

Resilience And Mental Health Among Young Adults In The Context of Lockdown Due To The COVID-19 Pandemic

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Research Article

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Abstract

Purpose: Psychological resilience is defined as the ability of an individual to adapt to adverse situations and in a certain way regulate mental health. Currently, the COVID-19 pandemic and lockdown measures implemented to avoid infection are considered risk agents for the development of mental disorders. The objective of this study is to explore the relationship between resilience capacity and the presence of depressive symptoms and poor sleep quality in the context of lockdown due to the pandemic.

Methods: The sample consisted of $n = 8,426$ young adults who were recruited via convenience sampling. Sociodemographic and mental health data was collected through online surveys. Previously validated tests were used to collect information on depression and sleep quality. Restriction of mobility was evaluated using information from Google Mobility Reports.

Results: Most of participants were highly educated women. Independently from sex, age and other confounders, individuals with psychological resilience were less likely to develop depressive symptoms or sleep disorders during confinement due to the COVID-19 pandemic. Moreover, higher mobility restriction was associated with depression but not with bad sleep quality. In this way, a longest stay at home and a higher restriction of mobility to groceries and pharmacies were related to depression.

Conclusions: These results show evidence of the importance of psychological resilience on mental health, and can contribute to the development of preventive public health interventions to face the negative effects of confinement on mental health.

1. Introduction

The impact of the COVID-19 pandemic, caused by the SARS-CoV-2 coronavirus, has generated an unprecedented damage to public health and therefore to the health of individuals. The rapid spread of the virus, and the lack of knowledge about its prevention and treatment, have resulted in an alarming increase of infected patients, who in some cases have experienced long-lasting effects or even death [1]. While it is clear that the COVID-19 pandemic represents a serious threat to physical health, it has been suggested that it may also affect the mental health of the population [2].

For instance, recent literature indicates that individuals who have been affected by COVID-19 are likely to display psychological problems that in turn could trigger severe mental disorders [1–4]. Previous research also argues that at least one out of every five new patients diagnosed with COVID-19 presents psychological alterations which result in poor mental health [5–6]. Similarly, it has been suggested that patients who have recovered from the disease might manifest some type of psychopathology after several years [7–8].

Individuals suffering from COVID-19, as well as those who have recovered from the virus, display depressive symptoms, anxiety disorders, post-traumatic stress disorder, panic attack, psychomotor agitation, and sleep disorders more frequently than the rest of the population [1, 5, 9–11]. Despite the fact

that most of the issues associated with mental health were detected in COVID-19 patients, there is empirical evidence that suggests an alteration of mental health in the general population. For example, it has been observed that non-infected individuals may show some type of psychopathological symptoms, largely caused by the lockdown measures established to reduce widespread infection [7].

In different countries around the world, ordinances were established that required citizens to use biohazard protection implements such as facemasks, practice social distancing, and to stay in confinement, avoiding unnecessary travel to reduce the rate of infection [12]. These guidelines aimed at protecting physical health overlooked the mental health of the population, becoming high risk factors for the development of mental disorders which can be aggravated by the presence of other risk factors such as low income, unemployment, student dropout, and interpersonal conflicts [13].

In addition, it has been suggested that experiencing prolonged periods of self-isolation or going back to previous stages of isolation result in an increase in anxiety and depression symptoms, stress and loss of sleep [14]. Furthermore, research shows that mobility restrictions, as well as the prohibition of trips and outings during confinement can cause a decrease in social communication, less interaction with peers, and fewer relationships with the community, contributing to the appearance of feelings of loneliness, frustration, hopelessness, and emotional instability; characteristics that modulate the development of psychopathological disorders. [8, 15–17].

Although self-isolation itself plays an important role in the increment of mental health problems in the general population, there are other factors that can precipitate and trigger the psychopathological symptoms mentioned above. For instance, it has been found that people who have less interpersonal contact within their household, tend to report higher scores in anxiety, depression, sleep disorders and stress [18]. Likewise, recent studies suggest that being alone during lockdown has a greater impact on the development of depressive symptoms and sleep disturbances compared to being accompanied of relatives within the household [19–20].

Although these psychological reactions are considered as normal responses to the possible infection of COVID-19, their onset and development will also depend on the particular psychological characteristics of individuals [10]. In fact, several studies have shown that individuals who present higher psychological qualities such as self-confidence, self-esteem and optimism have better mental health [21]. Along the same line, it has also been shown that resilience is the main protective factor against the development of psychopathological symptoms [22]. Psychological resilience involves two peculiarities: the need to go through or be going through an adverse situation; and the execution of this dynamic process to overcome the threatening circumstance [23].

Psychological resilience implies more than just the individual's ability to overcome adversity, it comprises a dynamic construct, which is why different measuring instruments have been used to assess this capability. One of these instruments is Antonovsky's Sense of Coherence (SOC) scale that is intended to measure resilience through this construct, which is considered as a relevant factor within the notion of resilience [24]. In this way, SOC scale seeks to assess an individual's ability to perceive, understand and

predict the events happening around them, as well as the manageability and the meaning that is given to said events. The original version of this scale has undergone some modifications and adaptations [25], currently there is a short version of 15 items with a consistent factorial structure [26].

Although it is known that resilience constitutes a protective factor over mental health in times of adversity in general [27–28], few studies have investigated the relation between resilience and mental health in the context of the lockdown due to the COVID-19 pandemic [22]. Therefore, the objective of this study is to assess whether resilience capacity of an individual is related to depressive symptoms and poor sleep quality in a group of young adults of the general population in the context of lockdown due to the pandemic.

2. Methods

2.1 Design and context

The present is a cross-sectional study. Data was collected via an online, self-administered survey, between May and June 2020 when lockdown in Ecuador was mandatory.

2.2 Participants and sampling

Participants were young adults (18 to 35 years of age) who voluntarily decided to partake in the study. Participants were recruited by convenience sampling via invitations sent on social media sites, and institutional platforms of different universities in Ecuador. A total of 8426 participants were recruited.

2.3 Instruments

2.3.1 Patient Health Questionnaire (PHQ-9)

This is a highly sensitive psychometric instrument consisting of nine items that identify symptoms of depressive disorder based on the DSM-5 criteria. This questionnaire assesses the symptoms of depression present during the two weeks prior to taking the test. Scores are measured using a Likert scale (0–3 points) that ranges from “not at all” to “nearly every day”. The final score ranges from 0 to 27. The higher the score, the more severe symptoms of depression. In this way, scores from 0 to 4 suggest none to minimal depression, from 5 to 9 mild, from 10 to 14 moderate, from 15 to 19 moderate/sever and >20 severe depression [29].

2.3.2 Pittsburgh Sleep Quality Index (PSQI)

This is a 24-item questionnaire that assesses the quantitative and qualitative aspects of sleep quality for a time period of one month. For this evaluation, the report of an individual sleeping with the evaluated subject is considered in addition to the participant's self-report. This instrument consists of seven elements: sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each of these items is measured with a score from zero to three,

obtaining a maximum score of twenty-one points. Higher scores indicate a poorer quality of sleep, being a total score greater than five points the cut-off point that indicates poor quality of sleep [30].

2.3.3 Sense of Coherence scale (SOC-15)

In order to determine resilience capacity, the SOC questionnaire was used, which measures the sense of coherence of an individual, who is considered the main element within this construct. It should be noted that the reduced version validated by Ortiz-Granja (2019), which consists of fifteen items was used. This instrument uses a Likert-type model for scoring, with answers that range from “never” (one point) to “always” (five points). The minimum scores is 15 and the maximum 75, with the highest scores representing a greater sense of coherence [31]. Scores from 15 to 29 suggest very low, from 30 to 44 low, from 45 to 59 high, and > 59 very high sense of coherence.

2.3.4 Sociodemographic variables and compliance with the lockdown

Sociodemographic data of participants was collected as part of the on-line survey as previously described in our preprint publication [32]. Compliance with lockdown measures was measured indirectly analyzing information extracted from COVID-19 Community Mobility Reports [33]. In this way, we matched the day when the survey was answered with its corresponding percentage change of mobility according to COVID-19 Community Mobility Reports. Three aspects of mobility were evaluated: time spent on residency places, mobility towards groceries and pharmacies and to retail and recreation. Details on how percentage change was calculated is explained elsewhere [33].

2.4 Statistical analysis

Categorical variables were summarized by frequency and percentages. Median and interquartile range (IQR) were used to summarize numerical variables since all were non/normally distributed. Association between categorical variables and biological sex was tested using Chi2 test. Association between numerical variables and biological sex was tested using rank-sum test. We considered two main outcomes: PHQ-9 score depicting depression and PSQI depicting quality of sleep. Our main explanatory variable was SOC-15 depicting resilience. In order to study the association between the outcomes and explanatory variables we implemented two regression models with restrictive cubic splines (RCS), one for PHQ-9 and one for PSQI. RCS regression model determined the shape of the relationship between PHQ-9 and PSQI and SOC-15 without any prior assumption. RCSs fitted a smooth continuous curve of adjusted means with 95% confidence intervals (95% CIs) across SOC-15 levels. RCSs allowed for changes in the function at defined knot points and restricted the splines to linear relationships at the tail ends. Knot points were located at percentiles 5, 27.5, 50, 72.5, and 95 of SOC-15 values, as previously recommended to avoid forcing curvature or inflections [34] R version 3.6.3 (2020-02-29) and related packages including rms were used to analyze the data [34–35]. To check the influence of mobility restrictions we also included the percentage change of mobility for retail and recreation, residential places and groceries and pharmacies as covariates in the models. Models were adjusted by age (years), biological sex

(male/female), zone of residence (urban/rural), use of sleeping pills (yes/no), living with a partner (yes/no), occupation (student/have a job/unemployed) and people living at home (1/2–3/4–5/>5).

3. Results

3.1 General characteristics of the sample and compliance with lockdown

The sample included 8426 people. The majority of participants were female (70.53%, $n = 5943$), with a median age of 21 years old (IQR: 19.00, 25.00), reported living in urban areas (70.73%, $n = 5960$), not consuming sleep pills (97.70%, $n = 8232$), and not having a partner (81.60%, $n = 6876$). While the majority were university students (83.91%, $n = 7070$), some reported having a job (10.69%, $n = 901$) and few were unemployed (5.40%, $n = 455$).

Mandatory lockdown due to the pandemic had a profound effect on the mobility of the population. Between May and June 2020 mobility in general was reduced by near 50% in comparison to January – February of the same year. Mobility to transit stations (-52.93, SD 7.71), to retail and recreation (-47.22, SD 19.87), and to parks (-46.44, SD 8.67) experienced higher reduction in comparison to mobility to workplaces (-39.83, SD 12.76) and to groceries and pharmacies (-29.75, SD 12.00). In contrast, staying at home increased by 23.71 (SD 3.20).

3.2 Sense of coherence, depression and sleep quality

Median SOC – 15 score of the sample was 61 (IQR: 55.00, 67.00) with a minimum and maximum of 15.00 and 75, respectively. A high ($n = 2961$, 35.14%) or very high ($n = 4944$, 58.68%) sense of coherence was reported by nearly 94% of individuals, the remaining 6% reported low ($n = 487$, 5.78%) or very low ($n = 34$, 0.40%) sense of coherence. Median PHQ-9 score of the sample was 3 (IQR: 1.00, 7.00) with a minimum and maximum of 0.00 and 27, respectively. Symptoms of mild to moderate depression were reported by nearly 36% of the individuals (mild: 27.20%, $n = 2292$; moderate: 9.23%, $n = 778$). Symptoms of moderate/severe to severe depression were reported by nearly 6% of participants (moderate/sever: 3.96%, $n = 334$; sever: 1.95%, $n = 164$). Median PSQI of the sample was 4 (IQR: 2.00, 7.00) with a minimum and maximum of 0.00 and 17, respectively. Bad quality of sleep was reported by nearly 38.52% ($n = 3246$) of participants. A summary of SOC-15, PHQ-9, PSQI and corresponding groups given by respective cut-off points by biological sex is depicted in Table 1.

3.3 Resilience and depression in the context of the lockdown

An inverse non-linear relationship was found between depression and sense of coherence ($F = 13.79$, $p < 0.001$). As it is shown in Fig. 1 higher scores of PHQ-9 were associated with lower SOC-15 scores, suggesting that depression is associated with lower resilience. We also found that restriction of mobility was associated with depression. In this way, a longest stay at home was related with higher scores of PHQ-9 ($F = 10.35$, $p = 0.001$; Fig. 1, panel a). Similarly, a higher restriction of mobility towards groceries

and pharmacies was related to higher scores of PHQ-9 ($F = 5.85, p = 0.016$; Fig. 1, panel b). Depression was not associated with restriction of mobility because of retail and recreation ($F = 1.25, p = 0.263$).

3.4 Resilience and sleep quality in the context of lockdown

An inverse non-linear relationship was found between quality of sleep and sense of coherence ($F = 13.63, p < 0.001$). As it is shown in Fig. 2 higher scores of PSQI were associated with lower SOC-15 scores, suggesting that bad sleep quality is associated with lower resilience. In contrast to depression, sleep quality was not significantly associated to time spend at residential places ($F = 0.41, p = 0.524$), neither to mobility towards groceries and pharmacies ($F = 0.84, p = 0.358$) or retail and recreation ($F = 0.01, p = 0.905$).

3.5 Depression and sleep quality and covariates

Depression was significantly associated with age ($F = 4.21, p = 0.040$), sex ($F = 76.64, p < 0.001$), area of residence ($F = 6.98, p = 0.008$), and consumption of sleeping pills ($F = 113.59, p < 0.001$), but not with living with a partner ($F = 1.94, p = 0.164$), occupation ($F = 1.10, p = 0.334$) or persons living at home ($F = 1.00, p = 0.391$). In this way, older people, females, people living in urban areas, and who consumed sleeping pills showed higher PHQ-9 values. Similarly, sleep quality was significantly associated with age ($F = 22.55, p < 0.001$), sex ($F = 5.33, p = 0.021$), area of residence ($F = 37.80, p < 0.001$), consumption of sleeping pills ($F = 131.93, p < 0.001$), and living with a partner ($F = 11.90, p = 0.001$), but with occupation ($F = 0.44, p = 0.646$) or persons living at home ($F = 2.36, p = 0.069$). In this way, older people, females, people living in urban areas, who consumed sleeping pills or lived with less people showed higher PSQI values.

4. Discussion

The present study examined psychological resilience and two aspects of mental health (i.e. depression and sleep quality) in the context of restriction of mobility due the COVID-19 pandemic. The results obtained in this study indicate that an individual's capacity to adapt to adverse circumstances can modulate the appearance of mental disorders during confinement due to the COVID-19 pandemic. Correspondingly, a greater alteration in mental health was also evidenced in those individuals who experienced more restrictions regarding their mobility.

The results obtained in this study are in accord with those from previous studies, where it has been shown that psychological resilience is associated with the appearance of depressive disorders and sleep disorders during confinement, both for individuals who have been infected with the virus, and those who have not. Empirical evidence has demonstrated that non-infected people with low psychological resilience have a higher risk of presenting psychopathological alterations, especially associated with the presence of mood disorders [36–37]. In this same group it has been found that longer periods of confinement due to the pandemic, paired with a lower capacity to adapt, increase an individual's risk to develop depressive and sleep disorders [38–39]. The same has been observed in individuals who have

recovered from the virus, where patients with less psychological resilience are more likely to develop mental disorders [40–41]. Although resilience by itself has an effect on the psychological effects endured by COVID-19 patients, there are other variables that might intervene to preserve or alleviate the mental health of an individual. For instance, studies have found that patients who spent fewer days at the hospital, performed more daily exercise, and received sunlight out in the open, showed a greater resilience capacity and also had a better capacity to recover from the disease [19, 36, 42]. Additionally, it has been shown that resilience might be a protective factor that mitigates the impact of the pandemic on mental health and reduces the probability of developing psychiatric disorders for both COVID-19 patients and for the population in general [42–47]. A lower psychopathological presence was also found in frontline healthcare professionals who displayed better resilience. They also responded with greater assertiveness and were more efficient at work in comparison to their colleagues who had less adaptation capacity [36, 48]. In any case, both low and high resilience capacity can modulate the presence of mental disorder.

This study also found an association between mobility restrictions and mental health. Essentially, individuals who engaged in trips and outings less frequently during lockdown, reported more depressive symptoms and poorer quality of sleep. These results are consistent with previous studies, which have also obtained relevant associations on this topic. For example, associations have been found between emotional eating and reduced trips to workplaces and parks [32]. The same is true for sleep quality, where a deterioration has been detected, due to restrictions of mobility and stress generated during lockdown [8, 49–50]. Other studies have shown that reduced exposure to daylight and the lack of external “timekeepers” to help regulate an individual’s schedule affect their circadian rhythm and therefore their sleep pattern, resulting in poorer quality of sleep and a higher prevalence of sleep disorders such as insomnia and daytime sleepiness [14, 38, 51–54]. Similarly, increasing symptoms of anxiety and depression have been identified on individuals who have not left their homes due to imposed restrictions or who have spent more time at home without traveling to workplaces, parks, or to carry out outdoor activities [7, 42]. Although psychological resilience is described as an influential agent in people’s mental health, other variables such as social support, communication and good interpersonal relationships can also result influential during self-isolation and lockdown. Along these lines, studies have also suggested that individuals who keep in contact with family and friends have an improved quality of life. Likewise, individuals who receive greater social support from their family and friends show better resilience [16, 20]. While social support is linked to a better adaptation and coping with the pandemic, other factors such as good sleep quality, exercise, and religious beliefs can also lead to a better assimilation of adverse circumstances [7, 38, 42]. Although most variables have been positively associated with the ability to cope with problems and overcome adversity during lockdown, other factors such as substance abuse could precipitate and trigger the development of psychopathologies, [19, 47].

Lastly, our results also indicated an association between greater psychopathological symptoms and resilience capacity, and staying at home, results that are consistent with previous studies [42]. These findings can also be the result of lockdown and mobility restrictions, where there is evidence of a loss of personal autonomy, less social contact and support, a decrease in recreational activities, and greater

interpersonal conflict in the household [47]. Essentially, and in a general manner, the expected results were obtained regarding the association between the elements discussed in this project.

4.1 Strengthens and limitations

One of the strengths of this study is the size of the sample, which included near 9,000 participants of the general population, which can provide a good picture of the mental health issues associated with the lockdown due to the pandemic. Moreover, we used previously validated instruments to collect information and objectively measured the impact of lockdown measures in the population. Nonetheless, the present work had certain limitations. For example, variables that could influence a person's resilience capacity during lockdown were not considered, such as substance use and social support. Likewise, it has also been suggested that exercise can modulate and regulate an individual's capacity for psychological resilience [55]. This variable should be taken into consideration in future research projects, to determine its influence as a protective factor to avoid the development of mental disorders or psychopathological symptoms. Moreover, although our sample included a good number of participants, they were recruited by convenience sampling, which could affect the external validity of our study. Still our findings open the discussion regarding the effects of lockdown on mental health among young adults and the need of public health policies directed to enhance resilience in order provide psychological tools to resist to adversity.

5. Conclusion

In young Ecuadorian adults higher resilience is associated with less depression and better quality of sleep in the context of the lockdown due to the COVID-19 pandemic. Depression, but not sleep quality was associated with higher mobility restriction.

Declarations

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Availability of data and material: All data are available upon request to the corresponding author.

Code availability: Analysis was performed using R and related packages. Code is available upon request to the corresponding author.

Authors' contributions: All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Vinueza-Veloz. The first draft of the manuscript was written by Guerrero-Vaca, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Additional declarations: not applicable

Ethics approval: The study was carried out following the Declaration of Helsinki to work with human beings and in accordance with the "Singapore Declaration on Integrity in Research". It was approved by the Scientific Committee of the School of Medicine and Instituto de Investigación (IDI) of the Escuela Superior Politécnica de Chimborazo. The manuscript does not report the results of a clinical trial nor patient data.

Consent to participate: All participants accepted and filled an informed consent form included at the beginning of the survey. Participant's responses were anonymous and confidential.

Consent for publication: Not applicable.

References

1. Barzilay R, Moore TM, Greenberg DM, DiDomenico GE, Brown LA, White LK, Gur RC, Gur RE (2020) Resilience, COVID-19-related stress, anxiety and depression during the pandemic in a large population enriched for healthcare providers. *Translational Psychiatry* 10(1):1–8. <https://doi.org/10.1038/s41398-020-00982-4>
2. Prime H, Wade M, Browne DT (2020) Risk and resilience in family well-being during the COVID-19 pandemic. *Am Psychol* 75(5):631–643. <https://doi.org/10.1037/amp0000660>
3. Horesh D, Brown AD (2020) Covid-19 response: Traumatic stress in the age of Covid-19: A call to close critical gaps and adapt to new realities. *Psychological Trauma: Theory Research Practice Policy* 12(4):331–335. <https://doi.org/10.1037/TRA0000592>
4. Hossain MM, Tasnim S, Sultana A, Faizah F, Mazumder H, Zou L, McKyer ELJ, Ahmed HU, Ma P (2020) Epidemiology of mental health problems in COVID-19: A review. In *F1000Research* (Vol. 9). F1000 Research Ltd. <https://doi.org/10.12688/f1000research.24457.1>
5. Ahmed MZ, Ahmed O, Aibao Z, Hanbin S, Siyu L, Ahmad A (2020) Epidemic of COVID-19 in China and associated Psychological Problems. *Asian Journal of Psychiatry*, 51. <https://doi.org/10.1016/j.ajp.2020.102092>
6. Fountoulakis KN, Apostolidou MK, Atsiova MB, Filippidou AK, Florou AK, Gousiou DS, Katsara AR, Mantzari SN, Padouva-Markoulaki M, Papatriantafyllou EI, Sacharidi PI, Tonia AI, Tsagalidou EG, Zymara VP, Prezerakos PE, Koupidis SA, Fountoulakis NK, Chrousos GP (2021) Self-reported changes in anxiety, depression and suicidality during the COVID-19 lockdown in Greece. *J Affect Disord* 279:624–629. <https://doi.org/10.1016/j.jad.2020.10.061>

7. Ramiz L, Contrand B, Rojas Castro MY, Dupuy M, Lu L, Sztal-Kutas C, Lagarde E (2021) A longitudinal study of mental health before and during COVID-19 lockdown in the French population. *Globalization Health* 17(1):1–17. <https://doi.org/10.1186/s12992-021-00682-8>
8. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, Ng CH (2020) Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The Lancet Psychiatry* 7(3):228–229. [https://doi.org/10.1016/S2215-0366\(20\)30046-8](https://doi.org/10.1016/S2215-0366(20)30046-8)
9. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, Zheng J (2020) The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Res*, 287. <https://doi.org/10.1016/j.psychres.2020.112934>
10. Mikocka-Walus A, Stokes M, Evans S, Olive L, Westrupp E (2021) Finding the power within and without: How can we strengthen resilience against symptoms of stress, anxiety, and depression in Australian parents during the COVID-19 pandemic? *Journal of Psychosomatic Research* August. <https://doi.org/10.1016/j.jpsychores.2021.110433>
11. Rehman U, Shahnawaz MG, Khan NH, Kharshiing KD, Khursheed M, Gupta K, Kashyap D, Uniyal R (2021) Depression, Anxiety and Stress Among Indians in Times of Covid-19 Lockdown. *Community Ment Health J* 57(1):42–48. <https://doi.org/10.1007/s10597-020-00664-x>
12. Majumdar P, Biswas A, Sahu S (2020) COVID-19 pandemic and lockdown: cause of sleep disruption, depression, somatic pain, and increased screen exposure of office workers and students of India. *Chronobiol Int* 37(8):1–10. <https://doi.org/10.1080/07420528.2020.1786107>
13. Kimhi S, Eshel Y, Marciano H, Adini B (2020) Distress and resilience in the days of COVID-19: Comparing two ethnicities. *International Journal of Environmental Research Public Health* 17(11):1–11. <https://doi.org/10.3390/ijerph17113956>
14. Huang Y, Zhao N (2020) Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Res*, 288. <https://doi.org/10.1016/j.psychres.2020.112954>
15. Gan Y, Ma J, Wu J, Chen Y, Zhu H, Hall BJ (2020) Immediate and Delayed Psychological Effects of Province-wide Lockdown and Personal Quarantine during the COVID-19 Outbreak in China. *Psychol Med*. <https://doi.org/10.1017/S0033291720003116>
16. Li F, Luo S, Mu W, Li Y, Ye L, Zheng X, Xu B, Ding Y, Ling P, Zhou M, Chen X (2021) Effects of sources of social support and resilience on the mental health of different age groups during the COVID-19 pandemic. *BMC Psychiatry* 21(1):1–15. <https://doi.org/10.1186/s12888-020-03012-1>
17. Mukhtar S (2020) Psychological health during the coronavirus disease 2019 pandemic outbreak. *Int J Soc Psychiatry* 66(5):512–516. <https://doi.org/10.1177/0020764020925835>
18. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P (2020) Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. In *Brain, Behavior, and Immunity* (Vol. 88, pp. 901–907). Academic Press Inc. <https://doi.org/10.1016/j.bbi.2020.05.026>

19. Blanc J, Briggs AQ, Seixas AA, Reid M, Jean-Louis G, Pandi-Perumal SR (2021) Addressing psychological resilience during the coronavirus disease 2019 pandemic: a rapid review. *Current Opinion in Psychiatry* 34(1):29–35. <https://doi.org/10.1097/YCO.0000000000000665>
20. Labrague LJ, De los Santos JAA, Falguera CC (2021) Social and emotional loneliness among college students during the COVID-19 pandemic: The predictive role of coping behaviors, social support, and personal resilience. *Perspect Psychiatr Care*, 1–15. <https://doi.org/10.1111/ppc.12721>
21. Conroy KM, Krishnan S, Mittelstaedt S, Patel SS (2020) Technological advancements to address elderly loneliness: practical considerations and community resilience implications for COVID-19 pandemic. *Working with Older People*. <https://doi.org/10.1108/WWOP-07-2020-0036>
22. Verdolini N, Amoretti S, Montejo L, García-Rizo C, Hogg B, Mezquida G, Rabelo-da-Ponte FD, Vallespir C, Radua J, Martinez-Aran A, Pacchiarotti I, Rosa AR, Bernardo M, Vieta E, Torrent C, Solé B (2021) Resilience and mental health during the COVID-19 pandemic. *J Affect Disord* 283(January):156–164. <https://doi.org/10.1016/j.jad.2021.01.055>
23. Uriarte Arcineaga JDD (2005) La resiliencia. Una nueva perspectiva en psicopatología del desarrollo Resilience. A new perspective into developmental psychopathology. *Revista de Psicodidáctica* 10(2):61–79. <https://www.redalyc.org/pdf/175/17510206.pdf>
24. Behnke A, Conrad D, Kolassa IT, Rojas R (2019) Higher sense of coherence is associated with better mental and physical health in emergency medical services: results from investigations on the revised sense of coherence scale (SOC-R) in rescue workers. *European Journal of Psychotraumatology*, 10(1). <https://doi.org/10.1080/20008198.2019.1606628>
25. Mc Gee SL, Hölzge J, Maercker A, Thoma MV (2018) Evaluation of the revised Sense of Coherence scale in a sample of older adults: A means to assess resilience aspects. *Aging Mental Health* 22(11):1438–1447. <https://doi.org/10.1080/13607863.2017.1364348>
26. Ortiz-Granja D, Acosta-Rodas P, Lepe-Martínez N, Valle M, Del, Ramos-Galarza C (2019) Scale reduced to value the sense of coherence: SOC 15. *Revista Ecuatoriana de Neurología* 28(2):23–27
27. Rossi R, Jannini TB, Socci V, Pacitti F, Lorenzo G, Di (2021) Stressful Life Events and Resilience During the COVID-19 Lockdown Measures in Italy: Association With Mental Health Outcomes and Age. *Front Psychiatry*, 12. <https://doi.org/10.3389/fpsy.2021.635832>
28. Lupe SE, Keefer L, Szigethy E (2020) Gaining resilience and reducing stress in the age of COVID-19. In *Current Opinion in Gastroenterology* (Vol. 36, 4, pp 295–303). Lippincott Williams and Wilkins. <https://doi.org/10.1097/MOG.0000000000000646>
29. Diez-Quevedo C, Rangil T, Sanchez-Planell L, Kroenke K, Spitzer RL (2001) Validation and utility of the patient health questionnaire in diagnosing mental disorders in 1003 general hospital Spanish inpatients. *Psychosom Med* 63(4):679–686. <https://doi.org/10.1097/00006842-200107000-00021>
30. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ (1989) The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. *Psychiatry Res* 28(2):193–213. [https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4)

31. Antonovsky A (1993) The structure and properties of the sense of coherence scale. *Soc Sci Med* 36(6):725–733. [https://doi.org/10.1016/0277-9536\(93\)90033-Z](https://doi.org/10.1016/0277-9536(93)90033-Z)
32. Valeria Carpio-Arias T, Piedra S, Nicolalde-Cifuentes M, Mogrovejo-Arias T Carolina, Padilla-Samaniego D Victoria, Tapia-Veloz M Carolina, E., & Vinueza-Veloz F, M (2021) Effects of mobility restrictions on mental health among young adults in the context of COVID-19 pandemic. A cross-sectional study. <https://doi.org/10.21203/rs.3.rs-279518/v1>
33. Informes de modalidad local sobre Covid-19. Available from: <https://www.google.com/covid19/mobility/><https://www.google.com/covid19/mobility/>
34. Frank E, Harrell Jr (2021) rms: Regression Modeling Strategies. R package version 6.2-0. <https://CRAN.R-project.org/package=rms>
35. R Core Team (2020) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>
36. Bahar A, Koçak HS, Samancıoğlu Bağlama S, Çuhadar D (2020) Can Psychological Resilience Protect the Mental Health of Healthcare Professionals during the COVID-19 Pandemic Period? *Dubai Medical Journal* 3(4):133–139. <https://doi.org/10.1159/000510264>
37. Dedoncker J, Vanderhasselt MA, Ottaviani C, Slavich GM (2021) Mental health during the COVID-19 pandemic and beyond: The importance of the vagus nerve for biopsychosocial resilience. *Neurosci Biobehav Rev* 125(February):1–10. <https://doi.org/10.1016/j.neubiorev.2021.02.010>
38. Ernstsén L, Havnen A (2021) Mental health and sleep disturbances in physically active adults during the COVID-19 lockdown in Norway: does change in physical activity level matter? *Sleep Med* 77:309–312. <https://doi.org/10.1016/j.sleep.2020.08.030>
39. Havnen A, Anyan F, Hjemdal O, Solem S, Riksfjord MG, Hagen K (2020) Resilience moderates negative outcome from stress during the covid.pdf. *International Journal of Environmental Research Public Health* 17(18):1–12
40. Capuano R, Altieri M, Biseco A, D’Ambrosio A, Docimo R, Buonanno D et al (2021) Psychological consequences of COVID-19 pandemic in Italian MS patients: signs of resilience? *J Neurol Mar* 268(3):743–750. <https://doi.org/10.1007/s00415-020-10099-9>
41. Zhang J, Yang Z, Wang X, Li J, Dong L, Wang F et al (2020) The relationship between resilience, anxiety and depression among patients with mild symptoms of COVID-19 in China: A cross-sectional study. *J Clin Nurs Nov*;29(21–22):4020–4029. <https://onlinelibrary.wiley.com/doi/full/10.1111/jocn.15425>
42. Killgore WDS, Taylor EC, Cloonan SA, Dailey NS (2020) Psychological resilience during the COVID-19 lockdown. *Psychiatry Res* 291(May):113216. <https://doi.org/10.1016/j.psychres.2020.113216>
43. Kavčič T, Avsec A, Zager Kocjan G (2021) Psychological Functioning of Slovene Adults during the COVID-19 Pandemic. Does Resilience Matter? *Psychiatric Quarterly* 92(1):207–216. <https://doi.org/10.1007/s11126-020-09789-4>
44. Khan S, Siddique R, Li H, Ali A, Shereen MA, Bashir N, Xue M (2020) Impact of coronavirus outbreak on psychological health. *Journal of Global Health*, 10(1). <https://doi.org/10.7189/JOGH.10.010331>

45. Labrague LJ, De los Santos JAA (2020) COVID-19 anxiety among front-line nurses: Predictive role of organisational support, personal resilience and social support. *J Nurs Manag* 28(7):1653–1661. <https://doi.org/10.1111/jonm.13121>
46. Osimo SA, Aiello M, Gentili C, Ionta S, Cecchetto C (2021) The Influence of Personality, Resilience, and Alexithymia on Mental Health During COVID-19 Pandemic. *Front Psychol*, 12(February). <https://doi.org/10.3389/fpsyg.2021.630751>
47. Verger NB, Urbanowicz A, Shankland R, McAloney-Kocaman K (2021) Coping in isolation: Predictors of individual and household risks and resilience against the COVID-19 pandemic. *Social Sciences Humanities Open* 3(1):100123. <https://doi.org/10.1016/j.ssaho.2021.100123>
48. Yıldırım M, Arslan G, Özaslan A (2020) Perceived Risk and Mental Health Problems among Healthcare Professionals during COVID-19 Pandemic: Exploring the Mediating Effects of Resilience and Coronavirus Fear. *International Journal of Mental Health Addiction*. <https://doi.org/10.1007/s11469-020-00424-8>
49. Vinkers CH, van Amelsvoort T, Bisson JI, Branchi I, Cryan JF, Domschke K, Howes OD, Manchia M, Pinto L, de Quervain D, Schmidt MV, van der Wee NJA (2020) Stress resilience during the coronavirus pandemic. *Eur Neuropsychopharmacol* 35:12–16. <https://doi.org/10.1016/j.euroneuro.2020.05.003>
50. Xiao X, Xiao J, Yao J, Chen Y, Saligan L, Reynolds NR, Wang H (2020) The role of resilience and gender in relation to infectious-disease-specific health literacy and anxiety during the covid-19 pandemic. *Neuropsychiatric Disease Treatment* 16:3011–3021. <https://doi.org/10.2147/NDT.S277231>
51. Gualano MR, Moro L, Voglino G, Bert G, F., & Siliquini R (2020) Effects of COVID-19 lockdown on mental health and sleep disturbances in Italy. *International Journal of Environmental Research Public Health* 17(13):1–13. <https://doi.org/10.3390/ijerph17134779>
52. Ingram J, Maciejewski G, Hand CJ (2020) Changes in Diet, Sleep, and Physical Activity Are Associated With Differences in Negative Mood During COVID-19 Lockdown. *Front Psychol*, 11. <https://doi.org/10.3389/fpsyg.2020.588604>
53. Janati Idrissi A, Lamkaddem A, Benouajjit A, Ben El Bouaazzaoui M, El Houari F, Alami M, Labyad S, Chahidi A, Benjelloun M, Rabhi S, Kissani N, Zarhouch B, Ouazzani R, Kadiri F, Alouane R, Elbiaze M, Boujraf S, Fakir E, S., & Souirti Z (2020) Sleep quality and mental health in the context of COVID-19 pandemic and lockdown in Morocco. *Sleep Med* 74:248–253. <https://doi.org/10.1016/j.sleep.2020.07.045>
54. Morin CM, Carrier J, Bastien C, Godbout R (2020) Sleep and circadian rhythm in response to the COVID-19 pandemic. *Can J Public Health* 111(5):654–657. <https://doi.org/10.17269/s41997-020-00382-7>
55. da Silveira MP, da Silva Fagundes KK, Bizuti MR, Starck É, Rossi RC, de R Silva, D. T (2021) Physical exercise as a tool to help the immune system against COVID-19: an integrative review of the current literature. In *Clinical and Experimental Medicine* (Vol. 21, 1, pp 15–28). Springer Science and Business Media Deutschland GmbH. <https://doi.org/10.1007/s10238-020-00650-3>

Table

Table 1. Sense of coherence, depression and sleep quality by biological sex. Sense of coherence was measured by SOC – 15, depression by PHQ-9 and sleep quality by PSQI (see Methods). Abbreviations and symbology: SOC – 15, abbreviated version of sense of coherence score; n, number; IQR, interquartil range; PHQ – 9 score, Patient Health Questionnaire score; PSQI, Pittsburgh Sleep Quality Index; Chisq. = Chi squared test; df, degrees of freedom

		Female	Male	Test stat.	P value
		5943	2483		
Sense of coherence	Median (IQR)	61 (54,67)	62 (55,68)	Ranksum test	< 0.001
	Very low	21 (0.35)	13 (0.52)	Chisq. (3 df) = 6.01	0.111
	Low	354 (5.96)	133 (5.36)		
	High	2123 (35.72)	838 (33.75)		
	Very high	3445 (57.97)	1499 (60.37)		
Depression	Median (IQR)	4 (1,8)	2 (0,6)	Ranksum test	< 0.001
	Healthy	4428 (74.51)	1984 (79.9)		
	Minor	1357 (22.83)	441 (17.76)	Chisq. (2 df) = 28.53	< 0.001
	Major	158 (2.66)	58 (2.34)		
Sleep quality	Median (IQR)	5 (2,7)	4 (2,7)	Ranksum test	< 0.001
	Good	3582 (60.27)	1598 (64.36)	Chisq. (1 df) = 12.34	< 0.001
	Poor	2361 (39.73)	885 (35.64)		

Figures

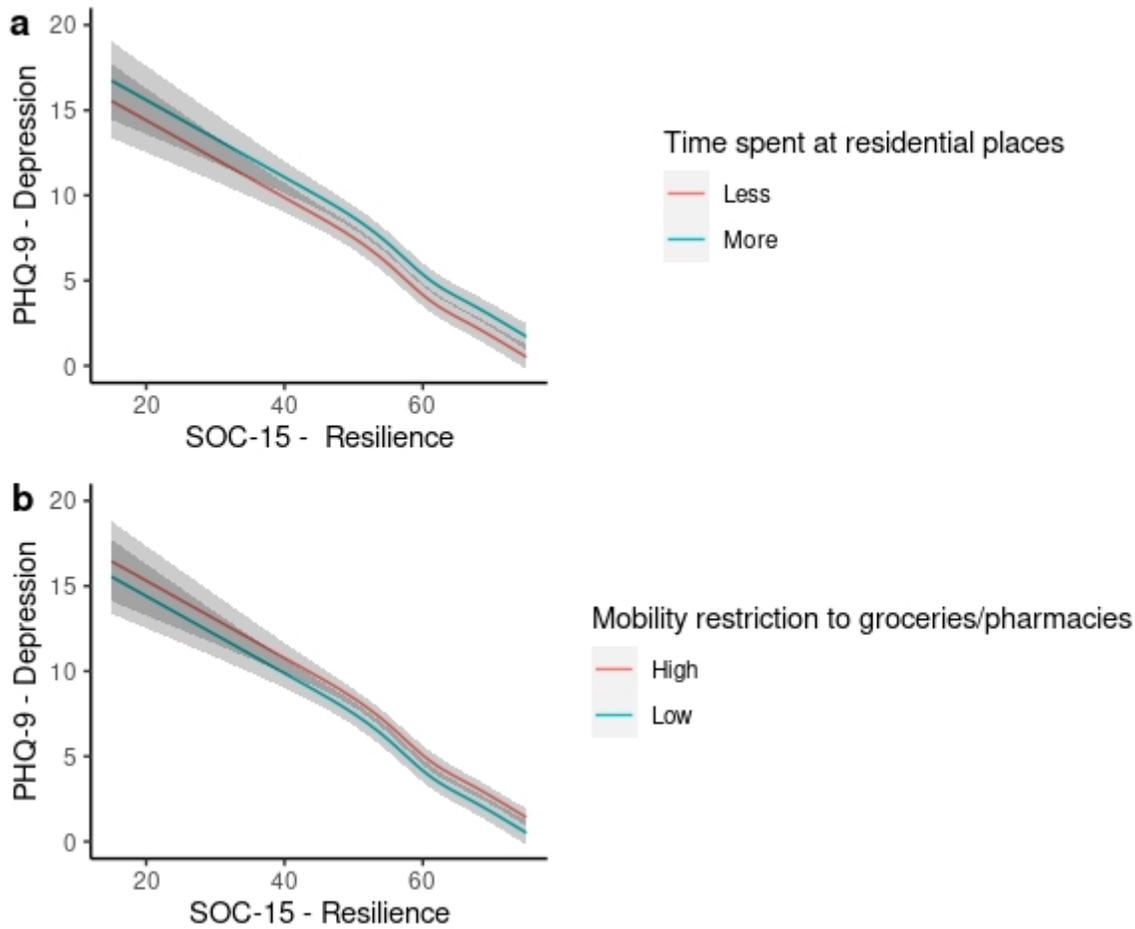


Figure 1

Predicted means for PHQ-9 scores by levels of SOC-15. Time spent at residential places was categorized using as cut-point the median. Panel a) shows predicted scores for PHQ-9 by time spent at residential places. Panel b) shows predicted scores for PHQ-9 by mobility restriction to groceries and pharmacies. Gray areas represent 95% confidence intervals. Abbreviations: PHQ-9, patient health questionnaire 9; SOC-15, sense of coherence 15

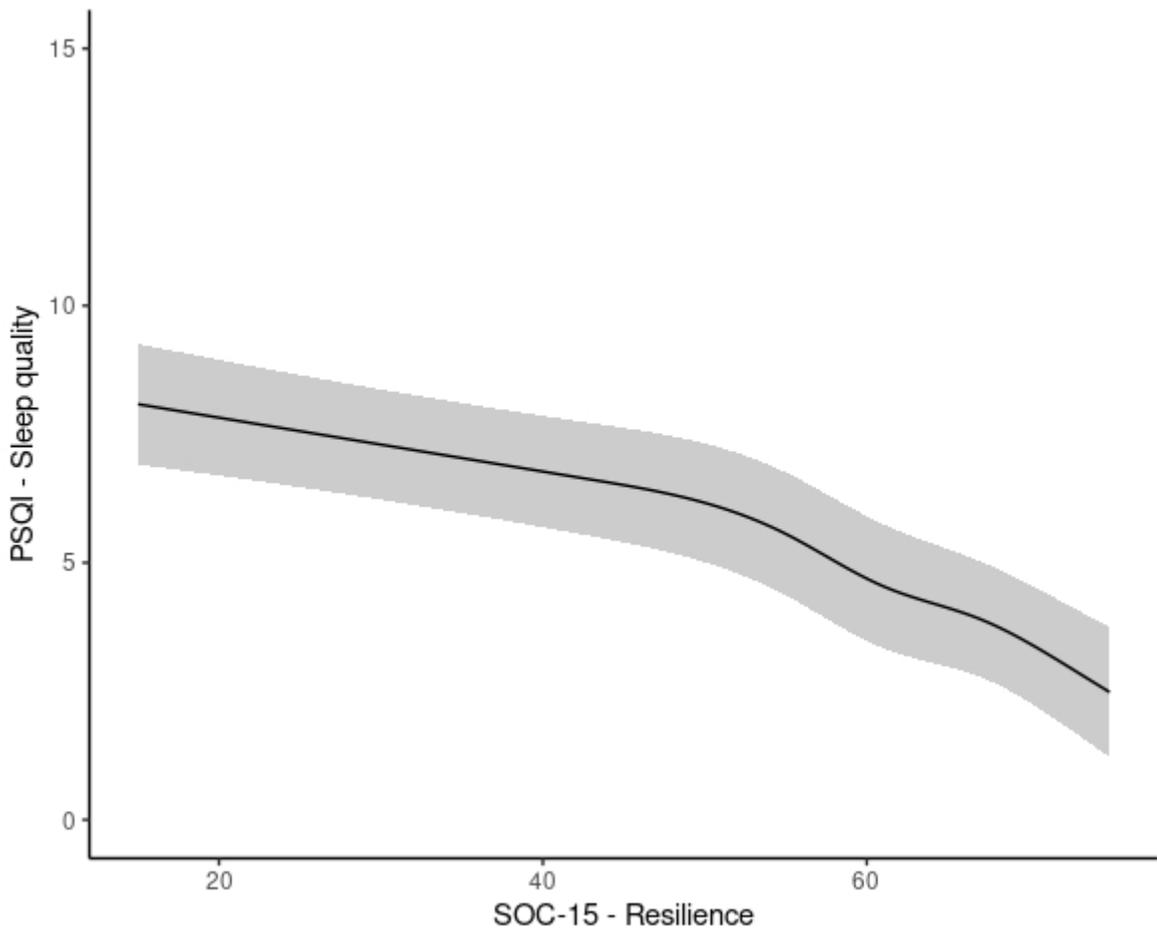


Figure 2

Predicted means for PSQI scores by levels of SOC-15. Gray zones represent 95% confidence intervals. Abbreviations: PSQI, Pittsburgh sleep quality index; SOC-15, sense of coherence 15