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COVID-19

Stress and coping strategies in the general population of Greece and Cyprus in response to the COVID-19 pandemic: A cross-sectional study

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ABSTRACT

The COVID-19 pandemic and the lockdown policy had a profound psychological impact on the general population worldwide. The aim of this study was to assess the level of stress and coping strategies used during the initial stage of the COVID-19 outbreak and their association. Secondary aims were to a) identify the most important coping strategies and b) investigate predictors of stress. A cross-sectional study was conducted by using an anonymous online questionnaire. The study was carried out from April 23 to May 4 2020. A snowball sampling method was conducted to recruit potential participants from the general population of Greece and Cyprus. Participants over 18 years old who were familiar with the Greek language were included. The psychological impact was assessed by the Impact of Event Scale-Revised (IES-R). Coping strategies were assessed using 15 statements detected from a review of the literature. Participants were asked to rate each one of the coping strategies according to how important it was to them, on a four-point likert scale. The sample consisted of 3941 participants (74.2% women, N=2926), with a mean age of 36.9 years old. The most important coping strategies adopted were 1) “Dealing the situation with a positive attitude” (96.5%), 2) “Follow strict personal protective measures” (95.9%), 3) “Acquiring knowledge about coronavirus” (94.6%), 4) “Engaging in health-promoting behaviors” (89.6%), 5) “Limiting the time spent on media” (75.5%). The highest and positive coefficients were recorded for the association of IES-R scales with 1) “Talking with family and friends to reduce stress”, 2) “Seeking help from a mental health professional”, 3) “Limiting the time spent on media”, 4) “Relieving and managing emotions”, 5) “Practicing relaxation techniques”. 26.5% showed severe psychological impact.

Conclusion: Addressing stress levels with the use of functional coping strategies can be beneficial to protect the general population from adverse psychological outcomes.

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1. Introduction

As a result of the COVID-19 outbreak, a situation of socio-economic crisis and psychological distress rapidly occurred worldwide (Center for Disease Control and Prevention, 2022). Social activities have been restricted in most countries with the implementation of the lockdown policy and quarantine (Brooks et al., 2020; Serafini et al., 2020). Every individual can apply different coping strategies in order to reduce the stressful impact of a disease outbreak.

1.1. Background

The COVID-19 outbreak caused progressively negative psychosocial effects, including stress, post-traumatic stress disorder (PTSD) symptoms, anxiety, depression, frustration, and uncertainty (Chew, Wei, Vasoo, Chua & Sim, 2020; Galanis et al., 2021). Previous outbreaks of infectious diseases (e.g. SARS, Ebola, MERS) have also revealed the effect of disease-related stress on the occurrence of psychological distress and PTSD (Lau et al., 2016; Lee, Kang, Cho, Kim &
The concept of coping was originally proposed by Lazarus and Folkman (1984) and is defined as the “constantly changing cognitive and behavioral efforts necessary to manage to master, reduce, or tolerate a troubled person-environment relationship”. Coping performs two basic functions: a) modifying the problematic individual-environment relationship that causes stress, and b) regulating emotions (Lazarus & Folkman, 1984). Based on these two functions, coping is divided into problem-focused coping and emotion-focused coping, respectively. Problem-focused coping is aimed at solving the problem and involves active efforts to handle the stressor while trying to manage or change the situation by seeking information and help, seeking instrumental help, planning, and direct action (Lazarus & Folkman, 1984). Emotion-focused coping refers to all the regulative efforts used to diminish the emotional consequences of stressful events, including strategies such as denial, focus on and venting of emotions, positive reinterpretation of events, and seeking out social support (Folkman, Lazarus, Gruen & DeLongis, 1986; Carver, Scheier & Weintraub, 1989). It has been argued that individuals choose coping strategies from one category or the other, based on the extent to which they believe they can control the stressful situation (Carver et al., 1989). Problem-focused coping strategies are usually used when individuals believe that they can have some impact on the stressful conditions, either by reducing the demands made by reality or by increasing their coping reserves. Conversely, when individuals feel unable to do anything to change the stressful situation, they are more likely to adopt emotion-focused strategies, attempting, through them, to control their emotional reactions (Lazarus & Folkman, 1984; Carver et al., 1989). However, research related to coping with stress suggests that the two coping functions often coexist (Folkman et al., 1988).

Individuals’ psychosocial status and stress during the period of the COVID-19 outbreak are counted as critical public health issues, and the coping strategies implemented remain an important aspect in the mental healthcare field. Currently, only a small number of studies have associated the effect of outbreak related stress on emerging psychological distress, PTSD, and coping on the general population (Serafini et al., 2020; Chew et al., 2020; Eisenbeck et al., 2022; Kotodzieczek et al., 2021; Kar, Kar & Kar, 2021;Rodriguez-Rey, Garrido-Hernansaiz & Collado, 2020; Li, 2020).

2. Aim

The aim of this study was to assess the level of stress and coping strategies used during the initial stage of the COVID-19 outbreak and their possible association. The secondary aims were: a) the identification of the most important coping strategies that have been adopted by the general population of the two countries; and b) the investigation of the predictors of stress.

3. Methods

3.1. Study design

A cross-sectional study was conducted to assess the population’s immediate psychological response during the pandemic of COVID-19, by using an anonymous online questionnaire. The research was carried out from April 23 to May 4 2020, when severe lockdown restrictions were instituted in Greece and Cyprus. A snowball sampling method was conducted to recruit potential participants. Information regarding the survey was included in the first part of the questionnaire along with the consent form.

3.2. Participants

The general population living in Greece and Cyprus were considered eligible to participate. Participants over 18 years old who were familiar with the Greek language were included in the study. All participants provided online informed consent prior to the survey.

3.3. Data collection

Data collection was carried out using an online questionnaire. The online questionnaire was sent: a) via e-mail, b) through social networks (such as Instagram, Twitter, Facebook, LinkedIn) and c) chat-based platforms (such as WhatsApp, Viber, WeChat, etc.). Responders were encouraged to share the survey link with others.

3.3.1. Questionnaire

An online questionnaire consisting of four parts was developed: a) information regarding the survey and instructions along with the consent form; b) information on demographic data; c) a list of 15 coping strategies; and d) the IES-R questionnaire.

3.3.2. The impact of event scale—revised

The psychological impact of COVID-19 was measured using the Impact of Event Scale-Revised (IES-R). The IES-R assesses PTSD symptoms in survivorship following an event. It is a self-administered questionnaire that has been well-validated in the Greek population previously (Mystakidou, Tsilika, Parpa, Galanos, & Vlahos, 2007). This 22-item questionnaire is composed of three subscales and aims to measure the mean avoidance, intrusion, and hyperarousal. The total IES-R score was divided into 0-23 (normal), 24-32 (mild psychological impact), 33-36 (moderate psychological impact), and >37 (severe psychological impact) (Creamer, Bell, & Failla, 2003).

3.3.3. Coping strategies list development

Initially, a focused literature review based on specific keywords (COVID-19, coping strategies, psychological distress, stress) was conducted, aiming to identify potential coping strategies relevant to outbreaks. Thematic units were extracted according to their relevance to the COVID-19 pandemic. The final list included 15 coping strategies. The back-translation technique was applied for the translation into the Greek language. Participants were asked to rate each of the coping strategies that were listed according to how important they felt it was for them, on a four-point likert scale.

3.4. Ethics approval

Participation in the study was voluntary and anonymous. Participants were informed of the aims of the study and the collected data through a mandatory field in the first part of the online questionnaire, with the option to consent in order to proceed and fill in the questionnaire. Written informed consent was obtained from all participants. Participants also consented for the findings to be published. Written approval was also obtained for the use of the Greek version of the IES-R questionnaire. Ethics approval was provided by the Cyprus National Bioethics Committee (ref. number 2020.01.81).

3.5. Statistical methods and data analysis

Quantitative variables were expressed as mean values (SD) or with median (Interquartile Range), while qualitative variables were expressed as absolute and relative frequencies. Spearman correlations coefficients were used to explore the association between IES-R...
scales and coping strategies against COVID-19. Correlation coefficient between 0.1 and 0.3 were considered low, between 0.31 and 0.5 moderate and those greater than 0.5 were considered high. Hierarchical multiple linear regression analysis was used to examine the association of IES-R scales with participants’ demographics and coping strategies against COVID-19. In the first step of the analysis, all demographics were entered into the model. In order to see which of the strategies were significantly associated with IES-R scales, they were entered in the second step according to the stepwise method. The internal consistency of the IES-R questionnaire was evaluated via Cronbach’s alpha. All reported p values are two-tailed. Statistical significance was set at p<0.05. Analyses were conducted using SPSS statistical software (version 22.0).

4. Results

4.1. Demographic characteristics

The sample consisted of 3941 participants (74.2% women, N=2926), with a mean age of 36.9 years old (SD=9.8 years). Table 1 shows the sample characteristics. 8.2% were unemployed due to the pandemic and 27.1% had remote work due to the pandemic. 17.1% were taking care of the elderly (>70 years) or patients with chronic disease, while 17.3% suffered from chronic disease.

Descriptive statistics for all IES-R subscales are presented in Table 2. Seventeen-point four percent of the participants (n=684) had overall IES-R score from 24 to 32 indicating mild psychological impact, 7% (n=277) of the participants had overall IES-R score from 33 to 36 indicating moderate psychological impact while 26.5% (n=1044) had overall IES-R score of above 37 indicating severe psychological impact.

4.2. Coping strategies with the COVID-19

Table 3 presents coping strategies with the COVID-19 items. 95.9% of the respondents (mean=3.66, SD=0.57) declared that it is important or very important to “Follow strict personal protective measures (item 1)”. Also, 94.6% (mean=3.56, SD=0.62) reported that it is important or very important to “Acquire knowledge about coronavirus (item 3)” and 96.5% (mean=3.61, SD=0.58) reported that it is appropriate to “Dealing the situation with a positive attitude (item 10)”.

75.5% (mean=3.09, SD=0.88) declared that it is important or very important to “Limit the time spent on media news about pandemic and related deaths” (item 12), while 89.6% (mean=3.38, SD=0.71) stated that it is important or very important to “Engage in health-promoting behaviors” (item 5).

4.3. Correlations of coping with COVID-19 items and IES-R scales

Correlations of coping with COVID-19 items and IES-R scales (Table 4) were almost all significant due to the large sample size. All the correlation coefficients were low, but the highest and positive coefficients were recorded for the association of the IES-R scales with 1) Talking with family and friends, (phone, chat) to reduce stress and seek emotional support (item 9), 2) Seeking help from a mental health professional (item 11), 3) Limiting the time spent on media news about pandemic and related deaths (item 12), 4) Relieving and managing emotions (item 13), 5) Practicing relaxation techniques (item 8) and 6) Use of sedative anxiolytic drugs (item 15). Increased score of intrusion, hyperarousal and avoidance was associated with increase importance for the aforementioned coping strategies.

4.4. Predictors of stress

When multiple hierarchical linear regression analyses was conducted with IES-R scales as dependent variables (Table 5), it was found that men had significantly lower scores on all IES-R scales as compared to women (p<0.001). Also, subjects living in Greece had lower scores on all IES-R scales as compared to those from Cyprus (p<0.001). Higher educational levels and being employed were found to be associated with lower scores on the IES-R scales. Taking care of the elderly (>70 years) or patients with chronic disease (p<0.001) and an increased number of persons living in the same house were associated with greater scores on the IES-R scales. Furthermore, subjects diagnosed with chronic mental disease had a greater score on hyperarousal (p<0.001).

All coping items except for “Follow strict personal protective measures” (item 1), “Relieving and managing emotions” (item 13), “Practicing relaxation techniques” (item 8), “Use of alcohol or drugs” (item 14), were found to be associated with intrusion in multiple analyses. Similarly, all coping items except for “Follow strict personal protective measures” (item 1), “Acquiring knowledge about coronavirus” (item 3), “Participation in leisure activities” (item 6), and

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**Table 1**

| Characteristics                         | N (%) |
|-----------------------------------------|-------|
| Sex                                     |       |
| Women                                   | 2926 (74.2) |
| Men                                     | 1015 (25.8) |
| Age (years), mean (SD)                  | 36.9 (9.8) |
| Place of residence                      |       |
| Cyprus                                  | 1430 (36.3) |
| Greece                                  | 2511 (63.7) |
| Family status                           |       |
| Unmarried                               | 1397 (35.4) |
| married/living together                 | 2248 (57.0) |
| Widowed                                 | 28 (0.7) |
| divorced                                | 268 (6.8) |
| Higher educational level                |       |
| Primary school                          | 6 (0.2) |
| Middle school                           | 39 (1.0) |
| High school                             | 426 (10.8) |
| 2 year post high school education       | 571 (14.5) |
| University                              | 1460 (37) |
| Master                                  | 1278 (32.4) |
| PhD                                     | 161 (4.1) |
| Employed                                | 3242 (82.3) |
| Unemployed due to pandemic              | 265 (8.2) |
| Remote work due to pandemic             | 876 (21.7) |
| Working in hospital                     | 1029 (31.7) |
| If yes, working as a nurse              | 836 (48.4) |
| If yes, is it a referral hospital       | 401 (24.5) |
| Daily contact with others due to profession | 1802 (57.3) |
| Working years in total, mean (SD)       | 14.0 (8.9) |
| Do you have minor children?             | 106 (1.5) |
| Taking care of elders (>70 years) or patients with chronic disease | 17 (0.4) |
| Living status during the pandemic       |       |
| With others                             | 3351 (85) |
| Alone                                   | 990 (15) |
| Persons living in the same house, median (IQR) | 3 (1–4) |
| Suffering from chronic disease          | 683 (17.3) |
| Under treatment                         | 979 (24.8) |
| Being vaccinated against common flu     | 926 (3.5) |
| Diagnosed with chronic mental disease   | 265 (6.7) |

**Table 2**

| IES-R scales | Minimum | Maximum | Mean | SD  | Cronbach’s α |
|--------------|---------|---------|------|-----|--------------|
| Intrusion    | 0.00    | 4.00    | 1.13 | 0.82| 0.89         |
| Hyperarousal | 0.00    | 4.00    | 1.03 | 0.81| 0.80         |
| Avoidance    | 0.00    | 4.00    | 1.36 | 0.87| 0.87         |
| IES-R total score | 0.00 | 12.00 | 3.51 | 2.25 | 0.94         |

**Table 3**

| Item | Description | Mean | SD | N |
|------|-------------|------|----|---|
| 1    | Talking with family and friends, (phone, chat) to reduce stress and seek emotional support | 3 | 0.7 | 2926 |
| 2    | Seeking help from a mental health professional | 3 | 0.7 | 2926 |
| 3    | Limiting the time spent on media news about pandemic and related deaths | 3 | 0.7 | 2926 |
| 4    | Relieving and managing emotions (item 13) | 3 | 0.7 | 2926 |
| 5    | Practicing relaxation techniques (item 8) | 3 | 0.7 | 2926 |
| 6    | Use of sedative anxiolytic drugs (item 15) | 3 | 0.7 | 2926 |

**Table 4**

| Item | Description | Mean | SD | N |
|------|-------------|------|----|---|
| 1    | Intrusion | 1.13 | 0.82 | 2926 |
| 2    | Hyperarousal | 1.03 | 0.81 | 2926 |
| 3    | Avoidance | 1.36 | 0.87 | 2926 |
| 4    | IES-R total score | 3.51 | 2.25 | 2926 |
“Practicing relaxation techniques” (item 8) were found to be associated with hyperarousal in multiple analyses. “Confront any person as potentially infected with coronavirus” (item 2), “Avoiding the use of public transport” (item 4), “Talking with family and friends, (phone, chat) to reduce stress and seek emotional support” (item 9), “Dealing the situation with a positive attitude” (item 10), “Limiting the time spent on media news about pandemic and related deaths” (item 12), “Practicing relaxation techniques” (item 8) and “Use of sedative anxiolytic drugs” (item 15) were significantly associated with avoidance. Also, all coping items except for “Follow strict personal protective measures” (item 1), “Acquiring knowledge about coronavirus” (item 3), “Participation in leisure activities” (item 6), and “Use of alcohol or drugs” (item 14) were found to be associated with the IES-R total score in multiple analyses.

As the sample was not equally distributed for men and women a more representative sample concerning sex was collected and analyses was computed again. The results that were produced were similar to the results that came from the initial sample.

5. Discussion

To our knowledge, this is the first and the largest study assessing the 15 specific, pandemic-related coping strategies adopted by the general population of Greece and Cyprus and their association with stress. Addressing stress levels with the use of functional coping strategies can protect the general population from psychological distress and the long-term development of mental disorders. The examination of different coping strategies that have been adopted by the population during the COVID-19 pandemic is of utmost importance for public health and mental health professionals. The results of the current study can contribute to the development of effective strategies for coping with stress and the prevention of mental disorders during pandemics. Further research is needed to explore the effectiveness of these strategies in different populations and settings.

Table 3
Coping strategies with the COVID-19 items.

| Items of coping with the COVID-19 | Not at all important N (%) | A little important N (%) | Important N (%) | Very important N (%) | Important / Very important % | Mean (SD) |
|----------------------------------|---------------------------|--------------------------|----------------|---------------------|-----------------------------|-----------|
| **PROBLEM-FOCUSED COPING STRATEGIES** |                           |                          |                |                     |                             |           |
| 1. Follow strict personal protective measures (e.g. hand washing, use of face masks, gloves, etc.) | 18 (0.5) | 142 (3.6) | 1017 (25.8) | 2764 (70.1) | 95.9 | 3.66 (0.57) |
| 2. Confront any person as potentially infected with coronavirus. | 155 (3.9) | 530 (13.4) | 1631 (41.4) | 1625 (41.2) | 82.6 | 3.2 (0.82) |
| 3. Acquiring knowledge about coronavirus (e.g. symptoms, mechanism of transmission, etc.) | 30 (0.8) | 183 (4.6) | 1266 (32.1) | 2462 (62.5) | 94.6 | 3.56 (0.62) |
| 4. Avoiding the use of public transport. | 98 (2.5) | 296 (7.5) | 1185 (30.1) | 2362 (59.9) | 90.0 | 3.47 (0.74) |
| 5. Engaging in health-promoting behaviors (e.g. rest, exercise, balanced diet, etc.). | 53 (1.3) | 358 (9.1) | 1584 (40.2) | 1946 (49.4) | 89.6 | 3.38 (0.71) |
| 6. Participation in leisure activities (e.g. movies, outdoor exercises, surfing the internet, etc.). | 47 (1.2) | 262 (6.6) | 1538 (39) | 2094 (53.1) | 92.2 | 3.44 (0.67) |
| 7. Acquiring knowledge and information about mental health. | 129 (3.3) | 613 (15.6) | 1751 (44.4) | 1448 (36.7) | 81.2 | 3.15 (0.8) |
| 8. Practicing relaxation techniques (e.g. diaphragmatic breathing, meditation, etc.). | 627 (15.9) | 1109 (28.1) | 1347 (34.2) | 858 (21.8) | 56.0 | 2.62 (0.99) |
| **EMOTION-FOCUSED COPING STRATEGIES** |                           |                          |                |                     |                             |           |
| 9. Talking with family and friends, (phone, chat) to reduce stress and seek emotional support. | 110 (2.8) | 395 (10) | 1486 (37.7) | 1950 (49.5) | 87.2 | 3.34 (0.77) |
| 10. Dealing the situation with a positive attitude. | 27 (0.7) | 110 (2.8) | 1220 (31) | 2584 (65.6) | 96.5 | 3.61 (0.58) |
| 11. Seeking help from a mental health professional | 739 (18.8) | 998 (25.3) | 1401 (35.5) | 803 (20.4) | 55.9 | 2.58 (1.01) |
| 12. Limiting the time spent on media news about the pandemic and related deaths. | 197 (5) | 770 (19.5) | 1475 (37.4) | 1499 (38) | 75.5 | 3.09 (0.88) |
| 13. Relieving and managing emotions. | 83 (2.1) | 299 (7.6) | 1755 (44.5) | 1804 (45.8) | 90.3 | 3.34 (0.71) |
| 14. Use of alcohol or drugs | 1318 (84.2) | 346 (8.8) | 147 (3.7) | 130 (3.3) | 7.0 | 1.26 (0.68) |
| 15. Use of sedative anxiolytic drugs. | 2948 (74.8) | 657 (16.7) | 222 (5.6) | 114 (2.9) | 8.5 | 1.37 (0.72) |

Table 4
Spearman correlation coefficients between the IES-R scales and items of coping with the COVID-19.

| Items of coping with the COVID-19 | IES-R scales | Spearman correlation coefficients |
|----------------------------------|--------------|----------------------------------|
|                                  | intrusion    | hyperarousal | avoidance | IES-R total score |
| **PROBLEM-FOCUSED COPING STRATEGIES** |               |               |           |                  |
| 1. Follow strict personal protective measures (e.g. hand washing, use of face masks, gloves, etc.). | 0.12*** | 0.05** | 0.07*** | 0.09*** |
| 2. Confront any person as potentially infected with coronavirus. | 0.18*** | 0.10*** | 0.11*** | 0.14*** |
| 3. Acquiring knowledge about coronavirus (e.g. symptoms, mechanism of transmission, etc.). | 0.16*** | 0.10*** | 0.07*** | 0.12*** |
| 4. Avoiding the use of public transport. | 0.14*** | 0.11*** | 0.13*** | 0.14*** |
| 5. Engaging in health-promoting behaviors (e.g. rest, exercise, balanced diet, etc.). | -0.03 | 0.02 | -0.06*** | -0.04*** |
| 6. Participation in leisure activities (e.g. movies, outdoor exercises, surfing the internet, etc.). | 0.02 | 0.02 | 0.08*** | 0.05** |
| 7. Acquiring knowledge and information about mental health. | 0.15*** | 0.14*** | 0.15*** | 0.16*** |
| 8. Practicing relaxation techniques (e.g. diaphragmatic breathing, meditation, etc.). | 0.15*** | 0.16*** | 0.18*** | 0.18*** |
| **EMOTION FOCUSED COPING STRATEGIES** |               |               |           |                  |
| 9. Talking with family and friends, (phone, chat) to reduce stress and seek emotional support. | 0.19*** | 0.16*** | 0.20*** | 0.20*** |
| 10. Dealing the situation with a positive attitude. | -0.09*** | -0.12*** | -0.03 | -0.09*** |
| 11. Seeking help from a mental health professional | 0.19*** | 0.19*** | 0.16*** | 0.20*** |
| 12. Limiting the time spent on media news about the pandemic and related deaths. | 0.10*** | 0.14*** | 0.24*** | 0.18*** |
| 13. Relieving and managing emotions. | 0.14*** | 0.16*** | 0.16*** | 0.17*** |
| 14. Use of alcohol or drugs | 0.06*** | 0.12*** | 0.05*** | 0.09*** |
| 15. Use of sedative anxiolytic drugs. | 0.18*** | 0.22*** | 0.15*** | 0.20*** |

*p<.05; **p<.01; ***p<.001.
Table 5
Multiple hierarchical linear regression results with IES-R scales as dependent variables and demographics and items of coping with COVID-19 as independent ones.

| Independent variables | Intrusion β (SE) | P | Hyperarousal β (SE) | P | Avoidance β (SE) | P | IES-R total score β (SE) | P |
|-----------------------|-----------------|---|-------------------|---|-----------------|---|------------------------|---|
| Sex                   |                 |   |                   |   |                 |   |                       |   |
| Women (reference)     |                 |   |                   |   |                 |   |                       |   |
| Men                   | -0.23 (0.03)    | <0.001 | -0.20 (0.03)    | <0.001 | -0.22 (0.03)    | <0.001 | -0.67 (0.08)   | <0.001 |
| Age (years)           | 0.00 (0.00)     | 0.404  | 0.00 (0.00)     | 0.369  | 0.00 (0.00)     | 0.449  | 0.00 (0.01)    | 0.713  |
| Place of residence    |                 |   |                   |   |                 |   |                       |   |
| Cyprus (reference)    |                 |   |                   |   |                 |   |                       |   |
| Greece                | -0.10 (0.03)    | <0.001 | -0.09 (0.03)    | 0.001  | -0.09 (0.03)    | 0.001  | -0.28 (0.07)   | <0.001 |
| Married               |                 |   |                   |   |                 |   |                       |   |
| No (reference)        | 0.02 (0.03)     | 0.494  | -0.01 (0.03)    | 0.845  | -0.03 (0.03)    | 0.453  | -0.01 (0.09)   | 0.895  |
| Higher educational level |             |   |                   |   |                 |   |                       |   |
| High school at most (reference) |     |   |                   |   |                 |   |                       |   |
| 2 year post high school education | -0.11 (0.05)    | 0.023  | -0.10 (0.05)    | 0.045  | -0.11 (0.05)    | 0.032  | -0.31 (0.13)   | 0.019  |
| University            | -0.09 (0.04)    | 0.041  | -0.11 (0.04)    | 0.007  | -0.13 (0.05)    | 0.005  | -0.33 (0.12)   | 0.005  |
| Master/ PhD           | -0.14 (0.04)    | 0.001  | -0.12 (0.04)    | 0.003  | -0.21 (0.05)    | <0.001 | -0.46 (0.12)   | <0.001 |
| Employed              |                 |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   |                 |   |                   |   |                 |   |                       |   |
| Working years in total|                 |   |                   |   |                 |   |                       |   |
| 0.00 (0.00)           | 0.123  | 0.00 (0.00)     | 0.528  | 0.00 (0.00)     | 0.668  | 0.00 (0.01)    | 0.950  |
| Do you have minor children? |             |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   | -0.04 (0.03)    | 0.220  | -0.04 (0.03)    | 0.143  | -0.04 (0.03)    | 0.277  | -0.12 (0.09)   | 0.165  |
| Taking care of elders (>70 years) or patients with chronic disease |             |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   | 0.13 (0.03)     | <0.001 | 0.17 (0.03)    | <0.001 | 0.08 (0.04)     | 0.025  | 0.39 (0.09)    | <0.001 |
| Living status during the pandemic |             |   |                   |   |                 |   |                       |   |
| With others (reference) |             |   |                   |   |                 |   |                       |   |
| Alone                 | 0.01 (0.04)     | 0.766  | 0.04 (0.04)     | 0.361  | 0.00 (0.05)     | 0.977  | 0.06 (0.12)    | 0.619  |
| Persons living in the same house | 0.02 (0.01)    | 0.047  | 0.02 (0.01)    | 0.042  | 0.03 (0.01)     | 0.021  | 0.07 (0.03)    | 0.017  |
| Suffering from chronic disease |             |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   | 0.07 (0.04)     | 0.094  | 0.08 (0.04)     | 0.060  | 0.02 (0.04)     | 0.579  | 0.17 (0.11)    | 0.122  |
| Under treatment       |                 |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   | 0.04 (0.04)     | 0.243  | 0.05 (0.04)     | 0.183  | 0.06 (0.04)     | 0.126  | 0.14 (0.10)    | 0.150  |
| Being vaccinated against common flu |             |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   | 0.02 (0.03)     | 0.570  | 0.00 (0.03)     | 0.962  | -0.01 (0.03)    | 0.674  | 0.01 (0.08)    | 0.876  |
| Diagnosed with chronic mental disease |             |   |                   |   |                 |   |                       |   |
| No (reference)        |                 |   |                   |   |                 |   |                       |   |
| Yes                   | 0.01 (0.05)     | 0.774  | 0.22 (0.05)     | <0.001 | 0.05 (0.06)     | 0.390  | 0.27 (0.14)    | 0.055  |

PROBLEM-FOCUSED COPING STRATEGIES
1. Follow strict personal protective measures (e.g. hand washing, use of face masks, gloves, etc.).
2. Confront any person as potentially infected with coronavirus.
3. Acquiring knowledge about coronavirus (e.g. symptoms, mechanism of transmission, etc.).
4. Avoiding the use of public transport.
5. Engaging in health-promoting behaviors (e.g. rest, exercise, balanced diet, etc.).
6. Participation in leisure activities (e.g. movies, outdoor exercises, surfing the internet, etc.).
7. Acquiring knowledge and information about mental health.
8. Practicing relaxation techniques (e.g. diaphragmatic breathing, meditation, etc.).
9. Talking with family and friends, (phone, chat) to reduce stress and seek emotional support.
10. Dealing the situation with a positive attitude.
11. Seeking help from a mental health professional.
12. Limiting the time spent on media news about the pandemic and related deaths.
13. Relieving and managing emotions.
14. Use of alcohol or drugs.
15. Use of sedative anxiolytic drugs.

*Regression coefficient (Standard Error).
general population and their role in reducing the adverse consequences of this stressful condition constitutes an important public health issue. As observed in this study, people use various coping methods to deal with stressors such as disease outbreaks or natural disasters (Taha, Matheson, Cronin & Anisman, 2014). The relationship between stress and coping strategies has been a topic of previous studies (Taha et al., 2014; Chew et al., 2020; Peng et al., 2010) because in critical situations, stress affects many people, but individual responses vary according to their behavioral and cognitive appraisal. According to the classic theory of Folkman et al. (1986), stress arises when the demands of the environment exceed the resources to cope with a situation perceived as threatening. Regarding the effects of the COVID-19 health crisis, 17.4% of the participants in our study had low overall IES-R score indicating mild psychological impact, 7% of participants showed moderate psychological impact while 26.5% showed severe psychological impact. 30.4% of the respondents showed severe psychological impact, 6.2% reported a moderate psychological impact, and 14.4% showed mild psychological impact in Rodríguez-Rey et al study (2020). Similar results were found in the study of Wang et al., 2020.

5.1. Coping strategies during the COVID-19 pandemic

Concerning the coping strategies during the COVID-19 pandemic, in our study, participants scored as important or very important: item 10 (96.5%) “Dealing with the situation with a positive attitude”, item 1 (95.9%) “Follow strict personal protective measures”, item 3 (94.6%) “Obtain information about coronavirus”, item 5 (89.6%) “Engage in health-promoting behaviors”, item 12 (75.5%) “Limit the time spent on media news about the pandemic and related deaths.” Coping strategies used from our sample indicate that participants applied both emotion-focused (items 10, 12) and problem-focused (items 1, 3, 5) coping to deal with the stress of the pandemic. In previous studies (Sim et al., 2010; Puterman, Delongis, Lee-Bagley & Greenglass, 2009) both emotion-focused and problem-focused coping was reported to effectively reduce negative emotions, including anger and sadness, during the pandemic outbreak. Li (2020) stated that 37.24% of the participants in their study used both emotion-focused and problem-focused coping, 11.45% of the respondents used problem-focused coping, and 51.31% used emotion-focused coping. Participants who used both emotion-focused and problem-focused coping had better psychological status than those using emotion-focused coping (Li, 2020). In the study by Kar et al. (2021), most people “hoped for the best”, which is an emotion-focused coping strategy. Some frequently used problem-focused strategies, as demonstrated in the study performed by Kar et al. (2021), where the participants were “remaining busy in activities”, “problem-solving”, and some used emotion-focused strategies in “sharing feelings”, and “talking to others”. Eisenbeck et al. (2022) found that emotion-focused coping strategies were adversely associated with health and well-being. Previous findings show that emotion-focused coping, especially avoidance-based, is often negatively associated with psychological health (Lau et al., 2016; Kołodziejczyk et al., 2021, Taha et al., 2014; Puterman et al., 2009; Huang, Lei, Xu, Liu & Yu, 2020). The above-mentioned findings may also indicate that people use emotion-focused coping strategies, particularly when they feel distressed and unable to confront the situation (Lazarus & Folkman, 1984). In the study of Eisenbeck et al. (2022), problem-focused strategies predicted better mental health, including reduced stress (Eisenbeck et al., 2022). Some previous studies reported that problem-focused coping strategies (e.g., problem solving, cognitive restructuring, active coping, and planning) were associated with better psychological adjustment during epidemics (Taha et al., 2014; Puterman et al., 2009), while others reported inverse relationships with mental health (Huang et al., 2020; Kołodziejczyk et al., 2021).

Several studies revealed the importance of the public’s compliance with the precautions for COVID-19 (Wang et al., 2020; Park et al., 2020). Wang et al. (2020) suggested that the precautionary measures adopted to prevent the spread of COVID-19 could have had protective psychological effects during the early stage of the pandemic. “Follow strict personal protective measures” (item 1), as national authorities indicated, is an adaptive, problem-focused, coping strategy used by the responders in our study. Furthermore, 94.6% of the responders in the current study reported that it is important or very important to “Obtain information about coronavirus” (item 3). Nearly all respondents in one other study desired additional information about COVID-19, most frequently with respect to the route of transmission (96.9%) and details on symptoms of COVID-19 infection (91.6%) (Wang et al., 2020). One other study concluded that poor or inadequate information from public health authorities may be a significant stressor because it provides inappropriate guidelines concerning call for actions or leads to confusion (Serafini et al., 2020). Additionally, “Limit the time spent on media news about the pandemic and related deaths” was an emotion-focused coping strategy adopted by our sample. Participants in the study of Munawar & Choudry (2021) reported that one of the major elements of stress is prolonged exposure to the news and social media. They stated that news is an unreliable source of information and creates panic.

5.2. Correlations of coping with COVID-19 items and IES-R scales

Our results revealed that the highest and positive coefficients were recorded for the association of IES-R scales with items 8, 9, 11, 12, 13, 15. Emotion-focused coping strategies were mainly related to IES-R scores in our study, except for item 8 (practicing relaxation techniques). Similar results were found in the study by Kar et al., 2021. The results of this study suggested that “hoping for the best” was the most frequent way of coping, followed by “remaining busy”. Most of the responders in the same study coped through “religious faith”, “trying to deal with the issues as they face them”, “sharing feelings”, “talking to others” and “avoiding thinking about the current stressful situation” (Kar et al., 2021).

Recently, Chew et al. (2020) introduced coping mechanisms, mainly emotion-focused, most often presented among populations facing pandemics, with self-distraction being the most commonly used avoidance strategy. The quarantine individuals were considerably more likely to use self-distraction as a coping strategy in one recent study (Eisenbeck et al., 2022). Moreover, a positive correlation was found between the act of turning to religion and IES-R scores as well as between seeking instrumental support and PTSD symptoms in the same study (Eisenbeck et al., 2022). The results of the study by Chávez-Valdez et al. (2021) revealed reliable indicators of physiological coping and PTSD symptoms. A 42% variance was related to PTSD delayed intrusive cognitive responses, a 40% variance was related to PTSD negative alterations in cognitions and mood, a 31% variance was explained by hyperarousal responses, and a 29% variance represented PTSD avoidance symptoms.

The mediating effect of social support as a coping strategy on the association of perceived stress and mental health has long been recognized (Mak et al., 2009). People commonly access family and social networks to elicit support following trauma. Lower levels of social support are strongly related to a higher risk of post-traumatic stress symptoms (Brewin, Andrews & Valentine, 2000). In our study, talking with family and friends and seeking emotional support (item 9) was associated with higher IES-R scores.

5.3. Predictors of stress

Our results revealed that men had significantly lower scores on all IES-R subscales as compared to women. Previous studies have shown that gender differences were also an important predictor of stress. In
particular, women, younger people, and those at higher health risks were found to have more psychopathological symptoms (Rodríguez-Rey et al., 2020; Mazza et al., 2020). Wang et al., 2020 suggests that females suffered a greater psychological impact from the outbreak as well as higher levels of stress, anxiety, and depression. This finding may also be linked to evidence in the international literature revealing that women tend to be more vulnerable to experiencing stress and developing post-traumatic symptoms (Brewin et al., 2000). Also, subjects living in Greece had lower scores on all IES-R subscales as compared to subjects living in Cyprus. This finding might reflect the amount and quality of information given by the media. Higher educational level and being employed were found to be associated with lower scores on the IES-R subscales. Lower education level was significantly associated with a higher risk of psychiatric disorders during the COVID-19 outbreak in several studies (Wang et al., 2020; Mazza et al., 2020). Lower education level was also associated with a higher risk of distress during the SARS outbreak (Peng et al., 2010). Taking care of the elderly (>70 years old) or patients with chronic disease, and an increased number of persons living in the same house were associated with greater scores on the IES-R subscales in the present study. Some other studies revealed similar results (Wang et al., 2020, Rodríguez-Rey et al., 2020; Mazza et al., 2020). Furthermore, subjects diagnosed with chronic mental diseases had greater scores on hyper-arousal subscale in our study. People with mental health conditions could be more influenced by the emotional responses brought on by the COVID-19 pandemic compared with the general population. High susceptibility to stress may result in relapses or worsening of an already existing mental health condition (Yao, Chen & Xu, 2020).

5.4. Limitations

There are several limitations in our study. First, the study employed an online self-report survey to collect data, thus participants’ responses may have been subject to response bias. Second, participants in this study were recruited by a non-random snowball sampling strategy, which may have produced selection bias, and the results should not be generalized to the entire population. Further, although different recruitment methods were employed, the sample was not representative of the general population of the two countries and probably underrepresented more vulnerable groups such as the elderly and low-educated individuals. For example, females (74.2%) and highly educated individuals (approximately 73.5%) were overrepresented while people without access to smartphones and the Internet were likely underrepresented. The use of more thorough questions concerning coping strategies, for instance, turning to religion, would provide a light on the effect of this specific coping strategy, which was not clearly considered in this study. We only examined relaxation techniques and meditation that might be considered as a part of religious rituals. The cross-sectional design of the study does not allow the establishment of a cause-effect relationship or the examination of the participants’ behavior over a period of time. Finally, coping strategies in this study were assessed as 15 statements concerning the pandemic outbreak, and a standardized and reliable instrument was not used.

5.5. Implications

The psychological impact caused by the rapid spread of the pandemic needs to be clearly recognized as a public health issue. Prolonged stress is associated with other physical and psychological health problems. Psycho-educational programs can reduce the burden of the disease and the destructive mental health consequences of this outbreak. Coping strategies identified may be incorporated into psycho-educational programs as well as telemental health programs in order to educate the general population to use adaptive and applicable coping strategies aiming to prevent stress and the long-term development of mental disorders. It seems crucial to examine the different coping strategies that have been adopted by the general population and their role in reducing the influence of this stressful condition. Therefore, the adaptive coping strategies identified in this pandemic outbreak should be selected to guide clinical operation and policymaking, in order to implement more cost-effective policies. Coping strategies identified in the current study should be analyzed in order to constitute a valid and reliable tool for mental health professionals. Future research should try to obtain more representative samples by using random sample selection. Further studies are needed to extend the findings of this study and to confirm the longitudinal effect of coping strategies in reducing stress.

6. Conclusion

The study provides information about stress, coping strategies, and their correlations in the general population of Greece and Cyprus during COVID-19 lockdown. The psychological impact caused by the pandemic need to be clearly recognized as a public health issue. Regarding the effects of the COVID-19 pandemic, a major proportion of the participants in this study showed severe psychological impact. The extent to which each coping strategy was helpful for relieving psychological distress was associated with several factors, including one’s appraisal of the situation, demographic factors, and other environmental factors. Reducing stress in periods of stressful conditions like outbreaks remains a challenge for mental health professionals. Addressing stress levels with the use of functional coping strategies can be beneficial to protect the general population from adverse psychological outcomes. Coping strategies identified may be used as guidance for psycho-educational and telemental health programs. To our knowledge, this is the first study that investigates a set of specific, COVID-19 related coping strategies. A valid and reliable tool consisting of a set of specific, COVID-19 related coping strategies is pivotal for mental health professionals.

Author statements

Author Contributions: All authors have contributed equally to this work. EK and GK conceived the idea of this paper and work on the conceptualization and on the supervision the entire process, and added important intellectual content. All authors have contributed to the study design and methodology and data curation. EK, EE, AG, EA, PG and DK contributed substantially in the manuscript write-up. EK, EE and AG extracted themes and rechecked the results of thematic analysis. CT. performed the data analysis. GK, AG and EE were involved in the interpretation and validation of the data. All authors were involved in the writing of the original draft, review and editing of the work and approved the final version of the manuscript.

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Patient consent for publication

Not required.

Data availability statement

Data are available upon reasonable request.

Ethics approval

Ethics approval was provided by the Cyprus National Bioethics Committee (ref. number 2020.01.81).
Conflict of interests
None declared. The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary materials
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