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Article

Mental Health Symptomatology and Posttraumatic Growth among Those with Multimorbidity in COVID Pandemic: Cross-Sectional Findings from the STRONG Study in Greece

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Abstract: Background: Individuals with physical or mental health conditions represent a vulnerable population, especially during the COVID-19 pandemic. However, limited information is available concerning posttraumatic growth and common mental health symptoms of this vulnerable health group during COVID-19. Methods: An online cross-sectional study (STRONG study; psychological changes and effects after COVID-19 quarantine in Greece) was conducted from 28 September 2020 (no lockdown restrictions) to 2 November 2020, just before the second lockdown in Greece. Main outcomes were depressive and anxiety symptoms as well as posttraumatic growth. Results: A total of 860 adults participated in the study. A high proportion of participants did not report any pre-existing health condition (61%), while 334 individuals reported one or more physical or mental health conditions. Overall, 20.2% of the participants reported significant depressive symptoms, and 27.9% reported moderate to high posttraumatic growth. The presence of physical and mental health conditions, either as single diagnosis or as a multimorbidity, was significantly associated with the development of depressive symptomatology (either physical or mental health conditions: OR = 1.12; 95% CI, 1.07–1.17, $p < 0.001$; both physical and mental health conditions: OR = 1.23; 95% CI, 1.14–1.33, $p < 0.001$). Posttraumatic growth did not differ between those with or without any pre-existing health issue. Conclusions: Although having a physical or/and a mental health condition predicted the development of depressive symptomatology in a post-lockdown period, the presence of pre-existing conditions was not associated with posttraumatic growth development. Clinicians should be aware of depressive symptoms among their multimorbid patients, even after exiting lockdown.

Keywords: anxiety; COVID-19; depression; multimorbidity; posttraumatic growth



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1. Introduction

The World Health Organisation (WHO) declared the pandemic COVID-19 in March 2020. The Greek government implemented restrictive measures and a national lockdown on 23 March lasting until 4 May. The first wave of the coronavirus outbreak found Greece with a low number of cases and related mortality [1].

During the COVID-19 crisis, most studies focused on the psychological impact of the pandemic and quarantines, with limited attention on countries with health inequities or vulnerable populations, such as those with multiple health conditions (e.g., diabetes mellitus, malignancy, cardiovascular diseases, depression, etc.) [2–4]. Studies have mainly revealed a high prevalence of anxiety and depression, especially among those with pre-existing health

conditions and common mental health symptoms [5–9]. Within the Greek context, university students showed an increase of anxiety and depression levels, suicidal thoughts, and a deterioration of sleep quality in comparison to the Greek general population [10]. According to another Greek survey, participants presented high levels of COVID-19-related fear (35.7%), depressive symptoms (22.8%), and moderate to severe anxiety levels (77.4%) [11]. In terms of the psychological consequences of COVID-19, a further Greek study presented depressive symptomatology in a general population cohort, which was additionally related to a strong belief in the severity of COVID-19 as an illness [12].

In view of the peritraumatic impact of the pandemic on the general population, a study conducted in Italy showed that a third of people presented with symptoms of mild/moderate and severe peritraumatic distress (35%; $n = 392$), with older people being more resilient compared to younger in regard to distress levels [13]. According to Chinese evidence, one month after the COVID-19 outbreak, the prevalence of posttraumatic stress symptoms in the general population ranged between 4.6% [14] to 7% [15].

However, as literature suggests that a traumatic event may be a trigger for psychological growth [16], researchers often shift their focus from the negative consequences of a traumatic event to the positive outcomes emerging from it. Tedeschi and Calhoun refer to these positive outcomes as a “positive change experienced as a result of the struggle with trauma” [17]. There are limited studies investigating the possible growth emerging from COVID-19 pandemic, mainly focused on health care workers as a population group directly exposed to the COVID-19 health threat. A large-scale survey in U.S. nurses revealed that 39.3% of respondents, working in ICU and departments providing care to COVID-19 patients, experienced posttraumatic growth [18]. High prevalence of posttraumatic growth was further observed in Chinese college students (66.9%), mainly predicted by one’s subjective social status, lower level of avoidant attachment, and higher level of resilience [19]. Other studies have also found a number of variables to be associated with posttraumatic growth, such as demographics, psychological factors, and perceived social support and health risk [20,21].

Overall, most studies to date focus on the psychological impact of COVID-19 in the general population. However, considering that the virus disproportionately affects those with underlying chronic health conditions, either physical or mental [2,20,22–25], limited attention has been given to the effects of the pandemic on this vulnerable population. Moreover, no studies have investigated the role of other psychological variables, such as posttraumatic growth, in this vulnerable patient group. Given this gap in knowledge, the aim of the current study was to conduct an online Greek survey and explore whether posttraumatic growth and common mental health symptomatology varies between populations with and without pre-existing health conditions in post-lockdown periods.

2. Materials and Methods

2.1. Study Design and Participants

We conducted an online cross-sectional study (the STRONG study; psychological changes and effects after COVID-19 quarantine in Greece) using Survey Monkey, from 28 September 2020 (no lockdown restrictions were implemented) to 2 November 2020, just before the second lockdown in Greece. Participants over 18 years old and living in Greece were asked to respond to questions about sociodemographic characteristics; pre-existing health conditions; post-traumatic growth; and depressive and anxiety symptoms. The 10-min anonymous survey was advertised on social platforms, such as Facebook and LinkedIn, using a passive snowballing method. Readers were further asked to share our online survey with their social network. We repeated the procedure twice over the study period. All participants provided online informed consent at the beginning of the survey and were free to leave the survey at any point.

2.2. Measurements

2.2.1. Sociodemographics and Self-Reported Health Conditions

Participants were asked to respond to the categorical sociodemographic items of age, sex, marital status, educational level, employment, and geographical region. In order to explore whether a participant had any pre-existing diagnosed health condition, a list of binary variables (Yes/No) indicating specific health issues were given. The conditions were anxiety disorders, depression, sleep disorders, any other diagnosed mental disorder, respiratory and cardiovascular diseases, diabetes, hypertension, obesity, and any other diagnosed physical illness. Participants had two further free-text options to report any type of condition that was missing from the choices given, diagnosed or not.

2.2.2. Posttraumatic Growth Assessment

Posttraumatic growth was assessed with the Greek version of the Posttraumatic Growth Inventory (PTGI) [17,26]. The inventory consists of 21 items referring to potential positive changes following a traumatic event. Participants were asked to report positive changes in particular areas of their lives on a six-point Likert scale from 0, "I have not experienced that change," to 5, "I have experienced that change to a large degree." The PTGI includes five subscales in which the participants evaluated the following positive changes: changes in relationships with others, changes in self-perception, changes in self-strength, appreciation of life, and spiritual changes. Higher values indicate higher posttraumatic growth. A recent metanalysis suggested that is more appropriate to use the term "moderate to high PTG" when either the total or each PTGI item score is $>60\%$ [27]. Based on this, we considered moderate growth levels at a total score of 63 and at an item level of 3. Scale reliability was high in our study (Cronbach's $\alpha = 0.95$).

2.2.3. Depressive Symptoms Assessment

For the assessment of depressive symptoms, we used the Greek version of the Patient Health Questionnaire (PHQ-9) [28]. PHQ-9 is a brief screening tool for depression that rates the frequency of symptoms over the past 2-week period on a 0–3 point Likert scale (not at all to nearly every day), with a maximum score of 27. A recent meta-analysis showed that a standard cut-off point ≥ 10 can be used for detecting major depression [29]. Cronbach's α for our study was $\alpha = 0.87$.

2.2.4. Anxiety Symptoms Assessment

Anxiety symptoms were assessed with the Greek version of Generalized Anxiety Disorder questionnaire (GAD-7), which rates the frequency of anxiety symptoms in the last 2 weeks on a Likert scale ranging from 0–3 (not at all to nearly every day) [30]. Items are summed up to provide a total score. Higher scores indicate more severe anxiety symptoms, with a standard cut-off point of 10 or greater indicating moderate to severe anxiety symptoms [31]. GAD-7 reliability was excellent in our sample (Cronbach's $\alpha = 0.91$).

2.3. Statistical Analyses

Based on the pre-existing self-reported health conditions, participants were grouped in the mutually exclusive health groups of having (a) neither physical nor mental health conditions, (b) either physical or mental, and (c) both physical and mental health conditions.

Descriptive statistics were carried out for the sociodemographic characteristics. To assess differences in psychological distress and posttraumatic growth between the health groups, one-way analyses of variance (ANOVAs) with Bonferroni post-hoc test were performed. A reliability analysis was performed for all scales used in the current study, and Cronbach's α was reported. Multinomial logistic regressions were conducted to investigate whether the presence of pre-existing conditions increases the risk of depression and anxiety and if they are associated with postgrowth development. The reference category for the regression was those with neither physical nor mental health conditions. Odds ratios (OR) and 95% CIs are presented. The significance level was set at $p < 0.05$, and

the statistical analysis was performed with the Statistical package for Social Sciences SPSS version 26 (SPSS Inc., Chicago, IL, USA).

3. Results

3.1. Sociodemographic Characteristics

Of the 860 survey participants, 80% were females, and less than half (41%) were married. The most prevalent age-group was those of 35–39 years of age (18%). In terms of employment status, 55% of the sample were currently employed, 7% unemployed, and 24% were students. A considerable proportion were educated at university level (38%), while more than half of the sample were from central Greece (56%), followed by Crete (12%) and Epirus (11%). A total of 61% of participants did not have any pre-existing physical or mental health conditions, with the remaining 39% ($n = 334$) reporting one or more (108 had one condition only; 157 had two or more conditions; 69 had combined physical and mental health conditions).

Table 1 presents the sociodemographic characteristics of the survey participants as per health groups.

Table 1. Sociodemographic characteristics by health groups.

	Neither Physical nor Mental Health Conditions n = 526	Either Physical or Mental Health Conditions n = 265	Both Physical and Mental Health Conditions n = 69
Age groups, n (%)			
<19	74 (14)	25 (9)	2 (3)
20–29	132 (25)	55 (21)	7 (10)
30–39	145 (27)	55 (21)	18 (26)
40–49	123 (23)	71 (27)	19 (27)
50–59	36 (7)	31 (12)	11 (16)
60+	16 (3)	28 (10)	12 (17)
Sex, n (%)			
Male	94 (18)	69 (26)	11 (16)
Female	432 (82)	196 (26)	58 (84)
Marital status, n (%)			
Married/Civil partnership	218 (41)	102 (39)	33 (48)
Divorced	22 (4)	18 (7)	8 (12)
Single	192 (37)	90 (34)	17 (25)
In a relationship	90 (17)	52 (20)	9 (13)
Widower	4 (1)	3 (1)	2 (3)
Have children, n (%)			
Yes	219 (42)	108 (41)	41 (59)
No	307 (58)	157 (59)	28 (41)
Employment status, n (%)			
Full-time employed	286 (54)	145 (55)	44 (64)
Part-time employed	36 (7)	21 (8)	3 (4)
Unemployed	36 (7)	20 (7)	6 (9)
Not in labour force *	20 (4)	21 (8)	11 (16)
Student	148 (28)	58 (22)	5 (7)
Educational level, n (%)			
Primary school certificate	1 (<1)	1 (<1)	-
Primary school certificate	146 (28)	64 (24)	20 (29)
Secondary school certificate	189 (36)	112 (42)	29 (42)
University degree	157 (30)	66 (25)	16 (23)
Master's degree	33 (6)	22 (8)	4 (6)
PhD/Doctoral degree			
Geographical region, n (%)			
Epirus	57 (11)	32 (12)	6 (9)
Thessaly	3 (<1)	5 (2)	-
Thrace	3 (<1)	-	-
Crete	72 (14)	29 (11)	5 (7)
Macedonia	47 (9)	16 (6)	6 (9)
Aegean Islands	13 (3)	7 (3)	4 (6)
Ionian Islands	3 (<1)	3 (1)	1 (1)
Peloponnese	39 (7)	23 (9)	4 (6)
Central Greece	289 (55)	150 (57)	43 (62)

* includes: home carer, pensioner, person receiving disability allowance.

3.2. Psychological Distress

As shown in Table 2, 174 individuals (20.2%) scored 10 or above in PHQ-9, which is suggestive of clinically significant depressive symptoms. Nearly half (43.5%) of individuals in the “both physical and mental health condition” group recorded scores 10 or above in PHQ-9. Mean PHQ-9 score was significantly higher in this group compared to the other two groups ($p < 0.001$). Furthermore, individuals with “either physical or mental health conditions” also recorded significantly higher scores in PHQ-9 compared to healthy individuals. A total of 203 individuals (23.6%) reported clinically significant anxiety symptoms since they scored ≥ 10 in GAD-7. Mean score was significantly higher only in the “both physical and mental health condition” group compared to healthy individuals ($p < 0.001$).

Table 2. Depressive and anxiety symptoms and posttraumatic growth in total sample and by health groups (ANOVA).

	Total Sample	Neither Physical nor Mental Health Conditions ⁽¹⁾	Either Physical or Mental Health Conditions ⁽²⁾	Both Physical and Mental Health Conditions ⁽³⁾	<i>p</i>
		n = 526	n = 265	n = 69	
PHQ-9 score (mean \pm SD)	5.60 \pm 5.28	4.71 \pm 4.66 ^(2,3)	6.57 \pm 5.91 ^(1,3)	8.65 \pm 5.47 ^(1,2)	<0.001 ***
PHQ-9 ≥ 10 (n% of corresponding group)	174 (20.2)	73 (13.9)	71 (26.8)	30 (43.5)	
GAD-7 score (mean \pm SD)	6.66 \pm 5.06	6.23 \pm 4.83 ⁽³⁾	7.09 \pm 5.26	8.33 \pm 5.58 ⁽¹⁾	0.001 ***
GAD-7 ≥ 10 (n% of corresponding group)	203 (23.6)	106 (20.2)	73 (27.5)	24 (34.8)	
Posttraumatic Growth Mean Item (mean \pm SD)					
Relating to others	2.24 \pm 1.18	2.21 \pm 1.17	2.27 \pm 1.22	2.35 \pm 1.11	0.597
New possibilities	2.00 \pm 1.14	1.95 \pm 1.11	2.10 \pm 1.18	1.94 \pm 1.20	0.234
Personal Strength	2.53 \pm 1.24	2.50 \pm 1.22	2.61 \pm 1.30	2.57 \pm 1.22	0.474
Spiritual change	1.83 \pm 1.41	1.79 \pm 1.38	1.86 \pm 1.42	2.11 \pm 1.53	0.184
Appreciation of life	2.62 \pm 1.20	2.59 \pm 1.19	2.66 \pm 1.22	2.69 \pm 1.25	0.648
Total Item Mean Score	2.25 \pm 1.08	2.22 \pm 1.06	2.31 \pm 1.11	2.32 \pm 1.02	0.462
PTGI ≥ 63 (n% of corresponding group)	240 (27.9)	139 (26.4)	81 (30.6)	20 (29.0)	

One-way analysis of variance; numbers in parentheses indicate that each specific group differs significantly at least at a 0.05 level from the group indicated in the parenthesis based on one-way ANOVA with Bonferroni post-hoc tests. *** Significance of bold value is $p < 0.001$.

3.3. Posttraumatic Growth

A total of 240 (27.9%) individuals recorded scores ≥ 63 in PTGI, meaning that they developed a moderate growth because of the pandemic (Table 2). Similar proportions with no statistically significant differences were observed in all health groups. Total mean score for our sample was 47.43 ± 10.68 , with no differences between the three groups. Individuals showed the most growth in the “appreciation of life” and in the “personal strength” dimension, indicating that individuals in our sample increased their appreciation for what they still had, and moreover, they reported that they could handle more difficult situations. The lowest scores were recorded in the spiritual change dimension, indicating that individuals did not experience a strong growth in existential and religious matters. The same pattern was observed in all groups except in the “both physical and mental health condition” group, which had the lowest score.

3.4. Multinomial Logistic Regression Analyses

To investigate the relationship between the presence of pre-existing health conditions with posttraumatic growth, depression, and anxiety symptoms, unadjusted and adjusted multinomial regressions were conducted. As presented in Table 3, those with either physical or mental health conditions were more likely to develop depressive and anxiety symptoms compared to those with no pre-existing health conditions of any type (PHQ-9: OR = 1.10; 95% CI, 1.06–1.15, $p < 0.001$; GAD: OR = 0.95; 95% CI, 0.91–0.99, $p = 0.04$). Further unadjusted analysis showed that physical and mental health multimorbidity was

associated only with depressive symptomatology (PHQ-9: OR = 1.18; 95% CI, 1.10–1.26, $p < 0.001$). No association was found between health groups and posttraumatic growth development. After adjusting for sex, age, educational level, and employment status, the group having either physical or mental health conditions and the group with physical and mental health multimorbidity were significantly associated with the development of depressive symptomatology (either physical or mental, PHQ-9: OR = 1.12; 95% CI, 1.07–1.17, $p < 0.001$; both physical and mental, PHQ-9: OR = 1.23; 95% CI, 1.14–1.33, $p < 0.001$). No association was found with any of the health groups with anxiety and posttraumatic growth.

Table 3. Unadjusted and adjusted multinomial regression investigating the relationship of health groups with depression, anxiety, and posttraumatic growth.

	PHQ-9		GAD		PTGI	
	OR	95% CI	OR	95% CI	OR	95% CI
Neither physical nor mental health conditions (n = 526)	ref	-	ref	-	ref	-
Either physical or mental health conditions (n = 265)	1.10 ***	1.06–1.15	0.95 **	0.91–0.99	1.00	0.99–1.01
Both physical and mental health conditions (n = 69)	1.18 ***	1.10–1.26	0.94	0.87–1.01	1.00	0.99–1.01
	OR ‡	95% CI	OR	95% CI	OR	95% CI
Neither physical nor mental health conditions (n = 526)	ref	-	ref	-	ref	-
Either physical or mental health conditions (n = 265)	1.12 ***	1.07–1.17	0.97	0.92–1.01	1.00	0.99–1.01
Both physical and mental health conditions (n = 69)	1.23 ***	1.14–1.33	0.96	0.88–1.03	1.00	0.99–1.01

*** Significance of bold value is $p < 0.001$; ** $p = 0.04$; ‡ Adjusted for: sex, age, marital status, educational level, and employment status.

4. Discussion

COVID-19-related research to date has focused on the mortality and hospitalisation risk among those with underlying health conditions [32,33]; however, limited attention has been given to whether the emotional experience of those with multiple pre-existing health conditions varies in comparison to those without any health issue. Our findings indicate that physical and mental health multimorbidity predicted further depressive symptomatology after the first lockdown period in Greece. Although having just a physical or a mental health condition was additionally associated with depressive symptoms, the presence of any health issue overall did not affect one's postgrowth development.

In our sample, the prevalence of depressive and anxiety symptoms was 20% and 23%, respectively. Previous studies within the general population during and after the first lockdown in Greece have further reported depressive symptomatology [11,12,34] although none has focused on the symptomatology variation among those with multiple health conditions. Dutch findings have shown that although adults with multiple mental health conditions have higher levels of depression and anxiety, compared to those with no mental health history, this predisposition did not seem to increase the level of distress after the first national lockdown in the Netherlands [35]. Considering that multimorbidity mainly affects older populations, Chinese studies have shown that older people with multimorbidities have increased psychological distress and anxiety levels after the COVID-19 outbreak [25,36]. Our results are more in accordance with Chinese evidence and highlight a high prevalence of depressive symptomatology in younger multimorbid populations (35–44 age group), specifically with physical/mental coexistence. To our knowledge, our study is the first reporting data concerning the impact of lockdown and quarantine on depression levels in individuals presenting combined mental and physical health conditions, irrespective to their age.

In terms of postgrowth development (PGT), our results showed that 27.9% of the participants reached the level of moderate growth. In respect to mean scores in each subscale, our sample did not report moderate growth in any of them (mean scores < 3) independently of their health status. This finding is different to the results of a study

in Chinese college students, where 66.9% of the participants developed posttraumatic growth [19]. However, this study had a different methodology and considered PTG as a dichotomous concept, with the score of 57 as indicative of the presence of growth. Ellena et al. (2020) similarly reported higher levels of growth in all dimensions in young adults from Italy [37]. Specifically, their sample reported moderate growth levels in all dimensions except spiritual change. It should be noted, however, that their sample consisted of people aged 18–34 years old, and although there are contradictory findings, medical literature mainly suggests that younger age is linked to PTG. Nevertheless, similar to this Italian study, our sample reported highest scores in the “appreciation of life” and “personal strength” dimensions and the lowest score in “spiritual change.”

Our findings overall should be seen with caution, as there are several limitations. The main limitation lies with our cross-sectional design that cannot show any causality between the pre-existing health conditions and the outcomes of interest explored. Future longitudinal research is needed in order to identify the impact of restrictions on the mental health of those with co-occurring health conditions. Given the small number of participants with physical/mental multimorbidity in our study, future prospective studies with bigger samples should provide subgroup analyses based on sociodemographic characteristics, such as sex, age, and employment status. Second, all health conditions were self-reported and may have been over- or under-reported. Furthermore, the study was conducted online, and the findings are possibly applicable only to those with access to social media platforms and not representative of the general population; therefore, we cannot exclude the possibility of selection bias. In addition, our sample consisted mainly of women, resulting in gender bias. However, literature indicates that women are more likely to voluntarily participate in health research surveys [38]. Moreover, we are aware of several online studies during the pandemic in Greece with female participation over 70% (11,12). Finally, the measurement of PTG may have been given too early, and our results may represent a coping mechanism rather than a real growth. Future research should explore the role of PTG in longer post pandemic periods.

5. Conclusions—Clinical Implications

The main practical implication of our study is that clinicians should be aware of depressive symptoms in patients with physical and mental health conditions during COVID-19 pandemic and especially after lockdown measures are lifted. Given the frequent contact that those with physical and mental health multimorbidity have with primary care health settings, attention should be given to clinicians, as they may be able to detect the progression of further mental illness symptomatology among multimorbid patients. Moreover, we argue that clinicians should further assess whether any positive changes may arise in their patients’ lives during the current COVID-19 pandemic in order to obtain an in-depth evaluation of their psychological status. Considering that the prevalence of multimorbidity is higher in clinical practice than presented in research [39], the theoretical implication of our study is to suggest those working on COVID-19 psychological effects to consider a clinically realistic grouping in their analyses and not to treat those with multiple, single, and no health conditions as a homogenous group. Moreover, our findings suggest that the COVID-19 pandemic may be related with the development of common mental health symptomatology among those with pre-existing multiple health conditions. The consequences of restriction measures, such as social distancing, economic pressures, and the disruption of health service capacity (in terms of provision and accessibility), may potentially put people with multimorbidity in emotional distress and therefore manifest symptoms of depression or anxiety. Further prospective cross-cultural studies should be conducted in order to validate this theoretical conclusion.

Overall, governmental and public health stakeholders should be aware that lifting restrictions does not necessarily mean that the COVID-19-related mental health effects will be eliminated but rather prolonged in vulnerable populations.

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