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Research article

Suicidal ideation during COVID-19 lockdown in Greece: Prevalence in the community, risk and protective factors

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ABSTRACT

The aim of this study was to investigate the prevalence of suicidal ideation in the community as well as the risk and protective factors of suicidal ideation during restriction measures in Greece, after the outbreak of the COVID-19 pandemic. A web-based anonymous survey was conducted during the first lockdown period. Participants completed the Generalized Anxiety Disorder scale (GAD-2), the Patient Health Questionnaire (PHQ-2), the Systemic Clinical Outcome and Routine Evaluation (SCORE-15), the Connor-Davidson Resilience Scale (CD-RISK-2), and a self-report questionnaire for COVID-19 pandemic-related data. From a total of 5,116 adults included in the study, 5.20% reported suicidal thoughts, 14.17% were potential clinical cases of anxiety, and 26.51% of depression. Participants presented significantly higher suicidal ideation rates during the last two weeks of the lockdown compared to its previous two weeks. Unmarried or divorced marital status, mental health history, poor perceived quality of physical health, impaired family functioning, anxiety and depression symptoms were independently associated with higher odds of suicidal ideation, whereas higher resilience, positive feelings with regard to the lockdown measures, relationship with friends, and faith in a Supreme Being were associated with lower suicidal ideation odds. According to the findings, suicidal ideation prevalence might be considered elevated and its increase during the lockdown period alarming. The risk and protective factors identified in the study offer valuable information for the development of preventive strategies against suicidal ideation, especially in times of crisis.

1. Introduction

The World Health Organization declared Coronavirus disease (COVID-19) as a pandemic having a great impact on public mental health. Indeed, several studies that have been carried out in the community just after the pandemic outbreak, showed an increase of common psychological problems, including anxiety, depression, and stress (Cao et al., 2020; Mazza et al., 2020; Nalleballe et al., 2020; Özdin and Bayrak Özdin, 2020; Sonderskov et al., 2020; Tian et al., 2020; Wang et al., 2020; Zhang et al., 2020).

Despite the early detection of psychological distress in the general population due to the COVID-19 pandemic, its impact on suicidal behavior, and mainly on suicidal ideation, has not been largely assessed in cross-sectional studies, as yet. Current evidence supports the need for expanding our knowledge on suicide risk during the pandemic. More specifically, Iob et al. (2020) found an increased rate of suicidal ideation (18%) in 44,775 participants in the UK in the first month of the lockdown. In cross-sectional studies in the USA in a total of 10,625 individuals, Bryan et al. (2020) reported a 4.6% past month suicidal ideation, which was not considered by the authors elevated. Gratz et al.
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(2020) in 500 individuals found a 11.6% suicidal risk. Similar findings from Fitzpatrick et al.'s (2020) study showed that a nearly 15% among 10,368 participants was categorized as high risk for suicide, whereas Czeisler et al. (2020) found a 10.7% prevalence of suicidal ideation vs. 4.3% in the last 12 months among 9,896 participants in their study. In Greece, Kaparounaki et al. (2020) found an 8-fold increase in suicidal thoughts of university students, with 9.7% of them currently thinking of committing suicide compared to 1.23% expected in the general population. Additionally, Kilgore et al. (2020b) have shown a significant positive association between higher COVID-19 anxiety and greater suicidal thinking.

Along with the aforementioned global evidence, the consequences of the pandemic itself coupled with the implemented restriction measures might lead to economic downturn. As it has been already identified in the literature, financial recession and unemployment are linked with increased suicidal rates. Particularly, it has been reported that each percentage point increase in unemployment is associated by a 0.79% rise in suicide in people aged 65 years or younger in Southern European Countries (McIntyre and Lee, 2020; Stuckler et al., 2009). It should also be noted that the European Commission recently predicted an actual GDP decline in Greece by 9% in 2020, and that a sustained economic stress might be associated with higher suicide rates in the future (European Commission, 2020). Furthermore, a worldwide increase in suicides from 2,135 to 9,570 per year has been foreseen due to increased unemployment (Kawohl and Nordt, 2020).

Beyond the economic distress, other adverse aspects of the pandemic, such as isolation and reduced social connections, barriers to access mental health services, increased physical health problems, and lack of religious support, might in turn increase suicidality (Reger et al., 2020). However, more research is needed on the role of such risk factors on suicidal behaviors and ideation. To date, there is some evidence that completed suicides increased in the USA during the 1918-1919 influenza pandemic (Gunnell et al., 2020; Wasserman, 1992). Suicides might have also increased among older people in Hong Kong during the 2003 severe acute respiratory syndrome (SARS) epidemic (Cheung et al., 2008). A recent review showed a scarce and weak evidence for an increased risk of suicide during viral disease outbreaks (Leaune et al., 2020).

Suicidal ideation in the general population, is a strong predictor of subsequent suicide attempts, thus studies have highlighted the importance of its detection in the general population in order to inform efforts to improve prevention strategies that would adequately address suicidal ideation risk and protective factors (Choi et al., 2013; Kuo et al., 2001; ten Have et al., 2009). Consequently, the purposes of this study were: i) to estimate the prevalence of suicidal ideation in a community sample in Greece during the outbreak of COVID-19 pandemic, and ii) to investigate possible risk and protective factors associated with suicidal ideation.

2. Methods

2.1. Process

A cross-sectional survey design was used to assess the psychological impact of COVID-19 pandemic on individuals in Greece during the period when lockdown measures were in force. Particularly, a web-based anonymous survey was conducted from April 7 to May 3, 2020. On March 10, the Greek government decided to suspend the operation of all educational institutions nationwide. The following days all “non-essential” shops (e.g. cafes, restaurants, retail shops), and sports and cultural facilities were closed, while all services in all areas of religious worship of any religion or dogma were suspended. On March 22, the Greek government announced further restrictions on all non-essential movement throughout the country, which were extended until May 4. Then, with a total number of 2,632 confirmed COVID-19 cases and 146 deaths in the country (total population of approximately 10.8 million), Greece started to gradually lift the restrictions and restart business activity after a 42-day nationwide lockdown (Hellenic Statistical Authority (ELSTAT), 2014; Wikipedia contributors, 2020; Official website of the Greek Government for the new coronavirus, 2020).

The data of the study were collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at the National and Kapodistrian University of Athens. REDCap is a secure, web-based software platform designed to support data capture for research studies (Harris et al., 2019; Harris et al., 2009). The REDCap link was shared via the social media (i.e., Facebook, Twitter, Instagram) as well as national and local news’ and media’ websites, while a snowball sampling strategy was utilized. The web-based survey was disseminated to members of the community and a significant effort was made in order to include individuals of different sex and age, educational level, marital and job status, place of residence, interests and leisure activities, and they were all encouraged to pass it on to others. The study received approval from the ethics review board of the University General Hospital of Athens “Attikon”.

2.2. Measures

In the present study, participants completed the following scales: the Generalized Anxiety Disorder (GAD-2; Kroenke et al., 2007; Spitzer et al., 2006), the Patient Health Questionnaire (PHQ-2 along with PHQ item 9 to assess suicidal thoughts; Kroenke et al., 2003), the Systemic Clinical Outcome and Routine Evaluation ((SCORE-15; Stratton et al., 2010)), and the Connor-Davidson Resilience Scale [(CD-RISC-2; Vaishnavi et al., 2007)]. Also, a questionnaire was developed to obtain socio-demographic data, psychological and physical health related data, and COVID-19 pandemic and lockdown related data.

2.2.1. Generalized Anxiety Disorder scale (GAD-2)

The GAD-2 is a brief and easy-to-perform initial screening tool for generalized anxiety disorder; it assesses the frequency of anxiety, nervousness and worry over the past two weeks. GAD-2 total score ranges from 0-6 (0 “not at all”, 1 “several days”, 2 “more than half the days”, 3 “nearly every day”) (Spitzer et al., 1994). Using a cut-off of 3, the GAD-2 has a sensitivity of 86% and specificity of 83% for diagnosis of generalized anxiety disorder (Kroenke et al., 2007; Spitzer et al., 2006). In this study, Cronbach’s alpha for the GAD-2 was 0.81.

2.2.2. Patient Health Questionnaire (PHQ-2) and suicidal ideation assessment

The PHQ-2 evaluates the frequency of depressed mood and anhedonia over the past two weeks and its purpose is to screen for depression in a “first-step” approach (Spitzer et al., 1994). PHQ-2 total score ranges from 0-6 (0 “not at all”, 1 “several days”, 2 “more than half the days”, 3 “nearly every day”). The authors identified a score of 3 as the optimal cut-off point when using the PHQ-2 to screen for depression; if the score is 3 or greater, major depressive disorder is likely (Kroenke et al., 2003). In this study, Cronbach’s alpha for PHQ-2 was 0.75.

The PHQ-2 includes only the first two items of the PHQ-9. However, in this study we also administered item 9 (“Thoughts that you would be better off dead, or of hurting yourself”) to assess suicidal ideation. A binary variable was devised to represent suicidal ideation; individuals who responded “not at all” were considered as not having suicidal ideation, whereas individuals who responded “several days”, “more than half the days”, or “nearly every day” were considered as presenting suicidal ideation.

2.2.3. Systemic Clinical Outcome and Routine Evaluation (SCORE-15)

The SCORE-15 is a self-report instrument assessing family processes and aspects of family functioning. Its items are rated on a 5-point Likert scale, from 1 “describes my family – extremely well” to 5 “describes my family – not at all”. Total score ranges from 15 to 75, where higher scores indicate more family problems (Stratton et al., 2010). With a view to identifying individuals with impaired family functioning the 90th
percentile was used as a cut-off score, since only 10% of families obtain scores higher than these (Ochs et al., 2020). In this study, Cronbach’s alpha for the SCORE-15 was 0.92.

2.2.4. Connor-Davidson Resilience Scale (CD-RISC-2)

The CD-RISC-2 is a two-item scale of the longer CD-RISC. The two items used for this scale were item 1 (“Able to adapt to change”) and item 8 (“Tend to bounce back after illness or hardship”). These items are deemed by Connor and Davidson to etymologically capture the essence of resilience. Hence, this short scale is considered to be useful as a brief measure of resilience, or for measuring progress after treatment (Vaishnavi et al., 2007). In this study, Cronbach’s alpha for the CD-RISC-2 was found to be 0.65.

2.2.5. Self-report questionnaire

A questionnaire was developed to obtain data regarding the socio-demographic, psychological and physical health related characteristics of the respondents as well as information regarding the impact of COVID-19 pandemic and the subsequent lockdown measures.

In particular, the respective questions about the socio-demographic characteristics of the participants included sex, age, education, occupation, place of residence, marital status, children, and number of household occupants. Individuals were also asked about their mental health history and their physical health. Regarding the latter, participants were considered to be of high risk for COVID-19 severe infection if they had a diagnosis of severe heart disease, severe lung disease, or uncontrolled diabetes, or if they were cancer patients under active chemotherapy / immunotherapy / radiation therapy, or transplant patients receiving two or more immunosuppressants drugs.

Also, a single item measure of perceived quality of physical health pertained to the following question: “In general, would you say your physical health is excellent, very good, good, fair, or poor?”. In national population surveys, self-rated health has been found to provide a reliable, valid, and cost-effective measure of physical health. Perceived quality of physical health appears to have an added value compared with measures obtained by more objective measurements of health conditions (Cunny and Perri, 1991; Deeg and Bath, 2003; Idler et al., 2004; van Solinge, 2007).

The questionnaire section that was developed with regard to the COVID-19 pandemic and the subsequent lockdown measures included questions about the participants’ perceived degree of COVID-19 information sufficiency, their perceived adherence to COVID-19 recommended prevention measures, and the degree of their worry of COVID-19 infection. Moreover, other questions assessed the impact of COVID-19 pandemic on the relationships with family, friends, and spouse/companion, and on the overall quality of sleep after the coronavirus outbreak.

The impact of the lockdown was also evaluated through questions with regard to consumption of alcohol, sedatives / hypnotics and smoking, use of social media, decreased amount of food and medications at home as well as decreased income. Participants’ feelings about the lockdown measures were also assessed. Positive feelings included relief, joy, hope, optimism, security, and trust as a result of the lockdown measures, while negative feelings included anxiety, stress, nervousness, irritability, anger, boredom, confinement, fear, sadness, loneliness, helplessness, and hopelessness due to the measures.

Finally, participants were asked whether they used any of the following coping strategies during COVID-19 pandemic: personal skills, relationship with family, relationship with friends, faith in a Supreme Being, and faith in one’s own values.

2.3. Statistical analysis

Data were summarized through tables containing absolute and relative (%) frequencies for the qualitative variables, and means and standard deviation (SD) for the quantitative variables. The significance of differences was examined using Chi-square tests for qualitative variables and independent Student’ s t-tests for quantitative ones.

A multiple stepwise regression analysis was performed to assess possible demographic, clinical/psychological, and COVID-19 pandemic-related predictors for suicidal ideation among participants in the study. The following two-stage procedure was employed: univariate logistic models were fitted for each of the following variables: job status, place of residence, marital status, number of household occupants, perceived quality of physical health, high risk group for COVID-19 infection, mental health history, impaired family functioning (SCORE-15), depression (PHQ-2), anxiety (GAD-2), resilience (CD-RISK-2), alcohol consumption, and smoking; variables related to COVID-19 and lockdown measures: increased use of social media, having less amount of food at home, having less amount of medications, less income, positive feelings about the lockdown measures, negative feelings about the lockdown measures, and quality of sleep after coronavirus outbreak; variables related to coping strategies during COVID-19 pandemic. Through the use of these univariable analyses, we identified any variable whose univariable test had a p-value less than or equal to 0.15, namely, all the aforementioned variables except alcohol consumption and number of household occupants. Next, the identified variables were entered in a multivariable logistic model. Their significance with regard to suicidal ideation was assessed with stepwise selection procedure (entry p: 0.05, removal p: 0.10). Sex, age and education were also included and retained independently from their statistical significance, as control variables. Regarding sex, due to the fact that only 5 individuals reported “other”, they were not included in the logistic regression.

The statistical significance level was set at p < 0.05 and all statistical analyses were performed using Stata (version 13.0, Stata Corporation, TX, USA).

3. Results

In total, 5,748 adults participated in the survey (1,434 males, 4,217 females and 5 individuals who reported “other” sex; 92 individuals did not provide any relevant information). Taking into account that the aim of this study was to investigate suicidal ideation, we included only those individuals who had complete data in the aforementioned relevant item 9 of the Patient Health Questionnaire. There was no statistically significant difference between individuals with and without incomplete data on sex (p = 0.679), marital status (p = 0.356), and mental health history (p = 0.223). Significant differences, though, were found with regard to age (p = 0.018; participants with incomplete vs. complete data, 18-24 years: 15.5% vs. 13.84%, 25-34: 16.82% vs. 19.40%, 35-44: 23.15% vs. 28.15%, 45-54: 26.67% vs. 23.60%, 55-64: 13.02% vs. 12.43%, 65-74: 3.80% vs. 2.59%) and education (p < 0.001; participants with incomplete vs. complete data, elementary / middle school: 4.74% vs. 1.77%, high school: 32.48% vs. 25.93%, higher /tertiary education: 62.77% vs. 72.31%).

Therefore, a total of 5,116 individuals from a community sample were included in this study. From them, 25.26% were males, 74.64% were females and 0.10% reported “other” sex. Most individuals were between 35-44 years of age (28.15%) and between 45-54 years of age (23.60%). The majority (72.31%) of the participants reported higher or tertiary educational level. Almost half (53.08%) of them were married. Most of them (82.31%) lived in an urban area. A percentage of 63.01% had a paid job, with half of them (50%) currently tele-working, while 9.31% were unemployed. Among the latter, 8.97% stated that this was due to the COVID-19 pandemic.

Table 1 presents the comparison of the socio-demographic variables between individuals with and without suicidal ideation. Statistically significant differences were found between sex (attributed mainly to individuals who reported “other” since no statistical difference was found between males and females), age, education, occupation, place of residence, marital status, and children.
Comparison of demographic variables among individuals with and without suicidal ideation in a community sample.

|                | Sex                  | Marital status     | Occupation                   | Place of residence | Age        | High school (10-12 years) | Higher /Tertiary education (≥ 12 years) | Education   | Notes |
|----------------|----------------------|--------------------|------------------------------|--------------------|------------|--------------------------|----------------------------------------|-------------|-------|
|                | Non-suicidal ideation| Suicidal ideation  |                              |                    |            |                          |                                        |             |       |
| N             | %                    | N                  | %                            |                    |            |                          |                                        |             |       |
| Sex           | Male                 | 1221               | 25.2                         | 68                 | 25.6       | 761                      | 15.8                                   | 74.8        |       |
|               | Female               | 3613               | 74.7                         | 196                | 73.7       | 2868                     | 58.2                                   | 39.4        |       |
| Age           | 18-24 years          | 653                | 13.3                         | 71                 | 26.69      | 425                      | 8.5                                    | 10.8        |       |
|               | 25-34 years          | 930                | 19.2                         | 60                 | 22.56      | 754                      | 15.55                                  | 13.8        |       |
|               | 35-44 years          | 1376               | 28.4                         | 65                 | 22.56      | 807                      | 16.6                                   | 12.7        |       |
|               | 45-54 years          | 1148               | 23.74                        | 56                 | 21.05      | 1106                     | 22.4                                   | 15.4        |       |
|               | 55-64 years          | 618                | 12.78                        | 16                 | 6.02       | 662                      | 13.4                                   | 7.3         |       |
|               | 65 years and above   | 129                | 2.67                         | 3                  | 1.13       | 133                      | 2.7                                    | 2.4         |       |
|                  | **Total**            | **5,429**          | **1,024**                    | **297**            | **1,024**  | **6,356**                | **1,321**                              | **435**     |       |

Notes: Absolute (N) and relative (%) frequencies for qualitative variables and Means and Standard deviation (SD) for quantitative variables

**Table 1**

Comparison of psychological and physical health related variables among individuals with and without suicidal ideation in a community sample.

|                          | Resilience - CD-RISK-2 | Depression – PHQ-2 | Anxiety – GAD-2 | Family functioning – SCORE-15 |
|--------------------------|--------------------------|---------------------|-----------------|-------------------------------|
|                          | Mean | SD   | Mean | SD   | Mean | SD   | t   | p-value |
| Non-suicidal ideation    |       |      |       |      |       |      |     |         |
| Suicidal ideation        |       |      |       |      |       |      |     |         |
| -------------------------|-------|------|-------|------|-------|------|-----|---------|
|                          | 6.07  | 1.46 | 4.90  | 1.89 | 12.45 | <0.001 |     |         |
|                          | 1.57  | 1.53 | 4.14  | 1.68 | 26.45 | <0.001 |     |         |
|                          | 1.15  | 1.33 | 3.35  | 1.72 | 25.80 | <0.001 |     |         |
|                          | 28.39 | 10.00| 39.79 | 12.55| 7.77  | 0.005 |     |         |

Notes: Absolute (N) and relative (%) frequencies for qualitative variables and Means and Standard deviation (SD) for quantitative variables

**Table 2**

Regarding the prevalence of suicidal ideation, anxiety and depression, 5.20% reported that they experienced suicidal thoughts during the past 2 weeks, 14.17% were possible clinical cases of anxiety, while 26.51% were possible clinical cases of depression (Table 2). With regard to the study period, individuals who took part in the survey during the first half (i.e., first 2 weeks) presented significantly lower suicidal ideation (4.31% vs. 7.70%, p < 0.001), anxiety (12.91% vs. 17.75%, p < 0.001), and depression (24.95% vs. 30.94%, p < 0.001), than those who responded during the second half (i.e., latter 2 weeks) of the study period.

As regards psychological and physical health related variables, individuals with suicidal ideation compared to those without suicidal ideation were more likely to have a mental health history, poorer perceived quality of physical health, and belong to a high-risk group for COVID-19 infection. Furthermore, individuals with suicidal ideation presented higher levels of depression and anxiety, they reported worse family functioning, while they also displayed lower resilience levels (Table 2).

Individually with and without suicidal ideation were compared in a number of COVID-19 pandemic-related variables. As shown in the Table of supplementary material, the overall impact of the COVID-19 pandemic as well as the subsequent lockdown measures was greater in the individuals with suicidal ideation. On the other hand, participants without suicidal thoughts were more positively inclined towards the lockdown measures and they applied significantly more coping strategies.

In the stepwise multiple regression analysis it was emerged that marital status, mental health history, perceived quality of physical health, family functioning, anxiety, depression, resilience, positive feelings about the lockdown measures, and relationship with friends and faith in a Supreme Being as coping strategies during the COVID-19 pandemic, were all independently associated with suicidal ideation among the participants of the study, controlling for sex, age, and education. Specifically, regarding marital status, individuals who were not married as well as those who were divorced were more likely to have suicidal thoughts compared to those who were married. Participants with a mental health history had 1.64-fold higher odds of suicidal ideation (95% CI: 1.11-2.41), individuals with anxiety had 3.51-fold higher odds of suicidal ideation (95% CI: 1.11-2.41), individuals with anxiety had 3.51-fold higher odds of suicidal ideation (95% CI: 1.11-2.41), individuals with anxiety had 3.51-fold higher odds of suicidal ideation (95% CI: 1.11-2.41), and those with depression had 4.64-fold higher odds of suicidal ideation (95% CI: 3.27-6.58). Moreover, the participants who perceived their physical health as poor were more likely to have suicidal thoughts compared to those who perceived it as fair, good, very good or excellent, while individuals with impaired family functioning (≥ 90th percentile) had 2.14 times higher odds (95% CI: 1.58-2.89) of having suicidal thoughts. Lastly, higher resilience levels, positive feelings about the lockdown measures, and the use of copying strategies during COVID-19 pandemic, such as relationship with friends and faith to a Supreme Being, were found to be independently associated with a lower likelihood of suicidal ideation (Table 3).
higher likelihood for suicidal ideation was found in those who were unmarried or divorced, had a history of a diagnosed psychiatric disorder, had higher rates of anxiety and depression as well as poorer perceived quality of physical health, and they reported impaired family functioning. In contrast, participants with higher resilience levels, with positive feelings about the restriction measures, a better relationship with friends and lastly, with faith to a Supreme Being, presented a lower likelihood of suicidal ideation.

To date, the prevalence of suicidal ideation in Greece has been assessed by telephone interviews using the Structured Clinical Interview for DSM-IV (SCID) in four different periods during the economic recession in the country (Economou et al., 2016). According to the results, one-month suicidal ideation was prevalent at a level of 2.4%, 5.2%, 6.7%, and 2.6% of the population in 2008, 2009, 2011, and 2013, respectively. The Greek economic crisis lasted six years (2008-2013) and it was extremely severe reaching its deepest point in 2011 when the national growth rate was -9.1% (the national growth rate was -0.3 in 2008, -4.3 in 2009, -9.1 in 2011, and -3.2 in 2013, respectively (Fountoulakis, 2020)). It should be noted that 5.2% prevalence of suicidal ideation was found in the second year of the Greek severe financial crisis, 6.7% during the worst year of the economic downturn, and 2.6% during the partial amelioration of the crisis. Similar trends were observed in Greece regarding the one-month prevalence of suicidal attempts (i.e., 1.1% in 2009; 1.5% in 2011; 0.9% in 2013; Economou et al., 2016). The 5.20% two-week prevalence of suicidal ideation found in our study is higher than the 2.4% of the first year of the financial crisis in 2008 and the 2.6% prevalence of 2013, the latter being the last year of the economic recession with a -3.2 national growth rate followed by +0.4 in 2014. Interestingly, it has been documented that increased rates of suicide attempts preceded several months prior to a rise in unemployment (Fountoulakis et al., 2014; Nordt et al., 2015). Then, our findings might be associated with the outset of an unfolding financial downturn in 2020. Nevertheless, it should be noted that in our sample an association of unemployment and suicidal ideation has not been found statistically significant in the stepwise multiple regression analysis.

In addition, an alarming finding of our study is the higher level of suicidal ideation in the last two weeks (5th and 6th) vs. the previous two weeks (3rd and 4th) of the lockdown (7.70% vs. 4.3%, respectively). This finding is in line with Killgore et al.’s study (2020a), which found a very similar pattern of suicidal ideation in the USA during the lockdown. It should be noted that the first wave of the pandemic was rather mild in Greece; the number of new COVID-19 cases was falling from the fourth week onwards, while the number of patients in intensive care units was falling considerably after the third week of the restriction measures’ implementation. Thus, this increase in suicidal ideation cannot be attributed to the trajectory of the number of coronavirus cases and deaths. Consequently, we consider that our results appear to be indicative of a potential increase of suicidal ideation, a finding that should be carefully investigated in studies following the first lockdown period.

Suicidal behavior is a complex phenomenon, only in part explained by unemployment, or by the consequences of financial recession (Fountoulakis, 2020). In our study, 26.51% possible clinical cases of depression were found, that is an elevated prevalence, presenting 4.64-fold odds for expressing suicidal ideation. Other web-based studies that investigated suicidal ideation have shown similar findings. Iob et al. (2020) during the first month of the lockdown in UK found a 29.5% moderate and severe depression in the community, by using the PHQ-9. In the USA, Bryan et al. (2020) found a 19.5% prevalence of depression using the same scale, and Fitzpatrick et al. (2020) found a mean of 16.7% by using the CES-D symptomatology, a percentage that was considered to be elevated by the authors. Lastly, Kaparounaki et al. (2020) found an increased 25.9% depression prevalence in a Greek university students’ sample.

However, the last epidemiological study on suicidal ideation in Greece reported a 12.3% depression prevalence in 2013 (Economou et al., 2016). Furthermore, in our study, 14.17% of the participants were possible clinical cases of anxiety, while Iob et al. (2020) found a 20.8% prevalence using the GAD-7, and Kaparounaki et al. (2020) reported increased anxiety symptoms by using the STAI-S. Different time periods
(i.e., COVID-19 pandemic and lockdown vs. financial crisis), different methods of data collection (i.e., online questionnaire vs. telephone interview), and different psychometric tools used (i.e., PHQ vs. SCID-I) might have contributed to these differences. It is noteworthy, though, that along with suicidal ideation, the cases of depression and anxiety in our study were also significantly more prevalent at the last two weeks of the lockdown.

Individuals who reported having been diagnosed with a psychiatric disorder had 1.64-fold higher odds of suicidal ideation. It is well-established that psychiatric disorders are major contributors, at a rate more than 90%, to suicidal behaviors (Jefsen et al., 2020; Mann et al., 2005). Nevertheless, the association of suicidal ideation with depression and anxiety in our study was much greater, a finding that might imply a considerable proportion of undiagnosed psychiatric disorders among the participants, especially with regard to mood disorders (Gournelis et al., 2018).

Unmarried and divorced responders were positively associated with higher suicidal ideation levels compared to married ones, as it has also been found in previous studies (Fitzpatrick et al., 2020; Nock et al., 2008; Taylor et al., 2007). In addition, a 74.64% of the samples were females and 25.26% males. Although the rates of lifetime suicidal ideation are higher in females than in males (Klonsky et al., 2016), no differences in suicidal ideation among male and female participants of our sample were found. One may speculate that men have become susceptible to manifesting suicidal ideation during the lockdown period, as being more vulnerable than women to unemployment and economic hardship due the traditional male role of “bread-winner”. However, such a speculation warrants further research that would take into account cultural aspects of the social roles among men and women.

Furthermore, the participants with impaired family functioning had 2.14 times higher odds of having suicidal thoughts. These findings are in line with previous studies that indicated the association between family difficulties and suicidal ideation (Vilhjalmsson et al., 1998). In this case, family difficulties might include family’s low adaptability to the pandemic, becoming overwhelmed by existing difficulties and having disrupted communication among family members. Interestingly, impaired family function in suicidal participants was distinguished with the highest odds among all the risk factors, underlying thus the need for clinicians not to overlook this particular dimension, but instead to incorporate its assessment in their daily clinical practice.

Lastly, individuals with perceived poor perceived quality of physical health displayed higher levels of suicidal ideation. The association between suicidal behavior and poor physical health is well-established: the greater the number of physical illnesses the more prevalent the suicidal behavior becomes (Bryan et al., 2020; Conwell and Thompson, 2008; Erlangsen et al., 2015; Juurlink et al., 2004). The results of our study support further the interplay between physical and mental health, as previously documented in the literature.

On the other hand, participants who reported their faith in a Supreme Being exhibited lower levels of suicidal ideation. Previous research has shown that individuals with religious beliefs manage to cope better with suicidal ideas. Particularly, attendance at religious services has been associated with an approximately 5-fold lower rate of suicide behavior compared with never attending religious services (Reger et al., 2020; VanderWeele et al., 2016). In the same vein, participants with better coping strategies and stronger social ties, such as maintaining relationships with friends, were also found to have lower levels of suicidal ideation. These findings are in accord with those of Fitzpatrick et al.’s study (2020) as well as previous evidence that underlines the key role of the relationships with others as a protective factor against mental distress in times of socioeconomic crisis (Yotsidi et al., 2018). Although the quarantine has been mainly associated with negative psychological effects, such as feelings of fear, confusion and frustration (Brooks et al., 2020), in our study individuals were also asked about possible positive feelings with regard to the restriction measures taken due to the pandemic. Interestingly, it was found that those who reported positive feelings about the lockdown measures presented lower suicidal ideation, a finding that warrants further research.

We consider among the limitations of our study the under-representation of males and elderly people, despite our strenuous efforts to generate a representative Panhellenic sample. Another limitation was the lack of comparable data regarding the participants’ suicidal behavior prior to the onset of the pandemic. Online surveys suffer from additional biases such as low participation of severely ill people and of residents of rural areas with limited access to digital devices.

On the other hand, we consider among the strengths of our study the evaluation of both the risk and the protective factors in a large sample of people at the community during the nationwide lockdown. A considerable effort was made in order to disseminate the survey to all members of the community and to include individuals of different sex and age, educational level, marital and job status, place of residence, interests and leisure activities. The fact that the survey was conducted from the third to the last (sixth) week of the nationwide lockdown provided us with the opportunity to evaluate the impact of the COVID-19 pandemic on suicidal ideation during its course, thus revealing an alarming increase in suicidal ideation rates. Furthermore, the use of well-known and widely validated assessment tools, such as the GAD-2 and the PHQ-2 which are useful brief screening measures of anxiety and depressive symptoms, gives the opportunity to compare our results with the respective findings from other studies.

To conclude, our study offers insight on suicidal ideation during the lockdown in Greece by determining its prevalence and its associated risk and protective factors. Depression, anxiety, mental health history, poor quality of physical health, impaired family functioning and unmarried or divorced marital status emerged as significant predictors of suicidal ideation. On the other hand, protective factors included resilience, positive feelings with regard to the lockdown measures, relationships with friends, and faith in a Supreme Being. This study also provides data on different trends of the suicidal ideation between the middle and the final stage of the lockdown. The increase of suicidal ideation rates in the course of the lockdown should be considered as an alarming finding that needs further research. Thus, our study can be considered as contributing to a better understanding and management of suicidal ideation as well as offering a considerable benchmark for future studies that will be carried out later during the pandemic.

CRediT authorship contribution statement

Athanasia Papadopoulou: Conceptualization, Writing - original draft, Writing - review & editing. Vasiliki Efstadthiou: Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Writing - review & editing, Visualization. Vasiliki Yotsidi: Conceptualization, Methodology, Writing - original draft, Writing - review & editing, Valeria Pomin: Conceptualization, Writing - review & editing. Ioannis Michopoulos: Writing - review & editing. Evaggelia Markopoulou: Writing - review & editing. Marianna Papadopoulou: Writing - review & editing. Evdoxia Tsigkaropoulou: Writing - review & editing. Georgia Kalemi: Writing - review & editing. Kalliopi Tournikioti: Writing - review & editing. Athanasios Douzenis: Writing - review & editing. Rossetos Gournellis: Conceptualization, Methodology, Formal analysis, Writing - original draft, Writing - review & editing, Supervision.

Declaration of Competing Interest

None.

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Tian, F., Li, H., Tian, S., Yang, J., Shao, J., Tian, C., 2020. Psychological symptoms of ordinary Chinese citizens based on SCL-90 during the level I emergency response to COVID-19. Psychiatry Res. 288, 112992 https://doi.org/10.1016/j.psychres.2020.112992.

Vaishnavi, S., Connor, K., Davidson, J.R., 2007. An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: psychometric properties and applications in psychopharmacological trials. Psychiatry Res. 152 (2-3), 293–297. https://doi.org/10.1016/j.psychres.2007.01.006.

van Solinge, H., 2007. Health change in retirement: a longitudinal study among older workers in the Netherlands. Res. Aging 29 (3), 225–256. https://doi.org/10.1177/0164027506298223.

VanderWeele, T.J., Li, S., Tsai, A.C., Kawachi, I., 2016. Association between religious service attendance and lower suicide rates among US women. JAMA Psychiatry 73 (8), 845–851. https://doi.org/10.1001/jamapsychiatry.2016.1245.

Vilhjálmsson, R., Kristjánsdóttir, G., Sveinbjarnardóttir, E., 1998. Factors associated with suicide ideation in adults. Soc. Psychiatry Psychiatr. Epidemiol. 33 (3), 97–103. https://doi.org/10.1007/s001270050028.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S., Ho, R.C., 2020. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int. J. Environ. Res. Public Health 17 (5), 1729. https://doi.org/10.3390/ijerph17051729.

Wasserman, I.M., 1992. The impact of epidemic, war, prohibition and media on suicide: United States, 1910-1920. Suicide Life Threat. Behav. 22 (2), 240–254. doi. Wikipedia contributors, 2020. COVID-19 pandemic in Greece. Wikipedia, the Free Encyclopedia. (Retrieved 12 July 2020). https://en.wikipedia.org/w/index.php?title=COVID-19_pandemic_in_Greece&oldid=967289212.

Yotsidi, V., Bohtsou, V., Kroupi, K., Pouloudi, M., Fragkouli, A., 2018. What makes the difference? Community mental health providers’ and users’ perceptions on dealing with the crisis in Greece. J. Psychosoc. Rehabil. Ment. Health 5 (1), 17–29. https://doi.org/10.1007/s40737-018-0106-4.

Zhang, S.X., Wang, Y., Rauch, A., Wei, F., 2020. Unprecedented disruption of lives and work: health, distress and life satisfaction of working adults in China one month into the COVID-19 outbreak. Psychiatry Res. 288, 112958 https://doi.org/10.1016/j.psychres.2020.112958.

Official website of the Greek Government for the new coronavirus, 2020. Daily overview [Ημερήσια Ενημέρωση]. (Retrieved 12 July 2020). https://covid19.gov.gr/covid19-live-analytics/.