the future	37.46	10.35	.898
Safety_physical presence	2.85	0.97	.836
Safety_sociality	3.22	0.83	.894
Safety_stigma	3.08	0.84	.699

Procedure

The survey was administered during the sixth week of the first lockdown (11 to 20 April 2020). The questionnaire was implemented on Qualtrics and spread through social networks (mainly Facebook, but LinkedIn and Instagram, as well). Respondents took part in the research voluntarily. Before accessing the questionnaires, participants had to read the study presentation reporting the aims of the research and the anticipated procedures for data treatment and give their informed consent.

Data Analysis

A statistical analysis was performed through Excel and SPSS. A correlation analysis and a multiple linear regression analysis were run.

Results

We performed a correlation analysis to investigate the relationships between positive anticipatory states (hope and optimism), psychological wellbeing, challenges in dealing with time, risk of contagion perception, safety perception, sex, and age (see Table 3). The results showed a significant correlation between hope and psychological wellbeing (r = .569, p =< .001) and between optimism and psychological wellbeing (r = .425, p = <.001). In more detail, considering the two components of hope separately, the results highlighted that higher levels of agency were associated with higher levels of psychological wellbeing (r = .541, p = <.001).

Correlation analysis showed that positive anticipatory states were inversely correlated with sex at a significant level: hope and sex (r = -.081; p < .001), agency (r = -.054; p < .05) and pathways (r = -.092; p < .001), optimism (r = -.081, p < .001). This means that men reported higher levels of positive anticipatory states than women did. The sex variable was coded as follows: 1 = male, 2 = female. Risk of contagion both in the present (r = -.232, p < .001) and in the future (r = .215, p < .001) showed a significant relationship with sex. Men reported higher levels of perceived risk than women in the present, conversely, women reported higher levels of perceived risk than men in the future. Similarly, the relationships between the subscale of safety and sex were significant: physical presence (r = .019; p < .001); sociality (r = .207, p < .001) and stigma (r = .241; p < .001). Also challenges in dealing with time (r = .007, p < .05) and psychological wellbeing (r = .-088, p < .001) showed a significant association with sex: men reported lower levels of challenge in dealing with time and higher levels of psychological wellbeing than did women. Correlation analysis didn't highlight any relationship between sex and age.

The correlation between positive anticipatory states and age proved significant: older people reported higher scores for hope (r = .122; p < .001), agency (r = .083; p < .05) and pathways (r = .137; p < .001), optimism (r =

Table 3. Overview of the Correlations Between the Variables Considered in the Study: Sex, Age, Psychological Wellbeing, Hope, Agency, Pathways, Optimism, Challenges in Dealing with Time, Risk of Contagion Perception in the Present and in the Future, Safety-Physical Presence, Sociality, and Stigma

	Safety_ stigma	Safet_ sociality	Safety_ physical presence	Risk of contagion perception in the future	Risk of contagion perception in the present	Challenges in dealing with time	Optimism	Hope	Hope_ Agency	Hope_pathways	Age	Sex	Psychological wellbeing
Psychological wellbeing	−.134**	−.094**	−.097**	−.074*	.007	-.329**	.425**	.569**	.541**	.468**	−.054*	−.088**	1
Sex	.241**	.207**	.190**	.215**	.232**	.070*	−.081**	−.081**	−.054*	−.092**	−.024	1	
Age	.192**	.192**	.308**	.151**	.095**	-.205**	.209**	.122**	.083**	.137**	1		
Hope_pathways	−.061**	−.062**	−.012	−.007	.025	-.309**	.467**	.880**	.585**	1			
Hope_Agency	−.055*	−.050*	−.016**	.018	.039	−.278**	.431**	.900**	1				
Hope	−.065*	−.063*	−.016	.006	.036	−.329**	.503**	1					
Optimism	−.080**	−.069*	−.036	−.062*	−.042	−.405**	1						
Challenges in dealing with time	.129**	.061*	.042	.074*	.054*	1							
Risk of contagion perception in the present	.455**	.463**	.455**	.651**	1								
Risk of contagion perception in the future	.458**	.475**	.471**	1									
Safety_physical presence	.677**	.783**	1										
Safet_sociality	.696**	1											
Safety_stigma	1												

**$p < .001$; *$p < .05$.

Table 4. Multiple Linear Regression Analysis (Dependent Variable: Psychological Wellbeing)

Step	Predictors	Final β	R^2	ΔR^2
1	Sex	–.030	.402**	.005
	Age	–.157**		
	Hope_Pathways	.158**		
	Hope_Agency	.343**		
	Optimism	.174**		
	Challenges in dealing with time	–.138**		
	Risk perception in the present	.089*		
	Risk perception in the future	–.067*		
	Safety_Physical presence	–.025		
	Safety_Sociaity	.039		
	Safety_Stigma	–.057		

**p =< .001; *p < .05.

.209, p < .001). Similarly, risk of contagion perception both in the present (r = .095; p < .001) and in the future (r = .115, p < .001) showed a significant relationship with age: older people reported higher levels of risk perception both in the present and in the future. The relationships between the subscale of safety perception and age were significant as well: older people estimated to regain the perception of feeling safe in situations of physical presence (r = .308; p < .001); sociality (r = .192, p < .001) and stigma (r = .192; p < .001) later in the future.

Challenges in dealing with time (r = -.205, p < .001) and psychological wellbeing (r = .-054, p < .05) showed an inversely significant association with age: older people reported less challenges in dealing with time but also lower level of psychological wellbeing.

A significant correlation between hope and challenges in dealing with time (r = -.329, p < .001) emerged: high levels of hope were associated with a lower perception of challenges in dealing with time during the lockdown experience. Both components of the construct, agency (r = -.278, p < .001), and pathways (r = -.309, p < .001), were inversely correlated with the challenges in wrestling with time. Similarly, the correlation between optimism and challenges in dealing with time proved significant (r = -.405, p < .001): people declaring higher levels of optimism perceived lower levels of challenges in struggling with time during the lockdown experience.

The relationship between hope and risk of contagion perception, both in the present situation and future scenarios, was not significant. Likewise, the relationship between optimism and risk of contagion perception, both in the present situation and future scenarios, was not significant. Conversely, the results illustrated a significant correlation between optimism and risk of contagion perception in future scenarios (r = -.062; p < .05).

Results highlighted significant correlations between the two positive anticipatory states and the three subscales of safety perception: hope and stigma (r = -.065, p < .05), hope and sociality (r = -.063, p < .05), and similarly, optimism and stigma (r = -.080, p < .001), and optimism and sociality (r = -.069, p =< .001). As previously explained, items related to safety perception were focused on when people estimate feeling safe again in some specific situations: so, people with higher levels of positive anticipatory states were also estimated to regain the perception of feeling safe in such situations earlier in the future.

Moreover, collected data showed that people with higher levels of psychological wellbeing experience lower levels of challenges in dealing with time (r = -.329, p < .001).

No significant relationship with risk of contagion perception in the present emerged. Conversely, psychological wellbeing revealed a significant association with risk perception in the future (r = -.074, p < .001).

Concerning safety perception, psychological wellbeing was associated with all the three safety perception subscales: physical presence (r = -.097, p < .001), social situations (r = -.094, p < .001) and stigma (r = -.134, p < .001).

To investigate whether sex, age, positive anticipatory states, challenges in dealing with time, risk of contagion perception and safety perception could jointly predict psychological wellbeing, the researchers tested a model of multiple linear regression analysis (Table 4). The regression model was significant and explained 40% of the total variance (Final $R2$ = .402).

Discussion

The first period of the COVID-19 pandemic was characterised by the most severe ban on leaving home except for specific and very limited reasons. The risk of contagion existed everywhere, and the death rate was alarming. In this period, both the present and the future appeared uncertain. Hope and optimism cover a central role in fostering personal wellbeing, both in the present (assuming a protective role) and future (determining the personal expectations) (Satici, 2016). In this study, we explored the protective role of these two constructs in preserving wellbeing – measured as psychological wellbeing and challenges in dealing with time – and risk perception, namely the risk of being infected, both regarding the present situation and future scenarios.

Results highlight that both hope, and optimism stood significantly related to wellbeing during the lockdown experience for the considered sample. On one side, high levels of positive anticipatory states were associated with high levels of psychological wellbeing, consistent with the literature about hope (Erez & Isen, 2002; Lazarus & Launier, 1978; Michael, 2000) and optimism (Scheier et al., 1994; Taylor, 1989). On the other side, higher levels of hope and optimism were associated with fewer difficulties involving coping with the challenges in dealing with time. Hopeful and optimistic people reported to perceive fewer challenges in dealing with time during the first lockdown in Italy. Similarly, higher levels of psychological wellbeing were associated with lower levels of challenges in dealing with time. The study's first hypothesis was confirmed: positive anticipatory states influence psychological wellbeing and challenges in dealing with time during a lockdown experience (Satici, 2016).

Concerning the risk of contagion perception in the present, the correlation analysis did not show significant interactions with positive anticipatory states and psychological wellbeing. Conversely, the association between optimism, risk of contagion perception in the future, and psychological wellbeing was highlighted. Results pointed out that higher levels of optimism and lower levels of contagion risk perception in future situations contribute to the individuals' psychological wellbeing. This is consistent not only with the protective role of optimism (Taylor, 1989; Tiger, 1979), but also with the effect of the optimistic bias (Jefferson et al., 2017; Sharot, 2011; Shepperd et al., 2015) that brings people to underestimate the level of risk connected to certain actions and situations, especially those considered extremely meaningful and useful for daily life. Recent studies conducted in the pandemic context in different countries exhibited similar results. Individuals reporting higher levels of optimism hold a lower level of perceived risk and a more positive though hazier representation of the future (Jefferson et al., 2017; Kuper-Smith, 2021; Makridakis & Moleskis, 2015; Reyes-Velázquez & Sealey-Potts, 2015; Scheier & Carver, 1985; Sharot, 2011; Shepperd et al., 2015). Regarding the relationship between hope and risk of contagion, we found no significant interaction for the present nor future scenarios. Several reasons may be hypothesised. Concerning hope, for example, the lack of a defined temporal frame could have influenced the answers related to the future. Snyder (2000) points out that the ability to hope needs a specific goal that the individual wants to achieve: during the first part of the pandemic situation, the uncertain social conditions made this impossible. Finally, our results about hope and risk perception are consistent with the literature, where contrasting results are present, suggesting that further research is needed to deepen the knowledge of this relationship. Regarding socio-demographic variables, risk of contagion perception both in the present and in the future revealed a significant relationship with age and sex. Women reported higher levels of perceiving an infection risk than did men (Dolinski et al., 2020). Considering age, the risk of contagion perception in the future increases with age. It is worth noting that one of the few and primarily acknowledged features of the novel virus as it spread involved its higher danger for older people. More in-depth knowledge has revealed that the COVID-19 virus may result in more dangerous consequences to those with previous pathologies, as often is the case with the elderly. In the first period of the pandemic, when the knowledge of the novel virus was limited, a very powerful association between the mortality and age of the victims appeared. Moreover, such association was strengthened by media communication and by some iconic events, such as the outbreaks of the disease in many nursing homes and the Army convoy carrying coffins of coronavirus victims, the vast majority of whom consisted of the elderly, out of the city of Bergamo. This is coherent with the knowledge about the impact of COVID-19: during the first wave older people had more risk of the contagion than younger people had.

Positive anticipatory states and psychological wellbeing displayed a significant relationship with the perception of risk measured as the perception of feeling safe in certain situations. Higher levels of positive anticipatory states were associated with regaining the perceived feeling of safety earlier in the future; this stood particularly true for social situations such as going to the cinema, taking part in events like weddings, thesis defences and birthday celebrations. Correlation analysis results also suggested that during the first COVID-19 wave, people tended to perceive themselves as being safe from stigma; for example, by talking about friends that contracted COVID-19, differently than what was suggested by Logie and Turan (2020). Considering psychological wellbeing, the results highlighted a significant association with safety perception. Indeed, higher levels of psychological wellbeing were associated not only with the subscales of sociality and

stigma, but also with the possibility to return to meeting people in person (physical presence). The questionnaire was administered during the pandemic's sixth week: people could not meet each other, and social situations had been strongly forbidden. In general, results about safety perception confirm its adaptive role. However, the association previously highlighted between risk of contagion perception in the future, optimism, and psychological wellbeing, pointed out the main difference between positive anticipatory states. Optimistic people, in the pandemic situation, tend to imagine the future with the effect of the optimistic bias in order to preserve their own wellbeing. A pandemic, as explained at the beginning of this paper, constitutes an exceptional and disruptive event, incomparable to other catastrophic stressors. Our hypothesis holds that the exceptional nature of experiencing a pandemic and a lockdown may have generated, brought out, or strengthened significant goals, like maintaining sociality and personal and global safety. Results highlighted that hope promotes safety perceptions and psychological wellbeing without an association to risk perception. Uncertain time and future scenarios stimulate hopeful thinking (Lazarus, 1999; Snyder et al., 1991): hopeful people identify their safety perceptions as their future goals, without underestimating risks while in the present and future scenarios.

During the lockdown, the presented predictive wellbeing model indicated that positive anticipatory states, sex, and age played a central role in determining individual psychological wellbeing during the pandemic's first wave in Italy. Both the considered dimensions of hope and optimism proved to influence psychological wellbeing, consistently with literature (Satici, 2016). Moreover, we confirmed the inverse influence between difficulties in managing time and psychological wellbeing. Also the risk of contagion perception, both in the present and in the future, proved to have a direct impact on psychological wellbeing: individuals perceiving lower levels of contagion risk experienced greater wellbeing.

Our findings remain consistent with the research on both positive anticipatory states. The COVID-19 emergency offered a chance to grasp the processes underlying hope and optimism since during the pandemic, all the people shared uncertainty and goals – which are the two fundamental elements of hope (Lazarus, 1999; Snyder, 2000) – and similar difficulties in coping with the present (Tiger, 1979). Moreover, information about the future remained ambiguous, insufficient, and emotionally complex. All such elements constitute typical components of optimism (Sharot, 2011). This study confirms the protective role of hope and optimism in situations characterized by deep uncertainty, not only from a personal (Lazarus, 1999) but also from a collective and social perspective. Furthermore, this work encourages new research on the role of optimism and hope in the perception of risk and safety. In fact, the present study's findings demonstrate a main difference between hope and optimism in promoting wellbeing in risky situations such as during a pandemic. The two positive anticipatory states serve their purpose for wellbeing and challenge in dealing with time differently and in a complementary manner. Focusing on the temporal dimension, optimism fosters a positive view of the future, thereby making the present more bearable. Besides, regarding both components of hope (Snyder et al., 1991), the ability to imagine defined pathways to a person's goals and the ability to plan the journey to such goals, bridge the present and the future, allowing to maintain continuity in the perception of one's life when disrupted by the stressful event of the pandemics. Additionally, hope underpins action, helping the individual to regain and support a sense of control on her own course of action in a very peculiar moment as the lockdown, when everyone's scope for action becomes dramatically curtailed. Showing no influence of positive states on risk perception in the present, results confirm the idea that, in as deeply a stressful situation as pandemics, risk perception is functional to the individual's wellbeing and survival (Slovic, 1987). On the other hand, higher levels of positive anticipatory states were associated with regaining the perceived feeling of safety earlier in the future, highlighting the role of optimism and hope in supporting positive thinking to promote trust and wellbeing. In conclusion, our results confirmed the role of hopeful thinking and optimistic feeling in responding adaptively to adverse circumstances, such as events endangering health, natural disasters, and socio-economic crises (Brazeau & Davis, 2018; Counted et al., 2022; Miller-Smedema et al., 2010), thus promoting safety perceptions and psychological wellbeing.

Strengths and Limitations

The present study bears some limitations. First, the data were collected in Italy, the second country hit by the virus after China and the first in Europe to experiment with restrictions and a lockdown. Although the findings provide useful insight into the role of positive anticipatory states on psychological wellbeing and risk perception during the pandemic event, this information cannot be generalised to other countries wherein the situation and the restrictions are different, and cultural differences may affect the subjective evaluation of primary needs and risks. Second, the collected data were cross-sectional, so an interpretation of possible changes during the following periods of the pandemic was precluded. Future work with longitudinal approaches to positive anticipatory states and events like pandemics is needed to empower insights into the association between the variables considered.

Conclusion, Implications and Future Directions

In general, the results confirm what the literature illustrates about positive anticipatory states. Uncertain time and future perceptions stimulate hopeful thinking (Lazarus, 1999; Snyder et al., 1991) and optimism has an adaptive role for individuals (Taylor, 1989). In the context of an uncertain present and future (Rajkumar, 2020), as during COVID-19, promoting hope can help people focus on specific goals supporting wellbeing without the influence of optimistic bias (Sharot, 2011). This study emphasises that hope and optimism have different impacts on psychological wellbeing: hope helps in defining a path towards an individual's personal goals, while optimism drives people to underestimate risks and anticipate positive future scenarios. Such a difference stands effectively represented by two slogans and hashtags that were very popular during the first lockdown in Italy: the first one was "*Everything will be fine*" (#andràtuttobene), which mirrors the need to imagine that the dramatic situation would develop positively, mimicking dispositional optimism and the optimistic bias. The second slogan was "*I stay at home*" (#iorestoacasa), which was the core of an information campaign aimed at promoting the idea that the only way to protect people from COVID-19 contagion involved staying at home safely. Such an aim can be compared to the function of hope; that is, fostering action plans to achieve uncertain but possible goals (Lazarus, 1999; Snyder, 2000).

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Ethical statement
This manuscript is the authors' original work.
The authors declare that the presented research was carried out ensuring voluntary participation, informed consent, anonymity and did not include any potential harm for the participants. The research was conducted in compliance with the Directive 95/46/EC (General Data Protection Regulation) and with the ethical recommendations for research in psychology, in accordance with the "Code of Ethics of Italian Psychologists" and the WMA Declaration of Helsinki - 2013.
All participants engaged in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

The Multifactorial Background of Helping Professionals' Vital Exhaustion and Subjective Well-Being During the First Wave of COVID-19 in Hungary: A Cross-Sectional Study

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Introduction: Vital exhaustion and the well-being of helping professionals are important issues regarding the sustainability of services, especially in a critical situation such as the COVID-19 pandemic.
Aims: The purpose of this study was to investigate helping professionals' vital exhaustion and well-being, concerning different groups of background variables during the COVID-19 pandemic.
Methods: In the spring of 2020, Hungarian helping professionals (N = 931) were contacted with an online questionnaire.
Results: Our results show that indicators of physical well-being are strongly associated with vital exhaustion and subjective well-being (sleeping quality (χ^2 (2) = 251.062, p < .001); frequency of meals (χ^2 (2) = 99.454, p < .001)). Health and social care workers were more exhausted than members of other helping professions (χ^2(4) =37.782, p < .001). There were statistically significant negative correlations between the Vital Exhaustion and Well-being Score and satisfaction with work conditions (r_s (929) = –.418, p < .001), satisfaction with family life (r_s (806) = –.342, p < .001) and its change (r_s (807) = –.287, p < .001), family-work balance (r_s (675) = –.444, p < .001) and its change (r_s(786) = -.515, p < .001). In the prediction of the Vital Exhaustion and the Well-being Score, the addition of physical well-being indicators to the regression model led to the strongest increase in R^2 of .344, p < .001.
Conclusion: A clear and consensual framework for life and work provides security amid unpredictable external changes.

Keywords: vital exhaustion, well-being, health care workers, social workers, helping professionals

Introduction

Several studies have already addressed the mental health and well-being issues of front-line helping professionals in the COVID-19 pandemic period. In the different waves of the pandemic, professionals working in health care (Alharbi et al., 2020; Barello & Graffigna, 2020; Comfort et al., 2021; Shah, Chaudhari, et al., 2020), social welfare (Banks et al., 2020; Miller et al., 2021; Truell, 2020), education (Collie & Martin, 2020; Hart & Nash, 2020; Randall et al., 2021; Sokal et al., 2020), and religion (Greene et al., 2020; Osei-Tutu et al., 2021) have encountered a comprehensive level of stress and vital exhaustion. Although some research studies investigated

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well-being during COVID-19, few of them focused on multiple professions or had a holistic approach. Thus, it is necessary to conduct a deep research into the helping professionals' well-being, also considering the physical, psychological, family, and workplace aspects.

Vital Exhaustion

The psychological construct of vital exhaustion describes a state which can be interpreted as a human response to long-lasting, uncontrollable stress (Appels et al., 1987). The phenomenon can be defined by a specific observable and measurable triad: feelings of excessive mental and physical fatigue (energy loss), increased irritability, and demoralization. Vital exhaustion is associated with other psychological constructs, such as the somatic affective dimension of depression, chronic fatigue syndrome, and burnout, all of which have links to the occurrence of coronary heart disease (De Miranda Azevedo et al., 2014). A strong connection exists between the concept of burnout syndrome and vital exhaustion. Besides specific physical and psychological symptoms, burnout also has three key components: emotional exhaustion, cynicism, and feelings of work inefficacy, and it can be interpreted as a long-term response to chronic stress (Kudielka et al., 2006). According to the WHO International Classification of Diseases 11th Revision (ICD-11; WHO, 2018), burnout is characterized by three dimensions, one of which is the "feelings of energy depletion or exhaustion."

According to two recently published systematic reviews and meta-analyses (Cohen et al., 2017; Frestad & Prescott, 2017), three-decades of research provide the empirical evidence that vital exhaustion stands an independent predictor and risk factor (relative risk: 1.5–2.6) for the incident of first and also recurrent cardiovascular diseases, acute myocardial infarction, and cerebrovascular events.

Mental Well-Being

Well-being is a complex, multidimensional construct, which is based on a holistic view and the biopsychosocial-spiritual model of development and mental health (Saad et al., 2017). This term is used to describe the mental state and, more broadly, a defining characteristic of social relationships, health behaviors, and work-related indicators. Personal well-being means that an individual can cope with difficulties of private life or workplace and can live a balanced and full life as a result of successful coping (Dodge et al., 2012; Headey & Wearing, 1989). In his reflections on the quality of life and the COVID-19, Shek (2021) also emphasizes the importance of psychological, social, and spiritual health in addition to physical health.

Vital exhaustion can be interpreted as the negative end of a continuum where *vitality* is the positive sense of *physical and psychological well-being*. From this perspective, vital exhaustion is a response to prolonged stress (Richman et al., 2009), and after Thayer (1990), we can refer to it as "tense tiredness."

Helping Professionals at Risk

In the helping professions, demanding work and burnout can be more frequent (Shanafelt et al., 2015). In these professions, where long and unsociable hours (often at nights and on weekends), physically and emotionally intensive work is typical, balancing between work and family demands presents a real challenge, especially for women (Karhula et al., 2018). It seems that among female doctors, burnout occurs significantly more frequently (Walsh, 2013). The highest risk for exhaustion and burnout is observed in health care professionals, among physicians (Fralick & Flegel, 2014; Patel et al., 2018; Tucker et al., 2015; Walsh, 2013), medical students (IsHak et al., 2013), and nurses (Galletta et al., 2016; Gorgievski et al., 2019). Compared to other professions, doctors bear approximately twice the risk of burnout and work-family conflict (Shanafelt et al., 2012). Besides health care professionals, those working in other stressful fields such as social work (Geisler et al., 2019; Hricová et al., 2020; Lloyd et al., 2002) education (García-Carmona et al., 2019; Sokal et al., 2020), and religion (Lewis et al., 2007; Weaver et al., 2002) also experience these conditions. The extreme work demands of helping professionals can also affect their general health behavior (insufficient sleep, irregular and unhealthy food intake, rare physical activity) (Tucker et al., 2015).

Vital Exhaustion and Well-Being During COVID-19

COVID-19 was identified in Wuhan city, China, in December 2019. So far, it has spread to more than 200 countries (https://www.worldometers.info/coronavirus). The WHO declared a pandemic on March 11, 2020.

Authorities announced the first COVID-19 cases in Hungary on March 4, 2020, and registered the first coronavirus-related death on March 15th. Since then, citizens have faced restrictions and varying degrees of confinement.

Unexpected social isolation and lockdowns in communities already in the first waves of COVID-19 caused some general changes in people's *mood and health behavior* (Lu et al., 2021). Some had opportunities to be more flexible and get more sleep, eat healthier, and engage in more exercise than before (Arora & Grey, 2020) and reported an increased level of health and well-being (Recchi et al., 2020). In a UK survey, however, 49% of the respondents reported higher stress levels (anxious and depressed mood), 38% reported sleeping less or less well than before the pandemic, and 35% have eaten more food or less healthy food than usual (Duffy et al., 2020). In the general population, those working women who raised children aged 0–5 years reported work-family balance as the most difficult to maintain. It was especially difficult for those women who had to work outside their home during the pandemic (in Italy: Del Boca et al., 2020; in the UK: Sevilla & Smith, 2020).

During the COVID-19 crisis, an increasing number of helping professionals are being affected. In the different waves of the pandemic, professionals working in health care (Alharbi et al., 2020; Barello & Graffigna, 2020; Shah, Chaudhari, et al., 2020), social welfare (Banks et al., 2020; Truell, 2020), education (Collie & Martin, 2020; Hart & Nash, 2020; Sokal et al., 2020), and religion (Greene et al., 2020) have encountered a comprehensive level of stress. Those colleagues most exposed work in health care – and especially hospital care – and they are facing huge physical and psychological demands (physical, emotional, and mental exhaustion, fear, and uncertainty regarding infection processes). According to previous experiences with similar outbreaks of SARS, MERS, and H1N1, health care workers can experience burnout quickly. In these situations, several further contributors can be identified: lack of control over processes and procedures, poor communications and guidelines, lack of psychological support, as well as the experience of prolonged suffering and fatal events (Shah, Chaudhari, et al., 2020; Shah, Kamrai, et al., 2020).

Our study was conducted in Hungary, in Central-Europe. Recent studies suggest that burnout and emotional exhaustion appear to be moderate to severe in a significant proportion of Hungarian helping professionals (Győrffy, 2019; Mák et al., 2020). We believe that our results are relevant beyond Hungary, as our study is the first to examine the constellation of these variables.

We conducted this study to determine the correlation between vital exhaustion, subjective well-being and socioeconomic background variables, physical well-being, work-related and family-related issues during the first wave of the COVID-19 pandemic in a sample of helping professionals.

Our research question was: What is the predictive power of the different groups of background variables on the scores of vital exhaustion and subjective well-being?

Methods

Participants

Participants included 931 professionals (Table 1) who worked in health care (21.2%), in social care (38.4%), in education (22.6%), or in the field of religion (7.4%), and one-tenth of the respondents were employed in more fields simultaneously (e.g. education and field of religion; education and social care). Participants were aged 23–77 years (M = 45.3, SD = 9.8). Further, 77.7% of the respondents had partners, 32.6% lived in the capital, and the vast majority (93.6%) had a higher education degree. In terms of total family income, most respondents (22.3%) fell into the € 1101–1377 (per month) category, and the subjective financial well-being stood around 2 ("they got along with a frugal attitude") on a 5-degree ordinal scale.

Procedure

We collected the sample using an online survey platform tool (LimeSurvey). The questionnaire remained available for 10 days, from the 8th to 17th of May, 2020, in the first wave of COVID-19, during the last week of curfew in Hungary, and was distributed using the snowball sampling method via various professional mailing lists and other group platforms. Helping professionals from health and social care, education, and the religion field were invited to fill out the questionnaire. In total, 1,535 respondents opened the questionnaire and started to fill it in. 751 participants answered all questions, and 784 partially completed the survey. We applied no exclusion criteria; as a result, 931 observations remained after data cleaning.

Table 1. Sample Characteristics and Socio-Demographic Background Variables

	N	Valid percent / Mean ± *SD*
Background variables I.: Socio-economic characteristics		
Age (years)	927	45.3 ± 9.79
Sex*		
Female	289	91.2
Male	28	8.8
Education		
Secondary school or lower	59	6.4
Higher education	815	87.9
Locality		
Capital	301	32.6
Country	622	67.4
Living in partnership		
Yes	673	77.7
No	223	22.3
Number of children		
0	351	39.1
1	190	21.2
2	203	22.6
3 or more	154	17.1
Age of children (years)		14.72 ± 8.61
Family income**		
Under 1120 €	505	55.5
Over 1121€	405	44.5
Subjective financial well-being (1- without problems; 5- financial deprivation)	920	1.97 ± .79

Notes:
* Due to a data collection error, the gender distribution is known only in a smaller part (*n* =317) of the sample. The deficiency is discussed in detail in the limitations.
** Family income was measured using a question in which we specified ten categories. For the analyses, we divided the sample into two, based on the median category.

Measures

Maastricht Vital Exhaustion Questionnaire. Vital exhaustion is a mental and physical state as well as a personal experience characterized by chronic fatigue, a significant decrease in energy levels, and increased irritability, sometimes accompanied by depressive mood. We used a Hungarian 5-item short version of the Maastricht Vital Exhaustion Questionnaire to measure vital exhaustion (Appels et al., 1993; Kopp et al., 1998); e.g., *"Do little things irritate you more lately than they used to?"*; *"Do you often feel tired?"*. Instead of the original scoring of the scale, we used a 5-point Likert-type scale (1-not at all; 5-completely) to get a more differentiated distribution of the construct. The scale had good internal consistency (α = .83) (Appels et al., 1993).

Subjective Well-being. We measured the experience of well-being during the pandemic by using two single-item questions: *"How stressful was the period since the outbreak of the pandemic for you?"*; *"All in all, how would you rate your current general well-being?"* which were scored on a 10-point Likert-type scale (1-not at all; 10-completely).

Physical well-being variables. We asked about sleep, eating habits, and physical activity. The questions addressed facts of lifestyle (eg., *"During the past week, what was your average sleep time in hours?"; "How many meals did you have before the outbreak of the pandemic per day?"; "How many times a week did you do physical activities before the outbreak of the pandemic, on average?"),* and the changes compared to the pre-pandemic practices (e.g., *"How often do you do intensive exercises compared to the pre-pandemic period?").* Also, we asked about the subjective perception of health (*"How would you rate your health now?").* Respondents answered each question on a 3, 4, or 5-degree ordinal scale.

Work-related variables. We asked about working hours and work schedules concerning the present and, retrospectively, the pre-pandemic situation. Two questions were asked related to job satisfaction. The first one was about the professional activity (*"How satisfied are you with your current job, professional activity – your tasks and their practical value, etc.?"*), and the other one about the working conditions (*"How satisfied are you with your current working conditions – schedule, workload, communication, etc.?"*). The questions were scored on a 10-point Likert-type scale (1-not at all; 10-completely).

Family-related variables. We used two single-item questions about family life and family-work balance (Clarke et al., 2004); we measured these on a 10-point Likert-type scale (1-not at all; 10-completely). We also asked how these had changed as a result of the pandemic (-3- much less; +3- much more).

Data Analysis

Participants who did not answer the vital exhaustion and well-being questions were removed from the database. In the cleansed dataset, the rate of missing data in the examined variables was acceptable (max. 10% of values, and less than 2% in the dependent variables – vital exhaustion and general well-being). To deal with problems of missing data, we used the Multiple Imputation (MI) method, except for variables where the lack of data was systematic. In the case of family-related questions, the analyses were run with a smaller sample of partnered persons (N = 652), as the questions could not be interpreted in the case of singles.

As a first step, we examined the variables' descriptive statistics, and we tested the normality of distributions using Kolmogorov-Smirnov and Shapiro-Wilk tests. Since many variables had a significantly different distribution from the normal one, non-parametric tests were used for further analyses. The relationships between socioeconomic and other background variables and the Principal Component Score of vital exhaustion and general well-being were examined using the Kruskal-Wallis Test and Spearman's rank-order correlations. Then a Hierarchical Linear Regression Model was constructed to explain the variance of the dependent variable (PCA score of psychological well-being and vital exhaustion). We built the model in four steps using the Enter method to examine the explanatory power of different groups of variables (socioeconomic variables, physical well-being variables, work-related variables, and family-related variables).

Ethical Considerations

Before starting the study, an ethics committee approval from the Medical Research Council's Scientific and Research Ethics Committee (IV/4005-2/2020/EKU), was obtained. All participants were informed, and each of them provided written informed consent.

Results

Descriptive Statistics

Descriptive statistics of background (independent) and dependent variables are shown in Table 2. For some variables of change (amount of sleep, eating regularity, satisfaction regarding family life, family-work balance), we found that approximately the same proportion of respondents reported negative and positive change. On the other hand, in terms of sleep quality and physical activity, we observe a shift to the negative.

The "Vital exhaustion and Well-being Score"

Due to the high correlations between the scores of Vital Exhaustion and the two single-item questions (Feeling of stress – r_s (931) = .641 p < .001; General Well-being – r_s (931) = .712, p < .001) a principal component analysis was run with these three variables. The Kaiser-Meyer-Olkin (KMO) measure was .71, Bartlett's test of sphericity stood statistically significant (p < .001), indicating that the data were suitable for principal component analyses. PCA revealed one component that had an eigenvalue greater than one; the one-component solution explained 76% of the total variance. For further analysis, we used the principal component score as a dependent variable. We refer to this score as the "Vital Exhaustion and Well-being Score" (VEWBS).

Table 2. Descriptive Statistics of Physical Well-Being, Work-Related Variables, Family-Related Variables, and the Dependent Variables

	N	Valid percent / Mean ± *SD*
Background variables II: Physical well-being		
An average day before the pandemic…		
I could sleep less than now	252	27.2
I slept the same as now	423	45.8
I could sleep more than I do now	250	27
During the pandemic (now)		
I sleep worse	341	36.8
I sleep the same way, neither better nor worse	28	8.8
I sleep better	100	10.8
Before the pandemic…		
I could eat 1-2 times a day	210	22.8
I could eat 3-5 times a day	711	77.2
During the pandemic (now)		
I can eat more irregularly than that	137	14.8
I can eat with the same regularity as before	612	66.2
I can eat more regularly than that	176	19
How often did you do physical activities intensively before the pandemic?		
I did not	130	14
1-2 times in a month	152	16.4
1-2 times per week	395	42.7
3-4 times per week or more	249	26.9
During the pandemic (now)		
I do physical activities less often than before	387	42.4
I do physical activities as regularly as before	308	33.7
I do physical activities more times than before	218	23.9
How many hours a day did you sleep on average in the last week? (hours)	925	6.91 ± 1.09
How healthy do you usually eat? (1- not at all; 5- completely healthy)	927	3.38 ± .88
How is your health? (1- very bad; 5- very good)	926	3.55 ± .72
Background variables III: Work-related variables		
Field of work		
Health care	165	21.2
Social care	299	38.4
Education	176	22.6
Field of religion	58	7.4
Mixed	81	10.4
Work schedule		
only during the day	719	90.8
also at night	73	9.2
Work experience (years)	814	16.6 ± 10.91
How many hours have you been working since the pandemic? (hours)	821	39.3 ± 18.44
Satisfaction with the job, professional activity (1- not at all; 10- completely)	821	7.22 ± 2.33
Satisfaction with the working conditions (1- not at all; 10- completely)	823	6.15 ± 2.63

(continued on the next page)

Table 2., continued

	N	Valid percent / Mean ± *SD*
Background variables IV: Family-related variables		
Satisfaction with family life (1- not at all; 10- completely)	808	7.47 ± 2.09
How did this change due to the pandemic? (-3- much less; +3- much more)	809	.08 ± 1.39
Family-work balance (1- not at all; 10- completely)	677	6.1 ± 2.03
How has this been changed due to the pandemic? (-3- much less; +3- much more)	788	–.07 ± 1.54
Dependent variables		
Vital exhaustion (5-25)*	931	13.96 ± 5.48
How stressful have you been feeling since the outbreak of the pandemic situation? (1-not at all, 10 - completely)	911	6.45 ± 2.51
All in all, how do you evaluate your current general well-being? (1-very good; 10-very bad)	914	4.47± 1.81

Note: * The original items of the scale were data imputed.

Differences in the "Vital exhaustion and Well-being Score" regarding different background variables

Kruskal-Wallis tests were conducted to determine whether there were differences in the VEWBS between groups corresponding to different background variables. No significant difference existed accounting for the following variables: sex, relationship status (partnered or not), number of children, age of children, location, frequency of meals before the pandemic, exercise frequency pre-pandemic, and working hours before the pandemic. We found that the median VEWBS of younger employees ($\chi^2(4) = 9.565$, $p = .048$) and people with low level of education (χ^2 (2) = 8.383, $p = .015$) registered significantly higher; there was also a difference between the objective (χ^2 (1) = 8.141, $p = .004$) and the subjective (χ^2 (3) = 53.173, $p < .001$) financial well-being categories and the change in family income due to the pandemic (χ^2 (2) = 10.360, $p = .006$). A worse financial situation was accompanied by a higher VEWBS. In the indicators of physical well-being, we can see that with negative changes in the amount (χ^2 (2) = 162.107, $p < .001$) or quality (χ^2 (2) = 251.062, $p < .001$) of sleep time, the frequency of physical activity (χ^2 (2) = 68.634, p < .001), and the frequency of meals (χ^2 (2) = 99.454, $p < .001$) the VEWBS also decreased. Those who consider themselves healthier (χ^2 (3) = 136.936, $p < .001$) and who eat healthily (χ^2 (2) =45.704, $p <$ .001), have a lower VEWBS. Health and social care workers were found to be more exhausted than professionals of other fields (χ^2 (4) =37.782, $p < .001$); those who also worked night shifts during the pandemic had higher VEWBS (χ^2 (1) =8.801, p = .003). Additional working hours (χ^2 (2) =58.319, $p < .001$), and changes in shift schedules (if night shift also appeared) (χ^2 (2) =13.857, $p = .001$) resulted in an increase in the VEWBS.

Spearman's rank-order correlations were run to assess the relationship between the VEWBS and the continuous background variables. There were statistically significant negative correlations between VEWBS and sleeping hours (r_s (929) = -.309, $p < .001$), satisfaction with professional activity (r_s (929) = -.232, $p < .001$), satisfaction with work conditions (r_s(929) = -.418, $p < .001$), satisfaction with family life (r_s (806) = -.342, $p < .001$) and its change (r_s (807) = -.287, $p < .001$), family-work balance (r_s (675) = -.444, $p < .001$) and its change (r_s (786) = -.515, $p < .001$).

Explaining the variance of Vital Exhaustion and Well-being Score by groups of background variables

We ran hierarchical multiple regression to determine how the addition of socio-demographical characteristics, physical well-being indicators, work- and family-related variables improved the prediction of the VEWBS. Four models were run separately for each domain of background variables, which showed a significant association with VEWBS in previous analyses. We constructed the final model using variables that remained significant in the separate models (see the first column in Table 3). The full model (Step 4) was statistically significant, R^2 = .551, $F(22, 652) = 35.117$, $p < .001$; adjusted R^2 = .535. The addition of physical well-being indicators led to the strongest increase in R^2 of .344, $F(11, 652) = 37.439$, $p < .001$, although each set of variables strengthened the model's predictive power. We can see the highest predictive power for the following variables: change in family-work balance (β = .279), change in the quality of sleep (reference: no change, β_{worse} = .249; β_{better} = -.070), and subjective health (β = -.192).

Table 3. Hierarchical Multiple Regression predicting Vital Exhaustion and Well-being Score

	Vital Exhaustion and Well-being Score											
	Step 1			Step 2			Step 3			Step 4		
Variable	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
Constans	–.122	.191		1.554	.319		1.811	.329		1.898	.310	
423	423	423	423	423	423	423	423	423	423	423	423	423
Socio-demographical												
Age	–.007	.004	–.072	–.007	.003	–.076**	–.005	.003	–.050	–.002	.003	–.022
Subjective financial wellbeing	.260	.047	.210**	.042	.040	.034	.009	.038	.007	.016	.035	.013
Physical well-being												
Sleeping hours				–.057	.031	–.065	–.050	.029	–.058	–.046	.027	–.053
Change in amount of sleeping (ref.: No change) [a]												
less				–.066	.082	–.031	–.028	.080	–.013	.019	.073	.009
more				.121	.084	.058	.067	.080	.032	.055	.073	.027
Change in sleep quality (ref.: No change) [a]												
worse				.632	.074	.334**	.587	.070	.310**	.471	.065	.249**
better				–.344	.110	–.110**	–.348	.104	–.111**	–.220	.096	–.070*
Change in eating frequency (ref.: No change) [a]												
less				.352	.086	.137**	.306	.083	.119**	.232	.076	.090**
more				.003	.077	.001	.010	.074	.004	.064	.068	.027
Subjective health				–.320	.044	–.236**	–.271	.042	–.200**	–.260	.039	–.192**
Work-related variables												
Field of work (1-Social and Health Care; 0–other) [a]							.096	.057	.051	.052	.053	.027
Satisfaction with work conditions							–.096	.011	–.257**	–.061	.011	–.163**
Change in work schedule (ref.: No change) [a]												
No night shift any more							–.220	.221	–.029	–.399	.203	–.052*
Night shift as well day to night							.177	.138	.038	.037	.127	.008
Change in working hours (ref.: No change) [a]												
less							–.041	.070	–.020	.079	.065	.039
more							.014	.079	.006	–.048	.073	–.023
Family-related variables												
Satisfaction with family life										–.035	.014	–.076*
Family-work balance										–.043	.015	–.095**
Change in family-work balance										–.183	.023	–.279**
R^2	.048			.391			.463			.554		
F	16.568**			41.978**			32.802**			40.077**		
ΔR^2	.048			.343			.072			.092		
ΔF	16.568**			46.075**			12.385**			44.131**		

Note. N = 652. * p < .05, ** p < .01; a Variable built in the model as a dummy.

Discussion

We conducted this study in order to determine and predict the differences in individual levels of vital exhaustion and subjective well-being with four groups of variables (socioeconomic, physical well-being, work, and family) among helping professionals in health care, social care, education, and the field of religion. As a public health emergency, the COVID-19 pandemic has fundamentally changed the pace of life for individuals, communities, and society as a whole. These pandemic-induced changes affect mental health and result in a crisis for both a shorter and a longer period (Liu et al., 2020; Pfefferbaum & North, 2020). Our research focused on helping professionals who are exposed to even more changes and new sources of stress. We can detect effective coping when a new balance is achieved in the changed circumstances (Chew et al., 2020; Rettie & Daniels, 2021). The results of our research suggest that, to avoid deteriorating trends in indicators of well-being and vital exhaustion, the key is the ability to adapt to change.

The hierarchical regression analysis indicated that every group of variables (sociodemographic background, physical well-being, work, and family) examined in our study had a significant association with vital exhaustion and subjective well-being. In every step of the model, we could identify the significant predictive power for every group of background variables, but physical well-being presented the strongest one. In the final model, the change in the quality of sleep and the frequency of meals, subjective health, satisfaction with work conditions, change in work schedule, satisfaction with family life, family-work balance, and the change in family-work balance had a significant relationship with vital exhaustion and well-being.

Research on subjective well-being and vital exhaustion takes into account not only the self-characterization of the mental state but also other factors arising from lifestyle, health behaviors and social relationships, and provides an overall picture of an individual's quality of life (Anderson & Fowers, 2020; Shi et al., 2019). Although well-being remains a slowly changing indicator, the COVID-19 pandemic constitutes a multi-level threat that can easily upset the previous balance or exacerbate problems that have caused only minor difficulties before. Our research results indicate that in a crisis, focusing on basic needs (eating, sleeping) and maintaining/establishing balance are closely related.

For physical and mental well-being, sleep stands as one of the most important factors since sleep quality and quantity significantly affect physical and mental health (Fu et al., 2020; Kripke et al., 2002). This has been confirmed by our research revealing that individuals with poor sleep quality suffered greater vital exhaustion, and changes in sleep quality had the highest impact on well-being. In our sample, a remarkable proportion (36.8%) reported a deterioration in sleep quality. On the other hand, individuals with good sleep quality showed better physical well-being (Huang & Zhao, 2020). In addition to personal implications, deterioration in sleep quality also bears economic consequences due to the declining job performance (Metlaine et al., 2005). Work quality and sleep are interlinked and interdependent. It has been demonstrated that regular physical activity can help to maintain good sleep quality (Ferris et al., 2005). And it is important to underline that nearly 60% of the respondents were at least as physically active during the first wave of the pandemic as before, although a significant proportion of helping professionals consider the lack of physical activity to be a risk factor. Our results confirm that physical activity is also associated with good sleep quality, highlighting the protective effect of regular physical activity (Ferris et al., 2005; Metlaine et al., 2005).

Since sleep, diet, and physical activity have a self-affirming transactional cycle: each habit can affect the other positively but also negatively. A healthy circle of these factors is necessary to prevent diet-driven chronic diseases (Arora & Grey, 2020; Ingram et al., 2020). Chronic time pressure and disturbed sleep can cause vital exhaustion and burnout (Rozanski & Cohen, 2017). Sleep and recovery processes can mediate work stress and burnout. Impaired (reduced or fragmented) sleep cannot support recovery after daily activity and can contribute to allostatic load and somatic morbidity (Grossi et al., 2015; Söderström et al., 2012). Disruption of the circadian rhythm due to very long working hours, sometimes extreme ones (12–24 hr shifts) (Koy et al., 2020), can put pressure on several physiological parameters of the body as well as cognitive functions (Caruso, 2014; Rhéaume & Mullen, 2018).

Another important result of our research is that during the COVID-19 pandemic, several work- and family-related variables (satisfaction with working conditions, changes in work schedule, satisfaction with family life, changes in family and work balance) also demonstrated a significant association with well-being. In our sample, the extra burdens of work and changes in work-life balance had a repercussion on well-being and changes in vital exhaustion.

Ethical challenges, compassion fatigue, and secondary traumatic stress remain very important issues for nurses and doctors, teachers, social workers, and those working in the religious field during the time of disasters such as

the COVID-19 pandemic. In addition to more frequently encountering suffering and death, decision making on resource rationing and utilization, lacking emotional communication and support can contribute to developing compassion fatigue, psychological trauma, and moral injury (Alharbi et al., 2019, 2020; Barello & Graffigna, 2020; Janeway, 2020; Morley & Vellas, 2020). Also, major ethical issues regularly occur in the field of social work (Banks et al., 2020), as well as in the healthcare system (Rosenbaum, 2020). In our research, we concluded that health and social care workers were found to be more exhausted than other professionals. Although in Hungary the focus was on the availability of hospital resources – both the number of beds and hospital staff – those working in social welfare found themselves on the front line and hence felt stressed and overworked. Ethical issues, psychological trauma, and moral injury are frequent risk factors for the deterioration of well-being for religious leaders of faith-based communities, as well (Greene et al., 2020). Mental health professionals have to cope with perceived stress, compassion fatigue, secondary traumatic stress, and therapeutic effectiveness in the new context (Joshi & Sharma, 2020). For teachers, the challenge involves managing physical distancing and maintaining social connectedness at the same time with children as well as with colleagues (Collie & Martin, 2020).

Strengths and Limitations

Due to a data acquisition error, gender was identified only for 317 respondents, and an analysis of gender differences was performed on this subsample. We did not find significant differences in the dependent variables (vital exhaustion, subjective well-being) or in most of the background variables between men and women. We only found gender differences in working hours before COVID-19 and changes in family income: men worked longer hours than women before the pandemic, and their incomes fell to a greater extent.

Our sample was not representative for helping professionals, and not all sectors were represented equally. Another limitation consisted in the cross-sectional study design: we cannot imply causality between the examined constructs.

We did not examine whether the respondents had a direct relationship with an infected person or whether the respondents were infected. These would have been important pandemic-related questions that can associate with vital exhaustion and subjective well-being.

In editing the questionnaire, we aimed to measure more dimensions of well-being and many aspects of them. On the other hand, we had to reduce the number of items per each examined construct to have a questionnaire that remains easy to handle and fill in. Thus, in several topics, we used single-item questions instead of multi-item scales.

To garner a better understanding of the issue, it would be important to also use other methods than the self-report questionnaire and to study these questions longitudinally.

Conclusion, Implications and Future Directions

Since the beginning of 2020, it has become clear that the COVID-19 pandemic is not a single, unexpected, and quickly-passing challenge that lends itself to rapid crisis interventions. Consistent attention and multi-layered interventions are required to strengthen the resilience of individuals and communities. The standing where the resilience of individuals and communities is strengthened can be reached with permanent attention and necessary interventions at several levels. These experiences can then be used to develop resilience and coping with similar situations in the future with the least possible loss. Based on the results of our research, we could formulate suggestions that address different levels: the individual, the workplace, and policymaking.

From the results of our study, it became apparent that the conscious maintenance and nurturing of basic physical well-being is crucial in a crisis among helping professionals. Proper quality and quantity of sleep, regular meals, and physical activity not only bear a preventive significance but also bestow a stabilizing effect in an acute crisis.

Beyond the individual sphere, it seems necessary for the workplace community to adhere to workplace practices even more consciously and to clarify or modify those, if necessary. A clear framework accepted by all provides security amid unpredictable external changes. Concerning the leadership of an institution, personalized leadership should come to the fore, as the employees react differently to the changed circumstances. Also, the rethinking and planning of formal and informal communication channels can be of crucial importance to the workplace community, as the predictable communication of external information and sharing internal, primarily emotional reactions is a key issue in this situation. These aspects are perhaps even more important in the helper professions than in other jobs.

The COVID-19 pandemic is challenging not only at the individual and community levels. Policies also need to be reconsidered to support the care system to adapt as flexibly as possible to unexpected challenges. Over-regulation can be an obstacle to quick and efficient decisions. Recent measures have highlighted the importance of lower-level decision making, following the principle of subsidiarity, in addition to swift and decisive central measures. Besides this, however, sectoral governance must also communicate operational guidelines quickly and clearly.

Last but not least, we mention the importance of interdisciplinarity. The COVID-19 pandemic has made it obvious that a global pandemic is not just a health issue, since it affects all functions of society. Therefore, it remains essential that cooperation and communication between the various sectors be as effective as possible to carry out a complex analysis of the phenomenon and take appropriate action.

Due to the protracted nature of the COVID-19 pandemic, we also suggest the collection of longitudinal data on the well-being of the general population as well as specific target groups. Longer-term follow-ups of multidimensional well-being indicators can greatly contribute to the identification of protective factors and the planning of interventions.

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Author contributions

Attila PILINSZKI: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, writing review and editing.
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All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The study was reviewed and approved by the Medical Research Council's Scientific and Research Ethics Committee (IV/4005-2/2020/EKU).
All participants participated in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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RESEARCH ARTICLE

Relationships Between Gratitude and Mental Health Difficulties During the COVID-19 Pandemic in a Southern Region of the United States

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Introduction: The extensive disruptions of the COVID-19 pandemic have led to heightened concerns about mental health sequelae. There has been significant interest in identifying factors associated with psychosocial vulnerability or resilience.
Aims: This study examined associations of trait gratitude with mental health difficulties among community residents in a southern state of the US.
Methods: In this cross-sectional online investigation, 543 adults were assessed during an earlier phase of the pandemic, characterized by the reopening of facilities but mounting infection rates. Participants were evaluated using a validated measure of trait gratitude and clinically relevant screening assessments of depression, anxiety, and trauma symptoms.
Results: After adjusting for a range of pandemic-associated burdens and sociodemographic factors, multivariable analyses indicated that gratitude was significantly related to diminished levels of depression, anxiety, and trauma. These effects remained significant after additional adjustment for other psychosocial resources (religiousness and perceived support).
Conclusions: Findings provide novel information regarding relationships between gratitude and reduced mental health difficulties among community residents during a stressful period early in the pandemic. Results set the stage for longitudinal research. A disposition to identify and appreciate beneficial experiences might contribute to more favorable adaptation to communal crises, and warrants further investigation.

Keywords: COVID-19 pandemic, mental health, gratitude, depression, post-traumatic stress

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Introduction

The COVID-19 pandemic precipitated a public health crisis of enormous dimensions. The pandemic and ensuing government mitigation efforts have had sweeping effects on the healthcare system, the economy, and social institutions, and led to pervasive alterations in day-to-day life. In the context of these stressful disruptions, notable levels of mental health difficulties have been documented in studies conducted around the globe (e.g., Fisher et al., 2021; Prati & Mancini, 2021; Schafer et al., 2022; Xiong et al., 2020).

Given that individuals vary widely in their adjustment to major stressors, delineating factors that contribute to psychological risk or resilience to the pandemic has attracted considerable interest. Gratitude is a psychosocial resource that has garnered notable attention for its potential salutary effects on mental health in other contexts. Construed as a generalized orientation toward noticing and appreciating positive facets of experience, trait gratitude has been related to diminished distress or greater well-being among community residents assessed during normative circumstances (Disabato et al., 2017; Petrocchi & Couyoumdjian, 2016). Fewer investigations have examined gratitude among adults in the context of crisis or trauma. Nonetheless, some studies reported that trait gratitude was tied to more favorable adjustment in response to personal crises such as medical illnesses (e.g., Millstein et al., 2016; Sherman, Simonton-Atchley et al., 2020) or mixed types of traumatic events (Kim & Bae, 2019; Van Dusen et al., 2015). Even fewer studies have focused on effects of gratitude among adult community residents in the aftermath of socially shared or collective crises, such as natural disasters. Thus far, gratitude has been related to perceived positive changes after communal upheaval (e.g., Zhang et al., 2020), but evidence has been mixed regarding associations with mental health symptoms (e.g., post-traumatic stress) or other aspects of distress (Lies et al., 2014; Zhang et al., 2020).

More recently, there have been indications that some individuals have experienced increased levels of gratitude in response to the challenges of COVID-19 (Yarrington et al., 2021), and a few pioneering investigations have begun to explore its effects among community residents (Bernabe-Valero et al., 2021; Burke et al, 2020; Jiang, 2021; Mead et al., 2021; Miragall et al., 2021; Nelson-Coffey et al., 2021; Pellerin & Raufaste, 2020; Pérez-Rojo et al., 2021; Syropoulos & Markowitz, 2021; Tong & Oh, 2021). The results have varied depending on the types of outcomes assessed; very few of these studies focused specifically on mental health symptoms such as depression, post-traumatic stress, or anxiety. For example, a longitudinal online study in Spain found that increases over time in gratitude were correlated with favorable changes in life satisfaction, positive affect, and negative affect, but not with symptoms of depression, anxiety, or stress (Miragall et al., 2021). Similarly, in a cross-sectional online survey of US residents, various indices of trait gratitude were related to greater levels of positive affect and lower negative affect, but not to a measure of pandemic-related distress (Bernabe-Valero et al., 2021). Among Irish residents, gratitude was associated with greater well-being in some demographic subgroups, but not with indices of depression, anxiety, or stress (Burke et al., 2020). In contrast, another cross-sectional study (Nelson-Coffey et al., 2021) conducted in the US reported significant associations with lower distress and negative affect in addition to enhanced positive outcomes (e.g., thriving, positive affect). Other investigations assessed gratitude as a transient emotional state rather than a more enduring orientation or trait. In a Chinese study that evaluated daily diary ratings, individuals who experienced greater than usual levels of grateful feelings also reported more positive affect and less COVID-related stress on the same day, and less COVID-related stress the next day; there were no associations with negative affect (Jiang, 2021). In a cross-sectional study of Chinese residents in Singapore (Tong & Oh, 2021), grateful feelings were related to greater use of pandemic precautions, perceived benefits from the pandemic, and positive emotions (e.g., joy, pride), but were also associated with greater negative feelings (e.g., anxiety, anger) in bivariate analyses. In sum, there are initial indications that gratitude may be tied to more favorable adjustment among community residents during COVID-19, but thus far data have been limited, and findings regarding distress (as opposed to positive outcomes) have been surprisingly inconsistent. Very little information exists specifically regarding psychiatric symptoms that might hold more immediate relevance from a clinical and public health perspective. To move the field forward, there is a need for additional investigations, particularly those that examine clinically relevant indices of distress or mental health symptoms, and target residents in understudied geographical regions at specific phases of the pandemic. The current study was intended to help address this gap.

This investigation evaluated associations of trait gratitude with a number of clinically important mental health outcomes among community residents of a medically underserved southern state in the US during an early phase of the pandemic. We examined symptoms of depression, anxiety, and trauma, using well-established screening measures. Little information is available regarding adaptation to the stressful disruptions of the pandemic in the country's rural southern regions, though research in rural areas has been identified as a priority (Holmes et al., 2020). Public health outcomes in these regions have been a longstanding concern; relative to other U.S. states, Arkansas ranks poorly across multiple indicators including rates of cardiovascular disease, chronic obstructive pul-

monary disease, and smoking (United Health Foundation, 2021), all of which have implications for vulnerability to COVID-19. We examined responses at an earlier phase of COVID-19, when the state was reopening but infection rates were growing rapidly (Centers for Disease Control and Prevention, n.d.). This period, associated with marked uncertainty, mixed public health messages, and heightened risks for infection, provided a particularly good opportunity to evaluate psychological resources such as gratitude that might contribute to resilience.

We hypothesized that greater levels of trait gratitude would be related to diminished distress on each of the three outcomes (i.e., lower depressive, anxiety-, and trauma-related difficulties), after adjusting for the effects of a range of pandemic-associated burdens and demographic characteristics. This approach was construed as a conservative test of study hypotheses. To further evaluate incremental validity, we also examined these relationships after additionally adjusting for other relevant psychological resource variables (i.e., religiousness, social support). The study was intended to help clarify whether the burden of mental health symptoms was diminished among community residents with a proclivity to appreciate benefits in life, during the early phase of a major public health crisis. Exploratory analyses also assessed whether the salutary effects of gratitude might be more evident among individuals struggling with the greatest disruption in daily life due to the pandemic.

Methods

Participants and Data Collection

These data stem from a larger online project concerning responses to COVID-19 among Arkansas residents. Other reports summarize pandemic-related burdens and associations with religiousness (Sherman, Williams et al., 2020; Sherman et al., 2021), whereas this investigation focused on relationships between gratitude and mental health indices. This was a cross-sectional, registry-based study involving an online survey, administered during a 4½-week interval (May 22-June 24, 2020). This period captured a critical interval (phase 1 and early phase 2) during which businesses were reopened within the state (including partially resuming dine-in services in restaurants as well as reopening hair salons, fitness centers, and sports venues with audiences < 50), but at the same time, COVID-19 case rates were mounting steeply (Centers for Disease Control and Prevention, n.d.). We emailed a study invitation to participants in the Translational Research Center's ARresearch registry at The University of Arkansas for Medical Sciences (UAMS). The registry lists individuals interested in research engagement, and who vary broadly in rural vs. urban, economic, and ethnic/racial characteristics. Participation was voluntary and no compensation was provided. Eligibility criteria required participants to be at least 18 years old, reside within Arkansas, and be listed in the registry as a healthy community resident (and not classified under a particular illness). We used REDCap, a secure web application for online research (Harris et al., 2009), to administer the survey. Potential respondents were informed about the investigation via an information form, and the protocol received exempt status by the UAM*S* Institutional Review Board.

Measures

Gratitude Questionnaire-6

Trait gratitude was evaluated using the Gratitude Questionnaire-6 (GQ-6; McCullough et al., 2002). This 6-item instrument assesses a generalized tendency to appreciate benevolent experiences in daily life (e.g., "If I had to list everything I felt grateful for it would be a very long list"). Items are rated on a 7-point scale (1 = "strongly disagree," 7 = "strongly agree"). The scale is one of the most commonly employed measures of gratitude, and studies in adult and student samples have supported the internal consistency and construct validity of the instrument (McCullough et al., 2002). In the current sample, Cronbach's alpha was .78.

Patient Health Questionnaire-9

Depressive symptoms were measured using the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). Respondents rate items on a 4-point scale based on frequency (0 = "not at all," 3 = "nearly every day"). This 9-item questionnaire is a widely-used screening instrument, and multiple investigations have supported its internal consistency and construct validity (Kroenke et al., 2001). Cronbach's alpha was .91 in the present sample.

Generalized Anxiety Disorder Questionnaire

Anxiety symptoms were evaluated using the Generalized Anxiety Disorder questionnaire (GAD-7; Spitzer et al., 2006). Individuals respond on a 4-point scale based on frequency (0 = "not at all," 3 = "nearly every day"). Evidence for the reliability and criterion-related validity of this 7-item screening instrument has been reported in studies of primary care patients and the general population (Spitzer et al., 2006). Cronbach's alpha was .93 in the current sample.

PTSD Checklist for DSM-5

The 20-item PTSD Checklist (PCL-5; Blevins et al., 2015) measured trauma symptoms. Items are rated on a 5-point scale (0 = "not at all," 4 = "extremely"), and were keyed to the pandemic. The instrument has demonstrated good internal consistency and convergent validity in diverse samples (Blevins et al., 2015). Cronbach's alpha was .92.

Background Demographic, Resource, and Pandemic-related Variables

Respondents provided information concerning demographic characteristics (e.g., age, education, etc.). *Perceived social support* was assessed using the 5-item version of the ENRICHD social support instrument (ESSI; Mitchell et al., 2003), which evaluates the availability of emotional support (e.g., "Can you count on anyone to provide you with emotional support?"). Items are rated on a 5-point scale (1 = "none of the time" to 5 = "all of the time"). The measure has demonstrated good internal consistency and construct validity regarding medical patients (Mitchell et al., 2003). In the current sample, Cronbach's alpha was .94. We evaluated *general religiousness* with a single item concerning religious commitment ("To what extent do you consider yourself a religious person?"). Participants responded on a 4-point scale (0 = "not at all," 3 = "a great deal"). This commonly used measure derives from the Fetzer Institute/National Institute on Aging Working Group (1999).

A range of pandemic-related burdens was evaluated. We inquired about COVID-19 testing with an item adapted from the University of Southern California (n.d.) Understanding America Study (UAS) Coronavirus Tracking Survey, and about perceived coronavirus exposure using an item derived from the Australian Treatment Outcome Study 18–20 Year Follow-up survey (Marel et al., n.d.). We measured food insecurity (e.g., "Go without eating for a whole day because of lack of money") using three items, and financial insecurity (e.g., missed or delayed payment of utility bills) using two questions adapted from the UAS; responses were coded for analysis as 0 = no or not sure, 1 = yes. Disregard of social distancing provisions (e.g., "Attended a gathering with more than 10 people") was measured with nine items adapted from the UAS; responses were coded for analysis as 0 = no or not sure, 1 = yes, and totaled to provide a summary score.

Disruptions in day-to-day routines and responsibilities due to COVID-19 were assessed using seven items created by the investigators (e.g., "trouble caring for people who depend on you day-to-day," "trouble staying connected with people who are important to you"); these items were rated on a 4-point scale and summed (Cronbach's alpha =.73). Additional items asked about the death or illness of loved ones as a result of the pandemic (coded as 0 = no, 1 = death or illness), effects on access to routine healthcare (coded for the analysis as 0 = no or not sure, 1 = yes), effects on work/income (coded 0 = no change, 1 = loss of job, business, or income), and extent of sheltering in one's residence (coded 0 = leaving at least several times per week, 1 = shelter at home, supplies are delivered and almost never leave residence).

Statistical Analysis

In preliminary bivariate analyses, relationships between mental health outcomes and background demographic- or pandemic-related factors were examined using independent sample t-tests for categorical variables and Pearson correlations for continuous variables. Variables that were significantly related to mental health indices were included as covariates in the primary multivariate analyses. In response to non-normal distributions, log transformations were used for disruption in daily life and the outcome measures (skewness for the transformed variables =.37 for disruption, .72 for depressive symptoms, .71 for anxiety symptoms, .95 for trauma symptoms). The remaining data revealed no substantive problems with normality or multicollinearity.

Multiple regression models were used in the main analyses to examine hypothesized associations between gratitude and each of the three mental health outcomes (i.e., depressive, anxiety, and trauma-related symptoms), after adjusting for significant pandemic-associated and sociodemographic characteristics. Although the mental health variables were highly correlated (*r*'s =.72 to .80), as would be anticipated, we retained them as separate

outcomes in the regression models to ensure ecological validity because they are conceptually distinct from each other and prompt different screening and treatment strategies in real-world clinical settings. *P*s < .017 were considered statistically significant, to adjust for multiple comparisons (i.e., three outcome variables divided by .05). (The investigation was sufficiently powered (> .98) to support multiple regression analyses with one predictor and as many as 10 covariates accounting for as little as 10% of the variance, at the adjusted *p* of .017, conservatively assuming a sample of 500 participants.)

In ancillary analyses, we evaluated the incremental validity of gratitude (i.e., beyond the effects of other commonly studied resource variables) in predicting each mental health outcome by additionally controlling for general religiousness and perceived social support. Finally, though not a primary focus of the current paper, we conducted exploratory analyses to examine whether the effects of gratitude on mental health were moderated by the severity of pandemic-related burdens (i.e., buffering effects). In each regression model, we tested statistical interactions between gratitude and the level of disruption in daily life, after centering these variables. The results of ancillary analyses were viewed as preliminary.

Results

Sample Characteristics

The current sample included 543 (32.5%) community residents who enrolled in the study and completed the gratitude measure, out of 1,672 individuals who received emailed notifications regarding the survey. Individuals who completed the study were more likely to be white ($p = .001$) and older ($p = .001$) compared with those who did not. As with most online surveys, no information is available regarding reasons for refusal. We excluded from the analysis an additional 47 respondents who were missing the gratitude questionnaire (which was located later in the packet); these respondents did not differ significantly ($p \geq .096$) from those included in the analysis on any sociodemographic or pandemic-related variables. There was a single outlier on the gratitude measure, and this individual too was excluded. Missing data were not imputed in view of the limited number of missing values.

Demographic and pandemic-related characteristics are summarized in Table 1. The mean age of respondents was 51.45 (14.90) years, 83.64% were white, and 76.80% were female. The jarring effects of the pandemic were vividly illustrated by the participants' responses, as reported more fully elsewhere (Sherman, Williams et al., 2020). Loss of employment or income due to COVID-19 was reported by 21.73% of the participants. Food insecurity was an immediate concern for 13.81%, and 39.78% experienced diminished access to routine healthcare. A number of individuals (17.38%) remained rigorously sheltering at home, relying on delivery of supplies. The vast majority of participants (89.50%) experienced at least some degree of disruption in their usual day-to-day activities and responsibilities as a consequence of the COVID-19. With respect to mental health indices, 20.25% of the participants exceeded established cut-off values for clinically elevated depressive symptoms (≥ 10; Kroenke et al., 2001), 16.02% exceeded cut-off values for elevated anxiety symptoms (≥ 10; Spitzer et al., 2006), and 5.39% exceeded thresholds for trauma-related difficulties (≥ 33; Blevins et al. 2015).

Preliminary Analyses

Initial bivariate analyses using independent sample t-tests indicated that there were significant group differences on all three mental health indices (i.e., depressive, anxiety, and trauma-related difficulties) related to several sociodemographic and pandemic-associated factors. On all three outcomes, greater difficulties were reported by participants of a younger age (all *p*'s < .001), female gender (all *p*'s < .001), lower family income (all *p*'s ≤ .002), previous mental health problems (all *p*'s < .001), loss of work or income due to the pandemic (all *p*'s ≤ .012), greater financial insecurity (all *p*'s < .001), greater food insecurity (all *p*'s < .001), diminished access to healthcare (all *p*'s < .001), and more restrictive sheltering in residence (all *p*'s ≤ .002; see Tables 2 and 3). In Pearson correlation analyses, all three mental health problems were related (all *p*'s < .001) to more marked disruption in day-to-day routines and responsibilities as a result of COVID-19. Additionally, increased depression scores were correlated ($p = .003$) with less education. We included these variables as covariates in the primary multivariable analyses. Mental health indices were not associated (all *p*'s ≥ .03) with ethnicity, perceived coronavirus exposure, social distancing practices, or death or illness of loved ones as a result of the pandemic.

Bivariate analyses using Pearson correlations indicated that gratitude was significantly correlated with each mental health variable, as expected ($r = -.25$ to $-.33$), with roughly medium effect sizes.

Table 1. Sample Characteristics

Characteristic	*N* (%)	Mean *(SD)*
age		51.44 (14.89)
education (years)		15.93 (2.05)
disruption in day-to-day routines (log)		1.16 (0.10)
disregard of social distancing (possible range 0-9)		3.96 (1.67)
gratitude (possible range 6-47)		37.88 (4.51)
PHQ-9 depression (possible range 0-27)		5.22 (5.56)
GAD-7 anxiety (possible range 0-21)		4.92 (5.13)
PCL-5 trauma (possible range 0-80)		8.90 (10.84)
gender		
male	126 (23.20)	
female	417 (76.80)	
race/ethnicity		
majority	454 (83.61)	
non-majority	89 (16.39)	
family income (n =540)		
$0-59,999	177 (32.84)	
≥$60,000	362 (67.16)	
coronavirus testing		
untested	497 (91.53)	
awaiting results	7 (1.29)	
tested negative	36 (6.63)	
tested positive	3 (.55)	
perceived coronavirus exposure	44 (8.12)	
diminished access to routine healthcare	216 (39.78)	
loss of job or income	118 (21.73)	
financial insecurity	60 (11.05)	
food insecurity	75 (13.81)	
death or illness of a loved one	33 (6.08)	
restrictive sheltering in one's residence	94 (17.38)	

Table 2. Correlations of Demographic and Pandemic-Associated Variables with Mental Health Difficulties

	depressive symptoms (log)		anxiety symptoms (log)		trauma symptoms (log)	
Characteristic	Pearson correlation	*p*-value	Pearson correlation	*p*-value	Pearson correlation	*p*-value
age (years)	–.24	.0001*	–.31	.0001*	–.20	.0001*
education (years)	–.13	.003*	–.09	.04	–.05	.23
disruptions in day-to-day						
routines (log)	.34	.0001*	.38	.0001*	.41	.0001*
disregard of social distancing	–.05	.21	–.02	.67	–.08	.06
gratitude	–.33	.0001*	–.25	.0001*	–.26	.0001*

Note: *$p < .0167$, the adjusted critical *p*-value

Table 3. Mental Health Scores Based on Differences in Pandemic and Sociodemographic Variables

	depressive symptoms (log)			anxiety symptoms (log)			trauma symptoms (log)		
Characteristic	*M (SD)*	*t*	*p*-value	*M (SD)*	*t*	*p*-value	*M (SD)*	*t*	*p*-value
gender		−3.36	.0009*		−5.52	.0001*		−4.27	.0001*
male	1.12 (.12)			1.10 (.11)			1.17 (.16)		
female	1.17 (.15)			1.17 (.14)			1.24 (.21)		
ethnicity		2.18	.03		1.54	.12		1.78	.08
majority	1.15 (.14)			1.15 (.13)			1.22 (.19)		
non-majority	1.19 (.15)			1.17 (.14)			1.26 (.23)		
family income		4.99	.0001*		3.78	.0002*		3.07	.002*
$0-59,999	1.20 (.16)			1.18 (.14)			1.26 (.21)		
≥$60,000	1.14 (.13)			1.14 (.13)			1.21 (.19)		
perceived coronavirus exposure		−1.29	20		−1.83	.07		−1.47	.14
no	1.16 (.14)			1.15 (.13)			1.22 (.20)		
yes	1.18 (.16)			1.19 (.14)			1.27 (.22)		
diminished healthcare access		−3.59	.0004*		−3.46	.0006*		−3.67	.0003*
no	1.14 (.13)			1.14 (.13)			1.20 (.19)		
yes	1.18 (.15)			1.18 (.14)			1.26 (.21)		
loss of job or income		−2.81	.006*		−2.54	.012*		−2.77	.006*
no	1.15 (.14)			1.14 (.13)			1.21 (.19)		
yes	1.19 (.16)			1.18 (.14)			1.27 (.23)		
financial insecurity		−5.11	.0001*		−5.01	.0001*		−3.72	.0004*
no	1.15 (.13)			1.14 (.13)			1.21 (.19)		
yes	1.26 (.16)			1.23 (.15)			1.32 (.22)		
food insecurity		−5.66	.0001*		−6.42	.0001*		−5.60	.0001*
no	1.14 (.13)			1.14 (.13)			1.20 (.19)		
yes	1.25 (.16)			1.24 (.14)			1.35 (.21)		
death or illness of loved one		−1.49	.14		−1.66	.10		−1.67	.07
no	1.16 (.14)			1.15 (.13)			1.22 (.20)		
yes	1.19 (.16)			1.19 (.13)			1.28 (.21)		
sheltering in one's residence		3.13	.002*		2.98	.003*		3.12	.002*
restrictive	1.20 (.16)			1.19 (.14)			1.29 (.24)		
relaxed or none	1.15 (.14)			1.14 (.13)			1.21 (.19)		

Note: p-values from independent sample t-tests; *$p < .0167$, the adjusted critical *p*-value

Associations between Gratitude and Mental Health Outcomes

The primary multivariate analyses, which controlled for significant pandemic-associated and sociodemographic variables, indicated that increased gratitude was associated with reduced difficulties on all three mental health indices, as hypothesized (see Table 4). Higher *depression scores* were associated with lower trait gratitude, $\beta = -.25$, $p < .001$, $f^2 = .09$ (95% CI: .04 – .14), as well as younger age, $\beta = -.12$, $p = .001$, prior mental health diagnoses, $\beta = .28$, $p = .001$, and more extensive disruption in day-to-day routines and responsibilities as a result of COVID-19, $\beta = .24$, $p = .001$. Higher *anxiety scores* were related to less gratitude, $\beta = -.17$, $p < .001$, $f^2 = .04$ (95% CI: .01 –.08), in conjunction with younger age, $\beta = -.19$, $p < .001$, male gender, $\beta = .13$, $p < .001$, previous mental health

Table 4. Multiple Regression Models Predicting Mental Health Difficulties From Gratitude

predictors	*B*	*SE*	β	*F*	Adjusted R^2	*p*
depressive symptoms (log)				27.46	.37	<.0001
age	–.001	.000	–.118*			
education	–.003	.003	–.038			
gender	.018	.012	.054			
family income	–.026	.011	–.085			
previous mental health problems	.080	.010	.282*			
disruption in daily routines (log)	.338	.053	.242*			
diminished healthcare access	.003	.011	.009			
loss of job or income	.004	.012	.011			
financial insecurity	.027	.017	.061			
food insecurity	.020	.016	.049			
sheltering in one's residence	–.029	.013	–.078			
gratitude	-.008	.001	–.246*			
anxiety symptoms (log)				27.86	.36	<.0001
age	–.002	.000	–.193*			
gender	.041	.011	.130*			
family income	–.015	.010	–.051			
previous mental health problems	.068	.010	.255*			
disruption in daily routines (log)	.357	.051	.271*			
diminished healthcare access	.000	.010	–.000			
loss of job or income	–.002	.012	–.005			
financial insecurity	.009	.016	.022			
food insecurity	.031	.015	.080			
sheltering in one's residence	–.017	.013	–.048			
gratitude	–.005	.001	–.169*			
trauma-related symptoms(log)				22.93	.31	.0001
age	–.001	.001	–.078			
gender	.045	.017	.096*			
family income	–.011	.016	–.026			
previous mental health problems	.078	.010	.194*			
disruption in daily routines (log)	.654	.078	.333*			
diminished healthcare access	.000	.016	.000			
loss of job or income	.016	.018	.032			
financial insecurity	.003	.026	.005			
food insecurity	.046	.024	.079			
sheltering in one's residence	–.047	.020	–.088			
gratitude	–.009	.002	–.203*			

Note: p-values from independent sample t-tests; *p < .0167, the adjusted critical p-value

diagnoses, β = .26, p < .001, and more marked interruption in day-to-day routines, β = .27, p < .001. Similarly, higher *trauma-related scores* were associated with less gratitude, β = –.20, p <.001, f^2 =.05 (95% CI: .02 – .09), in addition to male gender, β = .10, p = .0096, previous mental health diagnoses, β = .19, p < .001, and more pronounced interruption in day-to-day activities, β = .33, p < .001. Effect sizes for gratitude were small-to-medium in these analyses. In sensitivity analyses, the multiple regression models were repeated using a composite index of mental health symptoms instead of the three separate measures, and results were not altered (β = –.22, p < .001).

Exploratory Analyses

Ancillary analyses examined the incremental validity of gratitude by additionally controlling for the effects of two other well-recognized personal resource variables: perceived social support and general religiousness, as well as pandemic-related and demographic factors. Gratitude remained a significant predictor in each model: $\beta = -.18$, $p < .001$ for depression difficulties, $\beta = -.11$, $p = .007$ for anxiety symptoms, and $\beta = -.15$, $p < .001$ for trauma problems. Finally, exploratory analyses tested whether the effects of gratitude on mental health outcomes might be moderated by the extent of pandemic-associated disruption in day-to-day routines. In each regression model, the interaction effects were non-significant: $b = -.02$, $p > .48$ for depression scores; $b = -04$, $p > .27$ for anxiety; $b = -.02$, $p > .31$ for trauma scores.

Discussion

This investigation sought to explore the role of gratitude among community residents confronting the myriad challenges of the COVID-19 pandemic. We evaluated gratitude during an especially unsettling period, when businesses were reopening but case rates were climbing. We focused on its relationship with pragmatic, clinically meaningful measures of distress, as assessed by widely-used screening instruments. Thus far, little is known about associations of trait gratitude with mental health symptoms among adult community residents during COVID-19 (Burke et al., 2020; Miragall et al., 2021) or during other situations of collective upheaval (Lies et al., 2014; Zhang et al., 2020), and available findings have been mixed. Information regarding mental health symptoms, as opposed to broader aspects of adjustment (e.g., negative affect, well-being), has more direct practical implications in view of its importance to clinicians and policy makers. Furthermore, little work has focused on medically underserved southern rural regions of the U.S., where medical and mental health burdens are high and access to primary care remains limited relative to other areas of the country (United Health Foundation, 2021). Consistent with theoretical frameworks (e.g., McCullough et al., 2002; Wood et al., 2010), in the current study gratitude was related to lower levels of mental health difficulties on each of the three indices we examined: symptoms of depression, anxiety, and trauma. These relationships remained significant after accounting for a broad array of pandemic-related burdens and demographic characteristics. Moreover, these associations could not be accounted for by two other conceptually important resource variables – perceived social support and general religiousness – supporting theoretical postulates regarding the unique effects of gratitude (McCullough et al., 2002). Findings were cross-sectional and do not allow for causal interpretations, but they seem consistent with expectations that the capacity to recognize and appreciate good things in life might perhaps have adaptive value in response to communal crises.

In the current study, trait gratitude was related to diminished mental health symptoms regardless of the level of disruption in daily life that individuals experienced as a result of the pandemic. We found no indications of moderator effects, suggesting that gratitude might serve as a general resource even for those who experience fewer stressful changes in daily routines and responsibilities. Future research may offer opportunities to further examine gratitude's potential buffering effects in the midst of a public health crisis (e.g., possible interactions with viral infection, perceived threat, job loss).

Several cognitive, emotional, and social processes exist through which gratitude might, theoretically, contribute to diminished mental health difficulties in response to communal crises. Some writers (e.g., Wood et al., 2008) have posited that gratitude may help ameliorate a "depressogenic" cognitive style, which encompasses reflexively negative interpretations about the self, the world, and the future, and instead may support a more balanced or dialectical accommodation of life's inevitable limitations (Jans-Beken, 2021). Moreover, some investigations have noted that gratitude was associated with diminished self-criticism and greater self-assurance (Petrocchi & Couyoumdjian, 2016), enhanced coping via proactive strategies and cognitive reframing (Lambert et al., 2012), and increased investment in meaningful goals (Otto et al., 2016), each of which might foster better adjustment. Consistent with the broaden-and-build model (Fredrickson, 2004), positive emotions such as gratitude may also help extend the focus of attention beyond an exclusive preoccupation with worry and loss, and widen an individual's typical cognitive and behavioral repertoires to promote more adaptive, flexible, and creative responses. Additionally, gratitude has been associated with higher levels of social support (Feng & Yin, 2021; Sherman et al. 2020; Wood et al., 2008). Notably, in the current investigation, the effects of gratitude could not be accounted for by perceived emotional support. Nonetheless, other relational processes (e.g., increased instrumental support, diminished social constraints, greater responsiveness), as well as cognitive, emotional, and coping factors, represent

viable pathways through which gratitude might reduce mental health symptoms in the context of public health crises, and further research would shed light on these possibilities.

Several other areas would be helpful to pursue in future investigations. The current study employed a widely used self-report measure of gratitude to ensure comparability with other studies, but it would be useful to supplement this approach with data derived concurrently from daily experience sampling (Jiang, 2021) or qualitative interviews. Along similar lines, it would be fruitful to extend the inquiry from generalized or dispositional gratitude to also include situationally specific aspects of appreciation (i.e., particular facets of the pandemic experience for which one is thankful; Burke et al., 2020; Nyugen & Gordon, 2022), and to evaluate behavioral expressions (i.e., what one does to convey gratitude) rather than only cognitive and affective responses (Bernabe-Valero et al., 2021; O'Connell et al., 2017). The current investigation focused on associations of gratitude with clinically salient mental health symptoms, which have received limited attention; further research is needed regarding other pertinent outcomes, including both negative endpoints (e.g., reduced vaccine uptake) and positive ones (e.g., prosocial behaviors, perceived benefits) – work in these areas is beginning (e.g., Nelson-Coffey et al., 2021; Syropoulos & Markowitz, 2021; Tong & Oh, 2021). Of course, distressing or tragic events may sometimes lead to increased levels of gratitude, as individuals are left "sadder but wiser" – both shaken and appreciative. Prospective designs (involving pre-event data collection), though challenging to implement, would be especially helpful in future disaster research, to trace the potential co-occurrence and dynamic interplay of these experiences over time (Jans-Beken, 2021). Finally, it would be helpful to further examine the effects of gratitude interventions, within the wider tapestry of support services available to assist individuals in coping with the demands of the pandemic. In the broader literature, meta-analyses generally have not found strong evidence for the efficacy of various gratitude interventions in improving well-being (e.g., Cregg & Cheavens, 2021; Davis et al., 2016), but little is known about potential benefits within the context of a major public health disaster. A few preliminary studies have begun to evaluate gratitude interventions in response to the pandemic (e.g., Fekete & Deichert, 2022; Oliveira et al., 2021; Ko et al., 2021; Wasil et al., 2021). As these interesting initiatives are further developed, an element of caution may be appropriate to ensure that the burdens of COVID-19 experienced by participants are not compounded by a perceived burden to feel grateful as well.

Strengths and Limitations

This study sought to address important gaps in the literature by focusing on associations of gratitude with clinically relevant endpoints assessed using well-validated measures, in a rural region of the country that has been understudied. Analyses controlled for a broad array of pandemic-related and demographic factors. Notable limitations of the investigation include the cross-sectional design, which offers no information about temporal or causal relationships. There is a need for longitudinal research to evaluate these relationships over the complex trajectory of the pandemic. The hypotheses tested in this study were pre-planned but represented a secondary analysis as part of a larger project (which focused on associations of adjustment with pandemic-related factors and religious/meaning resources), so findings should be interpreted with caution. Self-report screening measures do not offer diagnoses, for which structured interviews are needed. The survey response rate was modest, though fairly typical of online community surveys (Sinclair et al., 2012), and the sample was not representative of the state population, notwithstanding the diverse background of participants. Further research would be helpful among individuals with more limited education, and those from racial/ethnic minority groups that are at heightened risk from COVID-19.

Conclusion, Implications and Future Directions

A disposition to identify and appreciate benefits in life was related to lower levels of mental health difficulties among community residents in a medically underserved, rural southern area of the US, confronted by the multiple demands of the COVID-19 pandemic. The results offer novel information about relationships between gratitude and mental health functioning during a major public health crisis, and set the stage for longitudinal studies. Gratitude might be a valuable resource during periods of collective upheaval, assisting individuals to weather disruptive changes. Helpful directions for future research might include efforts to further explore situational as opposed to dispositional aspects of gratitude in response to community crises, to better differentiate effects of behavioral expression vs. affective and reflective dimensions, and to further probe some of the multiple pathways potentially linking gratitude to enhanced adaptation.

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Ethical statement
This manuscript is the authors' original work.
The study was reviewed and approved by the University of Arkansas for Medical Sciences Institutional Review Board with a waiver of written documentation of consent. An information form was used to inform potential participants about study procedures and confidentiality.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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SECTION C:
PATIENTS WITH MENTAL HEALTH PROBLEMS

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REVIEW ARTICLE

The COVID-19 Pandemic and the Obsessive-Compulsive Phenomena, in the General Population and among OCD Patients: A Systematic Review

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Introduction: An increase in obsessive-compulsive disorder (OCD) was predicted as a consequence of the COVID-19 pandemic and the measures established for controlling it.
Aims: This review seeks to analyze the relationship between the COVID-19 pandemic and obsessive-compulsive disorder (OCD), and in particular the pandemic's effect on the prevalence of obsessive-compulsive (OC) symptoms, predisposing factors, interventions carried out, their effectiveness and the proposal of interventions in future situations similar to the one studied.
Methods: For this purpose, a systematic review of empirical articles, published from November 2019 to June 2022, is carried out, following the PRISMA methodology. The review was registered in Open Science Forum [10.17605/OSF.IO/DV8GZ].
Results: The studies indicated an increase in the prevalence of OC symptoms in the general population, as well as new obsessions, relapses, and/or worsening of the pre-existing symptoms in patients with OCD mainly related to contamination obsessions and cleaning and hand washing compulsions. Predisposing factors are being younger, low resilience, low social support, the presence of previous contamination symptoms, overexposure to news about COVID-19, the previous severity and aggressiveness of OC symptomatology, and the absence or lack of treatment adherence. The combined use of pharmacological treatment, cognitive-behavioral therapies, teaching skills to reinforce resilience, and training in coping strategies will be recommended.
Conclusions: The data obtained can be used as a basis for future OCD prevention plans in crises similar to the one studied.

Keywords: COVID-19, coronavirus, pandemic, obsessive-compulsive disorders, mental health

Introduction

After the COVID-19 state of pandemic declaration in March 2019, an increase in the prevalence of Obsessive Compulsive Disorder (OCD) was predicted (Capuzzi et al., 2020), similar to what happened during and after the epidemics of Severe Acute Respiratory Syndrome (SARS-COV-1) or Middle East Respiratory Syndrome (MERS) (Banerjee, 2020; Chakraborty and Karmakar, 2020; Cudris-Torres et al., 2020).

For some researchers, the increase would not be related to a specific and objective cause such as the appearance of a new virus (Aardema, 2020; Cudris-Torres et al., 2020), but rather to the lack of mental health care during

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epidemic outbreaks (Banerjee, 2020), and with the nature of people suffering OCD, characterized by repeated efforts to avoid dangers by adopting compulsive behaviors (Cai et al., 2020; Fineberg et al., 2020) and their inflexibility to unlearn them at the moment when they become obsolete (Cai et al., 2020). Thus, mobility limitations would prevent patients from continuing with psychological treatments (Fineberg et al., 2020), and the advice of health authorities to perform frequent and ritualized cleaning/hand washing would originate a compulsion that can become disabling (Banerjee, 2020). Other researchers consider that the pandemic will not necessarily negatively affect subjects with OCD, since mobility limitations, and the fact that everyone in their environment takes hygiene measures, can make them feel safer (Cudris-Torres et al., 2020; Littman et al., 2020), reducing their anxiety levels and, consequently, not affecting or even reducing the severity of their symptoms. Under this hypothesis, the expected increase in psychiatric consultations could be due to a subjective assessment linked to the reduction in other types of consultations. In all cases, the researchers postulate an increase in cases or a worsening of those already diagnosed. In order to confirm or discard this postulate, it is proposed to carry out, about three years after the start of the COVID-19 pandemic, a systematic review aimed at updating the existing data on the subject.

There have already been some recent reviews of the effects of COVID-19 on OCD (e.g., Cunning & Hodes, 2022; Grant et al., 2021; Guzick et al., 2021; Liu et al., 2021; Zaccari et al., 2021), but their scope was much more limited than in our current study because they include a small number of studies, look at shorter time ranges, only include articles published in the English language, which adopt a different approach. The present study aims to provide data on a larger scale, for which purpose, it analyzes articles in several languages, in the general and clinical population, published in the last three years, with special emphasis on prevalence, risk factors, interventions carried out, and proposals to increase their effectiveness, thus amplifying key questions that can help inform health policy makers, also helping to improve clinical decision-making.

Methods

Design and Procedure

To select the articles, the PRISMA methodology was followed (Liberati et al., 2009). To collect the information, a review protocol was created and the TIDieR template utilized (Hoffmann et al., 2016). The review was registered in Open Science Forum [10.17605/OSF.IO/DV8GZ]. This protocol was applied simultaneously by two independent researchers. The discordant information was discussed and consolidated, resolving the disagreements through discussion and consensus.

For the research, a systematic search was carried out of articles published from November 2019 to June 2022, in the Scopus, PsycInfo, PsycArticles and Google Scholar databases, using the MeSH search terms: "COVID-19" OR "Coronavirus" AND "Obsessive Compulsive Disorder" OR "Obsessive Compulsive". Other more specific terms (for example: "washing compulsion", "treatment", "diagnosis, etc.) were added to the search, but did not lead to new results. The search was carried out in English and Spanish, but articles in French, Italian and Portuguese were not ruled out.

Since no standardized method exists to measure psychological factors, and because of the great variability found between studies (type of sample, the pandemic phase, measurement instruments, etc.), the protocol did not include meta-analysis, instead focusing on a more narrative than quantitative systematic review.

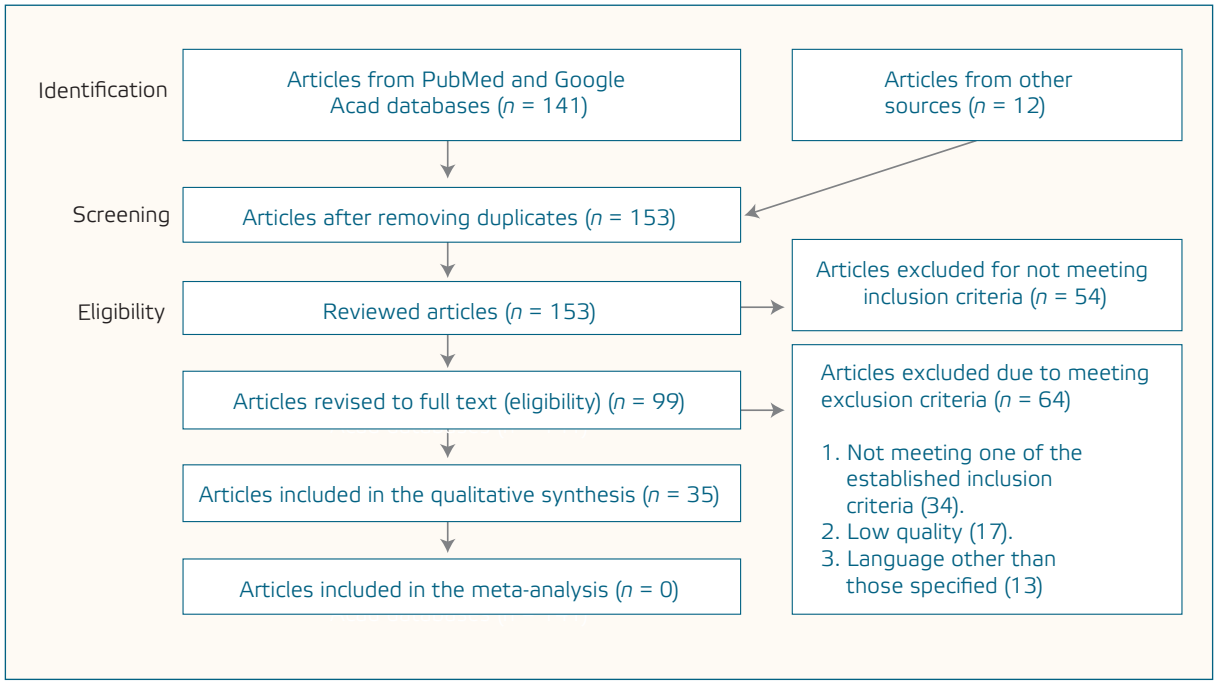
Eligibility Criteria

To be eligible, articles had to be original prospective investigations of an empirical nature, analyzing OCD or OC symptoms, published in the proposed range of data. Publications were excluded if they did not meet any one of the following established inclusion criteria: low methodological quality (inadequate description of the sample, study date, methodology or results); or written in a language other than English, Spanish, French, Italian or Portuguese.

Risk of Bias and Coding Reliability

The methodological quality of the studies was assessed using the Cochrane Risk of Bias tool RoB2 (Higgins et al., 2019). In any case, the risk of bias proved significant in all the studies analyzed, so only articles with a high risk of bias were discarded.

Figure 1. Search and Selection of Studies



The coding of the articles was carried out by the two researchers independently, at two different times, and following the adjustment recommendations indicated in Cochrane's Risk of Bias (Higgins et al., 2019). Its agreement was made by determining the true *kappa* statistic (¯κ ≥ 0,80). Following the technique of categorical content analysis, and applying the statistical solution of Fariña et al. (2002), the coding was evaluated with the true kappa in terms of inter-coder and intra-coder agreement (¯κ). For this, it was recorded as 1-agreement if there was an agreement between coders and at all times; 1-disagreement if there was a lack of agreement in any of the records; and 2-disagreements if the records between coders and times were different. In this study, a ¯κ> 0.857 was obtained, which allows us to conclude that the encoding is reliable and that another encoder trained in the encoding technique would have created a similar database.

Results

Following the PRISMA methodology (see selection flow and discard reasons in Figure 1), 35 articles were selected. Of these, 11 studies are in the general population (27,579 subjects), and 24 in samples with OCD (1,789 subjects with OCD, and 1,388 with psychiatric illnesses including OCD).

The information obtained from the selected articles can be seen in Table 1 and Table 2.

The studies found are few and very heterogeneous, considering both the demographic characteristics of the sample used, and the methodology, and design of the studies. Sample size ranges from very large samples (e.g., Abba-Aji, et al., 2020) to smaller samples (e.g., Mazza et al., 2020), or even single case studies (e.g., French & Lyne, 2020) whose results should be taken with caution. The age of the sample ranges from the adult population (e.g., Cudris-Torres et al., 2020; Littman et al., 2020) to the young population (e.g., Nissen et al., 2020), including populations without symptoms or with mild symptoms and without treatment (e.g., Abba-Aji et al., 2020; Fernández et al., 2020) as well as people with previously diagnosed OCD (e.g., Benatti et al., 2020; Jelinek et al., 2021; Hezel et al., 2022) of a different nature. The studies in turn will have been carried out at different phases of the pandemic: at the beginning (e.g., Abba-Aji et al., 2020; AlHusseini et al, 2021; Jelinek et al., 2021) or after the first wave, when few cases were recorded (Ji et al., 2020). Only Hezel et al. (2022) provides data obtained in a study with a longitudinal design, although the sample analysed is relatively small, observing a clear effect of the pandemic's severity on patients' perception of OCD symptoms. Furthermore, some of the studies apply quantitative methodologies (e.g., Capuzzi et al., 2020), while others apply qualitative methodologies (e.g., French & Lyne, 2020). Therefore, it was not considered appropriate to apply meta-analysis to the results.

Table 1. COVID-19 Pandemic and OC Symptoms in the General Population not OCD Diagnosed

References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors
Abba-Aji, et al. (2020)	General population (*n* = 6041)	Canada	Female gender: 86.5% Age range: 11 to 88 years old.	Cross-sectional online survey in the early phases of the pandemic.	Brief Obsessive-Compulsive Scale (BOCS), Perceived Stress Scale (PSS), Generalized Anxiety Disorder scale (GAD-7), Major Depressive Disorder (MDD), Patient Health Questionnaire (PHQ-9)	60.3% reported the appearance of OCD symptoms, and 53.8% hand washing compulsions. Compulsive hand washing was positively correlated with stress and anxiety, but not with major depression.	Have pre-pandemic OC symptoms.
AlHusseini et al. (2021)	General population	Saudi Arabia	Female gender: 60.5% Age: not informed	Cross-sectional survey via social media platforms	Patient Health Questionnaire (PHQ-9) and Obsessive-Compulsive Inventory-Revised Assessment Test (OCI-R)	Self-reported values ranging from 48.1% to 81.2%.	It was more frequent in the male, 55 years or older, married, with higher income, higher education levels and employed.
Fernández et al. (2020)	General population (*n* = 4408 subjects in the initial survey and *n* = 644 in the replication survey).	Argentina	Female gender: 71.2% Age range: 18 to 92 years old.	Cross-sectional online survey, during quarantine, in April-2020; and replication survey in April-May 2020.	Complete Brief Symptom Inventory-53.	25.1% reported elevated OC symptoms.	Not described.
Ji et al. (2020)	University students (*n* = 5827 subjects in survey 1 and 2 and *n* = 4006 in survey 3).	China	Female gender: 65.4%, 64.7% & 54.7% respectively Mean age: 21.3 (DS: 2.5), 21.2 (DS: 2.3) & 20.9 (DS: 2.0) years respectively.	Longitudinal survey online or by telephone at three times: February 8, 2020 (15 days of quarantine); March 25, 2020; and April 28, 2020 (15 days without new cases).	Yale-Brown Obsessive Compulsive (Y-BOCS); Zung's Self-Assessment Anxiety Scale (SAS); and questions about the level of fear	OCD scores were obtained in 11.3%, 3.6% and 3.5% of the participants for surveys 1, 2 and 3 respectively	High rates of fear and anxiety; the masculine gender; have brothers; and are specialized in a non-clinical discipline
Knowles & Olatunji (2021)	Healthy volunteers, university students (*n* = 108),	US	Female gender: 75% Mean age: 19.6 (SD: 1.2)	Comparative study. Pre-pandemic (January 2020) and. early pandemic (February-March 2020)	Padua Inventory-Contamination, Obsessions and Washing Compulsions Subscale and Obsessive-Compulsive Inventory-Revised (OCI-R)	Participants reported a wide range of contamination fear. Significant increase in obsessive-compulsive washing symptoms was described.	Information overload on COVID-19, and individual differences in disgust proneness
Mazza et al. (2020)	COVID-19 survivors (*n*= 402); some with previous mental illness (*n* = 36), but not OCD.	Italy	Female gender: 34.8% Mean age: 57.8 years old.	Clinical interview one month after hospital discharge (April-June 2020).	Not described.	20% report OC symptoms.	Not described.

(continued on the next page)

Table 1., continued

References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors
Meda et al. (2021)	Healthy volunteers, university students (*n* = 358),	Italy	Female gender: 79.9% Mean age: 21,3 (SD: 2,1)	Comparative study. Pre-pandemic (October-December 2019), during national lockdown (April 2020) and post-lockdown (May-June 2020)	Obsessive-Compulsive Inventory-Revised (OCI-R)	No significant increase in obsessive-compulsive symptoms seen during lockdown, though lifting of lockdown was associated with reduced symptoms.	Not described.
Mrklas et al. (2020)	Health workers (n = 1414) and other workers (*n* = 3951), subscribed to Text4Hope to seek support, due to having high self-reported symptoms.	Canada	Female gender: 86.2% Age: not informed .	Cross-sectional online survey (March-May 2020).	Symptom Checklist 90-Revised (SC-90-R)	Before the pandemic, the self-reported prevalence of OC symptoms due to contamination (obsessive hand washing) was 35.3% vs. 29.3% in health workers compared to other workers; going to 46.1% vs 57.6% after the pandemic's start.	Not described.
Munk et al., (2020)	General population (*n* = 949)	Germany	Female gender: 79.5% Mean age: 28.97 years old.	Cross-sectional online survey during quarantine (March-April 2020).	Obsessive-Compulsive Inventory-Revised	During quarantine, a prevalence of OCD of 21.4% was recorded vs. 3.6% recorded 12 months earlier.	Not described.
Seçer andUlaş (2020)	Young sample (*n* = 598)	Turkiya	Female gender: 61.1% Mean age: 16.4 (DS: 2.14) years old.	Online cross-sectional study during quarantine.	Obsessive Compulsive Inventory. Child Version; Experiential Avoidance Questionnaire; Fear of COVID-19 Scale: Emotional Reactivity Scale; y Depression and Anxiety Scale for Children.	Not described.	Fear of COVID-19, emotional reactivity, depression-anxiety and experimental avoidance
Tian et al. (2020)	General population (*n* =1060)	China	Female gender: 48.2% Mean age = 35.01 (DS: 12.8) years old	Cross-sectional online survey (January-February 2020)	Symptom Checklist-90 (SCL-90)	Score from 1.62 (DS: 0.58) (in 1986) vs 2.24 (DS: 0.75) (during the pandemic). Recorded OC symptoms are: being forgetful, worrying about neatness of clothing and manners, and repeatedly washing hands.	Not described.

Table 2. COVID-19 Pandemic and OCD (Samples with OCD)

References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Alonso et al. (2021)	Patients with OCD (*n* = 127) and without (*n* = 237)	Spain	Female gender: OCD: 53.5%; Control: 57,4% Mean age: OCD: 42.0 (SD: 11.3). Control: 40.8 (SD: 12.3)	Comparative study. Pre-pandemic data (December 2019-March 2020) and during pandemic (April-May 2020)	Yale-Brown Obsessive Compulsive Scale (Y-BOCS)	65.3 % of patients reported symptom worsening; but only 31.4 % had worsening >25 %. 15.7% of patients described a significant improvement in their obsessions and compulsions, The risk of getting infected by COVID-19 was reported as a new obsession that became obsessive in approximately 10% of the patients.	The presence of pre-pandemic depression, contamination/ washing symptoms, and lower perceived social support	It was necessary to change (25.1% of the patients), increase the dose of pharmacological treatment (all but 2 patients) or add benzodiazepines.
Benatti et al. (2020)	Patients with OCD (*n* = 123) 35.8% with clinical symptoms and 64.2% without.	Italy	Female gender: 45.5%. Age: not informed	Clinical interview, face to face (6%) or by telephone.	Not described.	29.5% present development of new obsessions and / or relapse in past obsessions. The most frequent compulsion phenotypes were washing and cleaning.	The increase was significantly greater in the group with clinical symptoms.	Not described.
Capuzzi et al. (2020)	Patients with OCD in 2020 during the pandemic (*n* = 225) and on the same dates in 2019 (*n* = 388).	Italy	Female gender: 13.9% y 12.9% respectively. Mean age: 43.9 (SD: 16.5) and 44.2 (SD: 18.1) years old respectively.	Comparative cross-sectional study by face-to-face clinical interview.	Not described.	Consultations for TOC grew to e 4.0% vs 0.5% in the same period of 2019.	Patients with OCD were significantly more likely to present to the emergency room during the lockdown.	Not described.
Chakraborty & Karmakar (2020)	Patients with OCD due to contamination (*n* = 84). 32.14% without treatment or discontinuous treatment.	Iran.	Female gender: 76.2%. Age: not informed.	Cross-sectional study through telephone interviews, (April-May 2020 compared to pre-pandemic data).	Yale-Brown Obsessive Compulsive (Y-BOCS)	6% of the total (3 with total remission of symptoms and 2 with partial remission before the pandemic) who had stopped their medication had an exacerbation of symptoms.	Not described.	Not described.
Cost et al. (2022)	Psychiatric patients (*n* = 347). 62% pre-existing psychiatric diagnosis. OCD in an unspecified subset.	Canada	Female gender: 48.2% Mean age: 13.05 (SD: 2.53) years old.	Cross-sectional study (February-July 2020)	International CRISIS questionnaire	Worsening in obsessions/compulsions was reported in 19.7-22.6% of total sample, in samples with prevalences of 13% to 30% in OCD; whereas improvements were noted in 3–4% of the sample.	Deterioration was associated with having a pre-COVID psychiatric diagnosis, and greater stress due to social isolation.	Not described.

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Table 2., continued

References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Davide et al. (2020)	OCD patients (*n* = 30) who had completed the therapeutic route.	Italy	Female gender: 53.33% Mean age: 43.17 (SD: 14.87) years old.	Semi-structured, face-to-face clinical interview, before quarantine and after 6 weeks of quarantine.	Yale-Brown Obsessive Compulsive (Y-BOCS) Severity score	A significant increase in the severity of obsession and compulsion is observed.	Remission status of OCD symptoms before quarantine; present or not pre-pandemic contamination symptoms; and / or living with a relative in the same home during quarantine.	Not described.
French & Lyne (2020)	Patient with OCD due to contamination (*n* = 1) controlled by drug treatment.	Ireland	Gender: female. Age: 30 years old.	Face-to-face clinical interview before any COVID-19 case was registered in Europe, and follow-up during the early phases of the pandemic.	CIE-10	Significant deterioration of underlying OCD symptoms related to exposure to COVID-19 news. With intensification of compulsive rituals, avoidance behaviors and psychological distress. She reported feeling safer as public health measures were implemented.	Exposure to the news about COVID-19.	He improves with adjusting the medication, but his compulsive acts continued. It relapses after the appearance of the first cases in Ireland (making a treatment readjustment necessary.
Hezel et al. (2022)	Healthy individuals (*n* = 30) and people with OCD (*n* = 33)	USA (NY)	Female gender: 71% Mean age: 27.4 (SD = 7.0) years old.	Longitudinal study at four assessment timepoints: baseline (April 2020) and one, two, and six months later.	Clinical interviews and self-report questionnaires on baseline resilience, the Obsessive-Compulsive Inventory-Revised (OCI-R), the Depression Anxiety Stress Scales (DASS-21), and the Epidemic-Pandemic Impacts Inventory (EPII)	There were no significant changes across timepoints in obsessive-compulsive, depressive, or anxiety symptom severity within each diagnostic group. But the majority of participants diagnosed with OCD perceived worsening.	Less resilience was associated with worsening obsessive-compulsive symptoms worsening depressive in both groups, and worsening anxiety symptoms in individuals with OCD.	One (3%) received ERP only; seven (21%) received a combination of ERP and medication (four of whom started a new medication); six (18%) had non-CBT therapy and medication (three started a new medication); four (12%) were taking psychiatric medication only (two started medication); and one (3%) was receiving a non-CBT therapy only.

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Table 2., continued

References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Højgaard et al. (2021)	Patients with OCD (*n* = 201)	Denmark	Female gender: 8% Age: 37.76 (SD: 4) years old.	Cross-sectional study (April 2020)	Questions adapted from Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)	61.2 % of the patients reported an increase in OCD severity during the pandemic. Five participants reported the emergence of contamination symptoms and two of harm related symptoms.	61.2 % of the patients reported an increase in OCD severity during the pandemic. Five participants reported the emergence of contamination symptoms and two of harm related symptoms.	Not described.
Jain et al. (2021)	A woman (*n* = 1) with OCD history, anxiety and major depressive disorder. And a man (*n* = 1) with depression, suicidal ideation and cleaning OC.	USA	Female gender: Age: 73 years old Male gender: Age: 38 years old	Face-to-face clinical interview.	Yale-Brown Obsessive-Compulsive Scale	Female: Worsening of cleaning OC. Male: Relates the obsessive need to clean	Not described.	The medication is readjusted. Concomitant Cognitive behavioral therapy, with exposure prevention, and response is advised.
Jelinek et al. (2021)	Patients with cleaning OCD (*n* = 394)	Germany	Female gender: 73.8% Age: 37.76 (SD: 12.14) years old.	Online Study (March-May 2020)	Obsessive-Compulsive Inventory-Revised (OCI-R); Patient Health Questionnaire (PHQ-9)	71.8% reported an increase in the severity of their symptoms, 6.5% a decrease, and 21.7% reported no change.	Have OC cleaning.	Not described.
Khosravani et al. (2021)	Patients with OCD (*n* = 270) before and during COVID-19	Iran	Female gender: 57.4% Mean age: 36 (SD = 12.1)	Comparative study, Face-to face e interview before the outbreak, and in July 2020 during the first wave of the COVID-19 pandemic.	The dimensional obsessive-compulsive scale (DOCS); The Yale-Brown obsessive-compulsive scale (Y-BOCS); The COVID-19 Stress Scale (CSS)	Obsessions and compulsions related to fears of contamination, responsibility for causing harm, unacceptable thoughts and symmetry increased by 3-5 points, while the total score determined that the Y-BOCS increased by around 9 points.	Danger and contamination-related stress reactions	All participants were taking medication, and 30% of the total sample had previously received psychological treatment.

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References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Kumar & Somani (2020)	Patient (*n* = 1) with OCD due to contamination, controlled by drug treatment.	India	Gender: male. Age: 28 years old.	Face-to-face clinical interview in the first phase of the pandemic.	Not described.	Treatment stops being effective after overexposure to COVID-19 news. Patient has intense fear of infection, exhibits avoidance behaviors and compulsive hand washing. This began because it was the recommended measure against infection, yet it becomes a disabling compulsion.	Overexposure to COVID-19 news.	The treatment is readjusted. No subsequent results are reported.
Littman et al. (2020)	Patients with OCD (*n* = 65)	Israel	Female gender: 58.46% Age range: 20 to 39 years old.	Online survey (March-April 2020) after 16 days of quarantine and until the end of the quarantine.	Depression, anxiety and stress scale (DASS-21) and questions about their OCD.	Most of the patients were unaffected (23/65) or even experienced symptomatic improvement (21/65). No phenotype transposition is recorded.	High levels of anxiety and stress are related to an increase in prevalence. Quarantine would be a preventive factor for compulsive cleaning or checking behaviors.	Not described.
Matsunaga et al. (2020)	Patients with contamination OCD (*n* = 29), aggressiveness / control (n = 20) and symmetry / repetition and ordering (*n* = 11). Under treatment. 40% with complete remission (CR) and 60% with partial remission (PR) of symptoms in the pre-pandemic phase.	Japan	Female gender: 58.3% Mean age = 41.5 (SD: 7.9) years old.	Face-to-face clinical interview (April-May 2020).	Yale Brown Obsessive-Compulsive Scale (Y-BOCS)	In both groups, the total mean scores increased. There was no transition of symptoms. 6.7% (1+3-CR:PR) presented contamination obsessions, or additional (1) or renewed (5) washing compulsions. 10% (3+ 3-CR:PR) presented worsening of symptoms (time spent on compulsions).	High rates of anxiety, depression, generalized anxiety, and pre-pandemic presence of contamination symptoms associated with respiratory virus infection, such as influenza.	Not described.

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References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Moreira-de-Oliveira et al. (2022)	OCD patients (*n* = 30), Compulsive behavior: washing (26.7%), checking (20.0%), symmetry/ order (3.3%), and other (46.7%).	Brazil	Female gender: 66.7%. Initial mean age: 15,7 (SD 8,99)	One-year large study (from January 2019 - January 2020 and about one year later).	Yale Brown Obsessive-Compulsive Scale (YBOS); Obsessive-Compulsive Inventory – Revised (OCI-R); Coronavirus Traumatic and Stressful Life Events Scale.	When analyzed individually, there are patients who worsen (46.66%), patients who improve (50%) and others who remain stable (3.34%).	Patients with worsening OCD severity were younger and had a shorter disease duration, which could make them more vulnerable during the pandemic.	All with pharmacological treatment. It is also possible that being under continuous high dose serotonin reuptake inhibitors might have contributed to this non-exacerbation of symptoms during the COVID-19 crisis.
Nissen et al. (2020).	Children and adolescents with OCD. Newly diagnosed (GP: *n* = 65) or who had completed their primary treatment several years before (CG: *n* = 37).	Denmark	Female gender: 63.1% & 66.7% respectively. Mean age: 14.9 (SD: 2.66) & 14.14 (SD: 2.79) years old respectively.	Cross-sectional and comparative study (April-May 2020)	Schedule for Affective Disorders and Schizophrenia for School-Aged Children Semi-structured severity rating (KSADS) Children's Yale-Brown Obsessive-Compulsive Scale (CYBOCS)	OCD worsens in 44.6% of GP subjects vs 73% of GC. 18.5% of GP increases avoidance behaviors.	The aggravation correlated with the degree of anxiety, depression, avoidance behavior, OCD aggressiveness, age of onset, and presence of concomitant psychiatric disorder.	Not described.
Pan et al. (2021)	Older persons with depression, anxiety, or OCD (*n* =1181) and without (*n* = 336)	Netherlands	Female gender: 64% Mean age: 56.1 (SD: 13.2) years old.	Cohort study (April-May, 2020)	Questionnaire on perceived mental health impact, fear of COVID-19, coping, and four validated scales assessing depressive symptoms, anxiety, worry, and loneliness.	No overall increase in the severity of symptoms was observed.	The largest burden of mental health disorders.	Not described.

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References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Rosa-Alcázar et al. (2021)	OCD patients (*n* = 122) and without (*n* =115)	Spain	Mean age: 33.48 (SD: 11.13) years old.	Cohort study.	Comparative study on adaptative strategies.	In OCD patients a greater use of inappropriate strategies (denial, substance abuse and self-blame) was observed.	Anxiety and depression levels were related to the use of less adaptive strategies.	Effective and adaptive coping strategies.
Sharma et al. (2020)	Patients with OCD during the pandemic (GP: *n* = 204) and with OCD during the same period one year earlier (CG: *n* = 207). 63% for contamination.	India	Female gender: 27% & 25% respectively. Mean age: 32.28 (SD: 9.7) & 32.97 (SD: 11.14) years old respectively.	Cross-sectional study by telephone interview, 2 months after the declaration of the pandemic.	Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)	Relapse rates of 21% are observed in the GP vs 20% in the CG, related to partial remissions and lack of adherence to drug treatment. 6% reported obsessive-compulsive symptoms related to COVID-19.	Not described.	Not described.
Storch et al. (2021)	Clinicians (*n* = 595) informing on OCD patients (*n* = 232).	USA	Clinicians female gender: 77%. Patients female gender: 51% Age: 28.5 years old.	Online survey to clinicians regarding patients with OCD receiving exposure and response prevention treatment (ERP) prior and during the pandemic (July-August, 2020)	National Institute of Mental Health-Global Obsessive-Compulsive Scale (NIMH-GOCS) and Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)	Clinicians estimated that 38% of their patients had symptoms worsen during the pandemic and 47% estimated that symptoms remained unchanged despite participating in ERP.	Treatment was less effective on adults, with lower levels of doubt/uncertainty, with financial distress, and medically at-risk.	Rates of improvement attenuated during the COVID-19 pandemic.
Tanir et al. (2020)	Children and adolescents with OCD (*n* = 61), 55.7% with complete remission of symptoms and the rest with partial remission. 11.4% without treatment and 1.6% under cognitive-behavioral therapy.	Turkey	Female gender: 44.3% Mean age: 13.62 (SD: 2.72) years old.	Cross-sectional study by telephone or online interview (April-2020); the results were compared with those recorded in the pre-pandemic stage.	Children's Yale-Brown Obsessive Compulsive (CY-BOCS) Clinical Global Impression-Severity Scale (CGI-S)	Relapses are observed in 31.1% of patients with total clinical remission and worsening in 54.09%. 34.4% do not present changes and 11.4% present an improvement. Obsessions due to contamination (78.6% vs 65.7%), aggressiveness (18% vs 16.4%) and somatic (19.7 vs 9.8%) increases. Cleaning/washing hands is the most frequent compulsion (75.4% vs 62.3%).	Not described.	Not described.

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Table 2., continued

References	Sample	Origin	*Gender and age*	Methodology	Instruments	Prevalence and typology of OC symptoms	Identified risk factors	Interventions carried out
Tükel et al. (2022)	Patients with OCD (*n* = 30) and without (*n* = 30)	Turkey	Female gender: 63.3% Mean age: 34.1 (SD: 12.6)	Comparative cross-sectional study (before March-21) based on retrospective information provided by the patients.	Yale-Brown Obsessive Compulsive Scale (Y-BOCS)	The most common obsessions/ compulsions were contamination/ cleaning-washing (73.3%) and doubt/ checking (60.0%). OCD symptoms worsened in 60% of OCD patients, remained unchanged in 30%, and improved in 10%.	Fear of and obsession with COVID-19.	Not described.
Wheaton et al. (2021)	Subjects with OCD (*n* = 252) and without (*n* = 305).	USA	Female gender: 89.4% & 40.9% respectively Mean age: 31,31 (SD: 10,38) & 37.67 (SD: 12.73) years old respectively	Cross-sectional online survey	Questions on how the pandemic has affected the patients; COVID-19 Threat Scale (CTS); Dimensional Obsessive-Compulsive Scale (DOCS); Depression Anxiety Stress Scales 21 (DASS-21)	46.8 % of the subjects with OCD reported a little worsening of symptoms, and the 29.4% an extensive worsening. 19.8% reported no change. 4.0% expressed improvement.	Not described.	Not described.

Discussion

Prevalence Analysis

In the general population, and those having mild symptoms and left without treatment, a significant increase in the prevalence of OC symptoms was observed (Abba-Aji et al., 2020; Fernández et al., 2020; Knowles & Olatunji, 2021; Mazza et al., 2020; Munk et al. al., 2020; Tian et al., 2020). In the study by Meda et al. (2021), they report no worsening, but it does improve after lockdown. These increases range from 11.3% to 25.1% (Fernández et al., 2020; Ji et al., 2020; Munk et al., 2020), even amounting to 60.3% to 81.2% of the respondents (Abba-Aji et al., 2020; Al Husseini et al, 2021; Jelinek et al., 2021) in the early phases of the pandemic. These data are far from the pre-pandemic prevalence, established at 2% to 3% for any psychiatric diagnosis (Cudris-Torres et al., 2020), or the 3.6% of prevalence registered in Germany twelve months before the pandemic (Munk et al., 2020). Therefore, the data obtained are in line with the forecasts and confirm an increase in the prevalence of OC symptoms due to the pandemic. However, taking into account the data provided by Ji et al. (2020), it is possible that the prevalence returns to normal levels when new cases are no longer detected, particularly because signs of OC symptoms do not automatically mean the beginning of an OC disorder.

In adult people with previous OCD, an increase in the prevalence from 6% to 71.8% jas been described (Alonso et al., 2021; Cudris-Torres et al., 2020; Benatti et al., 2020; Jelinek et al., 2021; Højgaard et al., 2021; Littman et al., 2020; Matsunaga et al., 2020; Moreira-de-Oliveira et al., 2022; Tükel et al., 2022; Wheaton et al., 2021). In the child-youth population, a worsening of OCD has been described. In this way, Cost et al. (2022) reported a worsening of obsessions and compulsions in 19.7% to 22.6% (in samples with prevalences of 13% to

30% in OCD); and Nissen et al. (2020), in a sample with a concurrent psychiatric disorder, observed a worsening in 44.6% of the newly diagnosed subjects, and in 73% of those who had completed their primary treatment, especially if they were no longer receiving a pharmacological treatment.

However, the data on 6.5-11.4% (Cudris-Torres et al., 2020), to 30% (Tükel et al., 2022) of adult patients with OCD do not report significant deterioration. And even the 4% to 15.7% of adult population whose data indicate a deterioration (Alonso et al., 2021; Jelinek et al., 2021; Tanir et al., 2020; Tükel et al., 2022; Wheaton et al., 2021), and 3% to 4% of child-youth patients (Cost et al., 2022) may experience symptomatic improvement, confirming the possible protective effect, in an important part of the patients, of hygiene measures and mobility limitations recommended by the health authorities (Jelinek et al., 2021; Littman et al., 2020; Pan et al., 2021) and in some cases, the administration of serotonin reuptake inhibitors in continuous high doses (Moreira-de-Oliveira et al., 2022). According to Hezel et al. (2022), the differences observed (from aggravation, to no change, or even to improvement of symptoms) may be due to the sample's levels of resilience, and also to the phase of the pandemic analyzed. Along these lines, the researchers observed in OCD patients the greatest severity of symptoms during April-May 2020 and November-December 2020, during the first and second wave of the COVID-19 pandemic; and fewer symptoms during June-August 2020, when COVID-19 cases stood drastically lower.

Symptoms Detected

The compulsions that present the greatest symptomatologic aggravation are those of contamination (Jelinek et al., 2021, Sharma et al., 2020; Tükel et al., 2022; Wheaton et al., 2021), aggressiveness and somatic symptoms (Sharma et al., 2020). Hand washing is the most frequent new or renewed compulsion (Abba-Aji et al., 2020; Benatti et al., 2020; French & Lyne, 2020; Jain et al., 2021; Matsunaga et al., 2020; Mrklas et al., 2020; Munk et al., 2020; Sharma et al., 2020; Tanir et al., 2020; Tian et al., 2020; Tükel et al., 2022), and may affect 53.8% (Abba-Aji et al., 2020) of the general population, and up to 73% of the diagnosed OCD population (Tükel et al., 2022**)**. Other recorded OC symptoms are being forgetful and worrying about the neatness of clothing and manners (Banerjee, 2020), the fears of contamination (Alonso et al., 2021; Højgaard et al., 2021; Khosravani et al., 2021), responsibility for causing harm (Højgaard et al., 2021; Khosravani et al., 2021), unacceptable thoughts and symmetry (Khosravani et al., 2021). No transition of symptoms has been recorded (Benatti et al., 2020; Matsunaga et al., 2020).

Risk Factors

The great variability of results observed in the prevalence data is directly related to the conjunction of risk factors. This risk registers higher in the male gender (Ji et al., 2020; Seçer and Ulaş, 2020) and in people with previous psychiatric illnesses (Cost et al., 2022; Mazza et al., 2020). It increases with age (Nissen et al., 2020), with educational level (Ji et al., 2020; Mrklas et al., 2020), and with the level of contact with the infection (Mrklas et al., 2020; Tian et al., 2020).

Regarding the appearance, relapse or worsening of symptoms in patients previously diagnosed with OCD, the following constitute the risk factors: the state of symptom remission before the pandemic (Alonso et al., 2021; Benatti et al., 2020; Davide et al., 2020; French & Lyne, 2020; Sharma et al., 2020), the aggressiveness of OCD (Nissen et al., 2020), the presence of pre-pandemic contamination symptoms (Davide et al., 2020; French & Lyne, 2020; Højgaard et al., 2021), especially those associated with respiratory infection by viruses such as influenza (Matsunaga et al., 2020), overexposure to news about COVID-19 (French & Lyne, 2020; Kumar & Somani, 2020), absence (Cudris-Torres et al., 2020; Nissen et al., 2020) or lack of adherence to OCD treatment (Sharma et al., 2020), self-reported psychiatric comorbidity (Højgaard et al., 2021), being younger and having a shorter duration of illness (Moreira-de-Oliveira et al., 2022), low resilience (Hezel et al., 2022) and lower perceived social support (Alonso et al., 2021).

Interventions

Researchers agree that symptoms improve when medication is administered (Jain et al., 2021) or readjusted (Alonso et al., 2021; French & Lyne, 2020; Hezel et al., 2022; Jain et al., 2021; Kumar and Somani, 2020; Nissen et al., 2020); although treatment does not always solve the compulsive handwashing problem (French & Lyne,

2020; Jain et al., 2021).

In turn, in a study carried out during the COVID-19 pandemic, it was observed that, contrary to expectations, 47% of the patients did not present a significant improvement when applying cognitive-behavioral therapy based on exposure and response prevention outcomes (Storch et al., 2021). Better results have been observed when combining both therapies (Jain et al., 2021). In this way, in the study carried out by Alonso et al. (2021), 6% of the patients had to incorporate pharmacological therapy in combination with previously established psychological therapy.

During this pandemic, it has also been observed that OCD patients experienced difficulties managing some adaptive (positive reinterpretation, acceptance, humor) and maladaptive (denial, self-blame) strategies, presenting a greater use of inappropriate strategies (denial, abuse of substances, and self-blame), which has led to recommending training in the use of effective and adaptive coping strategies (Rosa-Alcázar et al., 2021). And according to Hezel et al. (2022) teaching skills to bolster resilience could be a potential intervention target for reducing the risk of psychopathology.

Strengths and Limitations

The authors of this review used a rigorous approach to the identification of relevant trials. Moreover, all data was extracted independently by two reviewers, and reliability checks were conducted. However, the results are subject to the limitations of the studies analyzed. Assessing the impact of predictors on outcome through a meta-analytic approach was not possible for the reasons outlined. Studies in the population with diagnosed OCD have been preferably carried out by telephone and not face-to-face assistance, and have small samples that combine different OCD phenotypes. In addition, three case-studies were included – whose results, given the specific characteristics of each of them – should be taken with caution, and the results cannot be generalized. In the general population, people prefer to use the online survey, which stands related to population bias. In turn, a self-reported response is related to memory and social desirability bias. Only one study has an exposure-free control group. Finally, except for a short-term longitudinal study, all the rest are cross-sectional studies, which does not allow us to analyze the long-term impact.

Conclusion, Implications and Future Directions

Despite its limitations, this study allows us to conclude that the pandemic increases the prevalence of OC symptoms in all populations, in a prevalence that ranges from 11.3% to 81.2% depending on the sample, the context, and the moment of the study. In any case, the data found do not allow us to know whether this will translate in the long term into an increase in the number of OCD cases. In patients with diagnosed OCD, the pandemic is related to the appearance of new obsessions, relapses, and/or worsening of the pre-existing symptoms in a prevalence range that extends from 6% to 71.8% depending, likewise, on the analyzed sample, the context and the time of the study. Identified risk factors consist of being young and with little time in therapy, the state of symptom remission before the pandemic, the aggressiveness of OCD, the presence of pre-pandemic contamination symptoms, overexposure to news about COVID-19, and the absence or lack of adherence to pharmacological treatment. Low resilience and little social support emerge as aggravating factors.

OCD symptoms reverse after readjustment of medication, although the compulsion to wash hands does not always do so. In turn, cognitive-behavioral therapy remains less effective than registered in the pre-pandemic phase. This could be due to difficulties in using proper coping strategies. So, the combined use of pharmacological treatment, cognitive-behavioral therapies and training in coping strategies will be recommended. Also, teaching skills to reinforce resilience could help reduce the risk of psychopathology in future crises.

These results should be interpreted in light of some limitations related to the biases mentioned above. In any case, the results provided constitute preliminary evidence regarding the effect of the pandemic on OCD, which can help governments and health authorities to make decisions in other situations similar to those of this pandemic, to prevent the appearance of obsessions and relapses and know how to act in the event that they occur.

They also show the need for further research on the subject. As a result of this review, it is possible to propose future lines of research. Thus, it would be interesting to carry out more longitudinal studies to find out the pandemic's effect on OCD in the long term. Another topic of interest bears on the study of combined therapies (pharmacological + cognitive-behavioral + coping strategies) proposed by some of the researchers that, despite not being new, are poorly documented.

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Olga MALAS: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, writing review and editing.
María-Dolores TOLSÁ: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, writing review and editing.
All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement
The authors have no conflicts of interest to disclose.

Ethical statement
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