The Impact of COVID-19 Epidemic on Mental Health in Terms of Age Gender and Education Level

Cheng Peiwen[1] Dr. Tengku Kasmini Tengku Wook[2]

[1,2]Faculty of Economics and Management，University Kembangan Malaysia，

ABSTRACT: In early 2020, the COVID-19 epidemic suddenly broke out across the world and spread rapidly. Global public health and social systems are collapsing due to the spread of coronavirus. Many cities are experiencing shortages of medical resources, with even intensive care units being overwhelmed.　The implementation of stringent epidemic prevention measures, the closure of educational institutions, and the suspension of non-essential production and commercial activities have had a profound impact on the daily lives and work activities of individuals, and have precipitated a global economic crisis. The global influence of the COVID-19 pandemic extends beyond the economies to encompass a multitude of other domains, including the lives and health of individuals. In addition to the direct physical harm and health risks to the body, the widespread spread of the virus and the lockdown measures implemented to contain it also impact people's mental health. This study employs a qualitative research approach to analyse the extensive literature and data from the questionnaire survey conducted by Yingfei Zhang etc. The objective of it was to investigate the impact of the COVID-19 epidemic on mental health. It investigates and analyses common elements related to mental distress during epidemic, including age, gender and education level, to gain insights into the correlation between these factors and people's psychological health status and the psychological influence of the epidemic.

Studies have shown that the COVID-19 epidemic not only brings anxiety and depression to people, but also causes great stress, and those who are psychologically vulnerable have even developed post-traumatic stress disorder (PTSD). The main factors affecting people's mental health disturbed by COVID-19 are age and education level, while gender differences have relatively little effect on it. In order to better address this issue, it is recommended that the government increase investment in mental health and strengthen mental health education to help people learn how to cope with stress and anxiety, and to help those affected by the pandemic to get out of their psychological difficulties as soon as possible.

KEYWORDS: COVID-19、Mental health、Age、Gender、Education Level、Anxiety、Stress、Depression

1.0 INTRODUCTION

The outbreak not only overwhelmed public health systems and caused serious physical health problems, but also triggered severe economic and social devastation. The resulting economic crisis, including mass unemployment, business closures and a sharp slowdown in economic activity, has exacerbated the challenges faced by societies around the world. In addition to the severe economic consequences, it is also considered to pose a major threat to mental health globally, requiring rigorous analytical discussion. The COVID-19 epidemic has caused negative emotions，including anxiety, depression and panic, and has even led to post-traumatic stress disorder and cognitive deficits in some populations.

According to the data of the World Health Organisation, the COVID-19 pandemic increased the global prevalence of anxiety and depression by 25%. Jiaqi Xiong, Orly Lipsitz and Flora Nasri (2020) employed a systematic search of eight countries, such as China,

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

Italy and so on, to identify a large number of literature with regard to the effects of COVID-19 on psychological outcomes in the general population. Literature of studies related to psychological outcomes. The incidence of anxiety, depression, post-traumatic stress disorder, psychological distress and stress in the general population is relatively high. The incidence of stress is as high as 81.9%.

This paper adopts a qualitative research approach, analysing a large body of literature and data from a questionnaire survey conducted by Yingfei Zhang etc. The aim of this paper is to elucidate the impact of the COVID-19 pandemic on mental health and to examine how elements for example age, sex and education moderated these impacts and how they relate to people's mental health status and to psychological impacts of the COVID-19 epidemic. Research shows that age and level of education are the main determinants of psychological impact, with gender differences playing a relatively minor role. Economic instability and the erosion of social norms affect younger populations and those with lower levels of education, who tend to be more vulnerable to economic shocks and have fewer coping mechanisms.

In order to address these challenges, it is recommended that governments increase investment in mental health and promote the development of mental health education to provide strong psychological counselling and psychological support services. This will enable individuals to develop the skills necessary to effectively manage stress and anxiety, while promoting a more effective societal response to the psychological consequences of a pandemic.

2.0 LITERATURE REVIEW

In December 2019, the first case of SARS was reported in Wuhan, China, followed by a series of similar cases, and before the cause and source could be identified, the epidemic situation expanded rapidly, with governments taking measures to combat the outbreak while allowing medical experts to work intensively on the virus, which was finally named it, and declared a global pandemic a month later. The situation of rapidly evolving has greatly changed people's lives and many aspects of the global, public and economic landscape. In response to the challenges posed by the pandemic, governments have introduced a number of policies and actions to prevent the spread of the pandemic on a large scale, such as regional blockades, social isolation, and so on. In the face of the threat of the epidemic, social isolation, economic uncertainty and information overload and other pressures, many people are experiencing negative emotions, including anxiety, depression, loneliness and fear. In the following, below in terms of three objectives: age, gender and education level.

Effect of age on COVID-19 mental health.

Yingfei Zhang and Zheng Feei Ma (2020) used social media to post an online questionnaire aimed at investigating the direct impact of the new Coronavirus pneumonia outbreak on the mental health and quality of life of residents aged 18 years or older in Liaoning Province, China. Chi-square test is used to evaluate whether there is significant correlation between classified variables. The average age of participants is about 40 years old. The results show that the COVID19 pandemic is related to slight stress, with half of the people feeling fearful and worried, but also that the majority of the participants received more support from relations and increase their common feelings and care with family and others. Age factor played a significant role in influencing people's feelings of fear, worry and helplessness about COVID-19. Prerna Varma, Moira Junge, Hailey Meaklim and Melinda L. Jackson (2021) released a global online survey of adults aged 18 years and older that investigated the influence of COVID-19 on global psychological distress, and identified the factors that may aggravate the decline of mental health. The findings show that mental health declined, with people globally experiencing higher stress, anxiety, and depression, and more than 70% of people exhibiting moderate levels of stress. And from the perspective of age differences, younger people are more vulnerable to stress, depression and anxiety.

Effect of gender on COVID-19 mental health.

Stephanie Rodriguez-Besteiro, José Francisco and etc (2021) surveyed 300 Spanish university students complete an online

questionnaire that analysed university students' perception of COVID-19 pandemic and the differences in psychology and oral health caused by gender. The results showed that women had a higher perceived risk of the COVID-19 virus than men and showed higher levels of anxiety and stress, but did not show differences in psychological characteristics due to gender differences. Cuiyan Wang, Riyu Pan, Xiaoyang Wan and Yilin Tan (2020) used a cross-sectional survey design and snowball sampling strategy to conduct an survey of Chinese public in China to collect outbreak-related information such as demographics, awareness and concerns about COVID-19 to know their anxiety, depression and stress levels during the early outbreak. About one-third of the respondents reported moderate to severe anxiety. Women suffered greater mental effect and higher anxiety, stress and depression during the outbreak, and women also have a higher risk of depression. Chengbin Liu, Danxia Liu, Ning Huang, etc (2020) published the results of a ten-day online survey. The survey was conducted using binary logistic regression to analyse related elements associated with PTSD, depression and insomnia. Furthermore, the interaction of gender and age on COVID-19-related mental health outcomes were examined. The findings indicate that approximately one-fifth of the population experienced psychological symptoms such as depression and insomnia in the COVID-19 epidemic. No significant joint effects of sex-age were found for insomnia, PTSD and depression. However, sex-age interactions were strongly associated with these outcomes. Younger men were easily to suffer from PTSD and depression, while women in their early 50s had the lowest prevalence of depression.

Effect of education level on COVID-19 mental health.

Marco Passavanti, Alessandro Argentieri, Diego Maria Barbieric and etc (2021) used a cross-sectional survey to sample 1612 subjects distributed in 7 countries around the world. The subjects were adult students and workers, and the main purpose was to analyze the mental impact of the restrictions imposed by the COVID-19 on residents of the seven countries mentioned above. The findings indicated that the majority of subjects exhibited elevated levels of stress, depression, and anxiety, and a higher-than-average risk of developing PTSD. In turn, the severity of these diseases depends to a large extent on influences, including level of education, gender, type of outdoor activity, household characteristics and income. Ebru Morgul, Abdulbari Bener and Timothy R Jordan (2020) administered questionnaires to 4700 participants in Istanbul, Turkey. This paper studies the relationship between COVID-19 pandemic and mental health problems and mental fatigue of Istanbul population in Turkey. It was found that 64.1% of the participants were classified as having psychological fatigue and the rest were classified as normal. There are significant differences between mentally fatigued participants and normal participants in terms of age, education level, and other demographic variables ($p < 0.001$). Rocio Rodriguez-Rey, Helena Garrido-Hernansaiz and Silvia Collado (2020) conducted a questionnaire survey among 3055 adults from various provinces in Spain, the survey collected information on the participants' gender, age, education level and monthly income and so on. The study mainly explores the psychological impact of the COVID-19 pandemic on the average adult, as well as their levels of anxiety, stress and depression, during the first phase of the outbreak in Spain. The findings indicated that 41% of respondents reported experiencing stress and depression, while 25% exhibited varying degrees of anxiety. Furthermore, different levels of education will also lead to different psychological conditions. Doctoral students exhibited a lower psychological impact, anxiety, stress, and depression than those with less than a bachelor's degree.

3.0 METHODOLOGY

This paper uses the list-categorization summary method of qualitative analysis, which is a systematic method of analysis, to collate and summarize a large amount of qualitative analysis literature. The following outlines the steps involved in utilizing the list categorization summary method.

(1) **Identify research topics and objectives**.

  The impact of COVID-19 epidemic on mental health and related factors.

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

(2) **Literature search and collection**.

Mainly search for relevant literature and secondary data on the influence of the COVID-19 epidemic on individual's psychological health and influencing factors in Google Scholar. Searches were conducted using appropriate keywords and defined time frames.

(3) Reading and screening.

Go through the title, abstract and conclusion sections of each paper to confirm if it is relevant to the research topic. And exclude irrelevant literature.

(4) Categorization and summary.

Classify the papers according to the categories established and provide a summary of the key findings, research methods, and conclusions for each category.

4.0 RESULTS AND DISCUSSION

The effect of age on COVID-19 mental health.

A cross-sectional study was conducted by Yingfei Zhang and Zheng Feei Ma (2020) from January 28 to February 5, 2020. A survey was distributed via social media platforms by researchers to assess the negative psychological health impacts of the pandemic. There are 263 participants (the average age of participants is about 40 years old) completed the survey. The study results show that age factors play a significant role in affecting people's fear, worry and helplessness about COVID-19, while gender and education level play a relatively small role in these psychological effects.(*Table 1. IES and negative health impacts by demographic factors.*)

A global online survey was conducted among 1653 participants (average age is about 43 years old) from 63 countries between April 9 and May 25, 2020. The study examines the effect of the COVID-19 outbreak on mental distress globally and identifies elements that may exacerbate declines in mental health. *Table 2* selects a total of 1427 individuals from 5 countries for covariance analysis. *Table 3* compares anxiety situation, resilient coping abilities, depressive symptoms and 3 other variables   among the groups. There are significant differences in psychological problems between age groups and young people face higher levels of anxiety compared to other age groups.

The effect of gender on COVID-19 mental health.

A total of 300 undergraduates living in Spain were surveyed from October to December 2020. The purpose was to examine gender differences in perceived risk and psychological aspects of the COVID-19 pandemic among college students. Women tend to perceive the dangers of the COVID-19 virus more acutely than men, and they exhibit higher levels of anxiety and stress. However, gender differences do not lead to differences in psychological characteristics such as depression and loneliness.(*Table 4. Gender differences in psychological profiles.*)

Chengbin Liu, Danxia Liu, Ning Huang and etc(2021) started the survey on 1 February 2020, and conducted a 10-day online questionnaire. It employed snowball sampling to select Chinese citizens aged 18 and above, with a total of 2,858 respondents from 31 provinces in China ultimately being included in the study. The research examines the potential mental conditions associated with the COVID-19 pandemic situation. Furthermore, the study investigates the interaction of gender and age on PTSS and depression. *Table 5* shows that young men are easily to suffer from depression than young women, and the prevalence of men reaches a peak in their 20s, and then decreases. As can be seen from *Table 6*, the prevalence of PTSS in male is generally higher than that in female, and participants aged 18-50 are more likely to experience depression. Those who were married and aged between 26 and 30 were easier to have higher levels of PTSD.

The interaction of gender-age on PTSS and depression.

PTSS and depression were affected by a combination of sex-age, with male in their 20s having relatively higher rates of PTSD symptoms, while female in their early 50s had the lowest rates of depression. Conversely, male age 26-30 are easier to suffer from

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

PTSS and depression.(*Table 7 The combine effect of gender and age on PTSS.* And *Table 8 The combine effect of gender and age on depression.*)

The effect of education on COVID-19 mental health.

A snowballing method was employed on 17 March 2020 to conduct a seven-day questionnaire survey among 3,055 public from various Spanish. The survey collected data on gender, age, education level, and monthly income via an online Google Forms questionnaire. It shows how education level and monthly income affect psychological responses to the events of the COVID-19 pandemic, including feelings of stress, anxiety, and depression. The results indicate that education and economic status are significant socioeconomic factors that influence mental health. Groups with lower education levels (such as individuals with no academic qualifications or only primary school education) have significantly higher levels of anxiety and depression than those with higher levels of education.(*Table 9*)

Rocio Rodriguez-Rey. etc(2020) employs a cross-sectional survey methodology, utilising Google Forms and the Wenjuanxing platform to collect data online between the 17th and 30th of April 2020. The collected content includes gender, nationality, age, education and other related information, aiming to analyse these mental influence of COVID-19 restrictions on 1612 subjects in 7 countries. *Table 10* presents the findings of the data analysis, which reveal the impact of the COVID-19 pandemic on psychological health in different countries and social groups, with a particular focus on the differences in stress, anxiety and depression. Individuals in higher income and education brackets exhibited lower levels of psychological distress. Women have higher levels of psychological distress and depression than men. Moreover, Italy and Iran exhibited significantly higher levels of anxiety and depression than other countries.

Summary

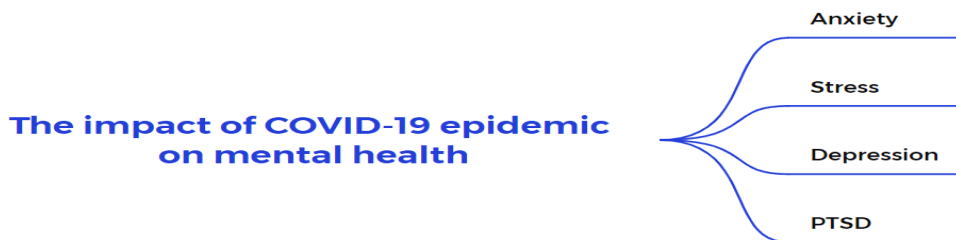A synopsis of the above analysis is presented in a diagram below:
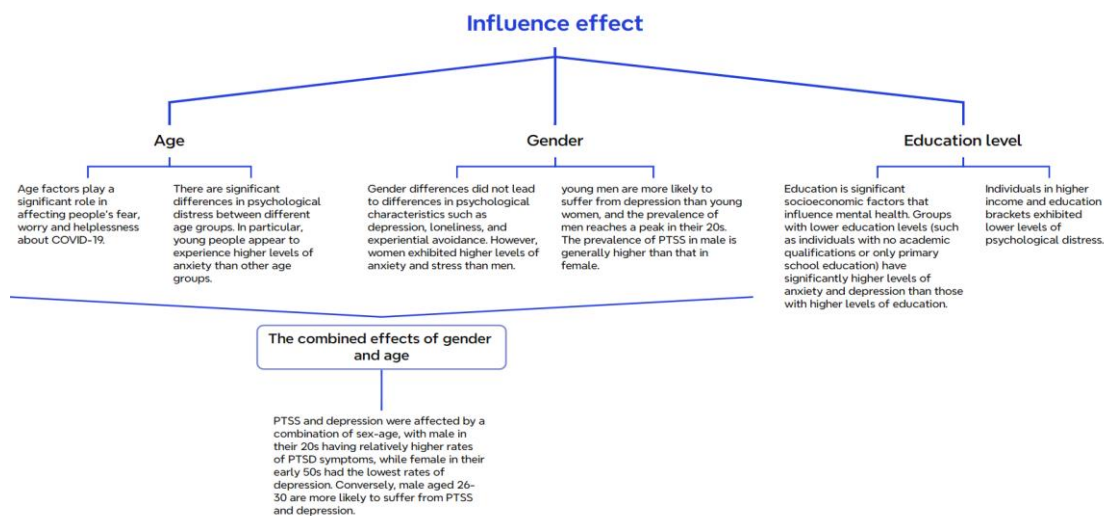

Figure1. The impact of COVID-19 mental health

Figure 2. The related factors and influence effect of COVID-19 epidemic on mental health

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

Synthesising and summarising the above questionnaires, the collective findings of these studies demonstrate the pervasive influence of the COVID-19 pandemic on the mental health of diverse demographic groups. Age and education level as the main determinants of psychological impacts, while gender differences play a relatively small role. Nevertheless, this study has limitations in the following aspects. Firstly, with regard to sampling method, convenience and snowball sampling are mainly used, which may lead to insufficient representativeness of the sample and may not fully reflect the situation of the whole target group. Secondly, in terms of time constraints, cross-sectional studies are only conducted at specific points in time and therefore cannot capture the dynamic changes in mental health at different stages of the epidemic. Finally, it is possible that the sample may be bias. Samples are mainly concentrated in a few specific countries and regions, such as China and Spain, and may not be representative of global mental health status. Therefore, these limitations may affect the broad applicability and accuracy of the findings and need to be used with caution when applying these findings.

5.0 POLICY IMPLICATION AND CONCLUSIONS

The novel coronavirus pandemic was a major public health event in human history, with far-reaching global political, economic and social implications, and a serious impact on individual's mental health. Economic instability and disruption of social norms can leave people exposed to economic shocks, and those without coping mechanisms are vulnerable to mental health problems. Young people can face higher psychological distress, possibly because young people are faced with an uncertain future and the financial pressures that come with it. Some research suggests that women will have higher levels of mental stress and depression than men, but young men will be at a higher risk of depression at a specific age, around 20 years old. Perhaps it is related to different social roles and sources of stress. Studies have also shown that highly educated and high-income groups typically have lower levels of psychological stress, suggesting that socioeconomic status plays a non-negligible role in mitigating the psychological distress associated with pandemics. It is of the utmost importance to comprehend these dynamics if we are to develop effective mental health intervention measures and policies that can alleviate the adverse effects of such global crises.

In order to deal with these challenges, the government should strengthen its focus on mental health issues and and increase its investment in the field of mental health to be able to provide strong psychological support services and mental health resources. The government can also provide financial support and employment assistance to low-income groups affected by the epidemic in order to alleviate their financial stress. Moreover, public awareness of mental health issues needs to be raised so that people can face up to their psychological problems. At last, mental health education can be strengthened to cultivate the ability of individuals to deal with anxiety and stress.

REFERENCES

1) Jiaqi Xiong, Orly Lipsitz and Flora Nasri（2020） Impact of COVID-19 pandemic on mental health in the general population: A systematic review. Journal of Affective Disorders. Volume 277, 1 December 2020, Pages 55-64 https://doi.org/10.1016/j.jad.2020.08.001

2) Yingfei Zhang and Zheng Feei Ma(2020) Impact of the COVID-19 Pandemic on Mental Health and Quality of Life among Local Residents in Liaoning Province, China: A Cross-Sectional Study. Int. J.Environ. Res. Public Health 2020,17(7),2381. https://doi.org110.3390/ijerph17072381

3) Prerna Varma, Moira Junge, Hailey Meaklim and Melinda L. Jackson(2021) Younger people are more vulnerable to stress, anxiety and depression during COVID-19 pandemic: A global cross-sectional survey. Progress in Neuro-psychopharmacology & Biological Psychiatry. Volume 109, 13 July 2021, 110236. https://doi.org/10.1016/j.pnpbp.2020.110236

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

4) Stephanie Rodriguez-Besteiro, José Francisco Tornero-Aguilera, Jesús Fernández-Lucas and Vicente Javier Clemente-Suárez(2021) Gender Differences in the COVID-19 Pandemic Risk Perception, Psychology, and Behaviors of Spanish University Students. Int. J. Environ. Res. Public Health 2021, 18(8), 3908;
https://doi.org/10.3390/ijerph18083908

5) Cuiyan Wang, Riyu Pan, Xiaoyang Wan and Yilin Tan(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 2020, 17(5),1729;
https://doi.org/10.3390/ijerph17051729

6) Chengbin Liu, Danxia Liu, Ning Huang and etc(2021) The Combined lmpact of Gender and Age on Post-traumatic Stress Symptoms, Depression and Insomnia During COVlD-19 Outbreak in China. ORIGINAL RESEARCH article. Front. Public Health, 21 January 2021. Sec. Public Mental Health. Volume 8-2020
https://doi.org/10 3389/fpubh.2020.620023

7) Marco Passavanti, Alessandro Argentieri, Diego Maria Barbieric and etc(2021) The psychological impact of COVID-19and restrictive measures in the world. Journal of Affective Disorders. Volume 283, 15 March 202l, Pages 36-51
https://doi.org/10.1016/j.jad.2021.01.020

8) Ebru Morgul, Abdulbari Bener and Timothy R Jordan(2020) COVID-19 pandemic and psychological fatigue in Turkey. International journal of Social Psychiatry. Volume 67, Issue 2
https://doi.org/10.1177/0020764020941889

9) Rocio Rodriguez-Rey, Helena Garrido-Hernansaiz and Silvia Collado(2020) Psychological Impact and Associated Factors During the Initial Stage of the Coronavirus (COVID-19) Pandemic Among the General Population in Spain. Front. Psychol., 23 June 2020. Sec. Health Psychology. Volume 11 - 2020
https://doi.org/10.3389/fpsyg.2020.01540

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

Appendix

Table 1.   IES and negative health impacts by demographic factors.

Variables	Sex (n = 263)		P-Value 1	Age Group (Years) (n = 263)				P-Value 1	Education Level (n = 263)		P-Value 1
	Females (n = 157)	Males (n = 106)		18–30 (n = 109)	31–40 (n = 46)	41–50 (n = 54)	>50 (n = 54)		Secondary School (n = 66)	Higher Qualification (n =197)	
IES	14.2 ± 7.8	12.8 ± 7.4	0.173 2	13.9 ± 8.1	13.1 ± 6.2	12.6 ± 7.0	14.5 ± 8.5	0.583 3	13.0 ± 7.6	13.8 ± 7.7	0.439 2
IES ≥26, n (%)	10 (6.4)	10 (9.4)	0.478	9 (8.3)	1 (2.2)	4 (7.4)	6 (11.1)	0.560	5 (7.6)	15 (7.6)	1.000
Increased stress from work, n (%)											
Yes	50 (31.8)	31 (29.2)	0.685	34 (31.2)	16 (34.8)	10 (18.5)	21 (38.9)	0.120	15 (22.7)	66 (33.5)	0.124
No	107 (68.2)	75 (70.8)		75 (68.8)	30 (65.2)	44 (81.5)	33 (61.1)		51 (77.3)	131 (66.5)	
Increased financial stress, n (%)											
Yes	37 (23.6)	24 (22.6)	0.883	28 (25.7)	10 (21.7)	8 (14.8)	15 (27.8)	0.362	11 (16.7)	50 (25.4)	0.178
No	120 (76.4)	82 (77.4)		81 (74.3)	36 (78.3)	46 (85.2)	39 (72.2)		55 (83.3)	147 (74.6)	
Increased stress from home, n (%)											
Yes	37 (23.6)	30 (28.3)	0.391	31 (28.4)	12 (26.1)	9 (16.7)	15 (27.8)	0.412	13 (19.7)	54 (27.4)	0.254
No	120 (76.4)	76 (71.7)		78 (71.6)	34 (73.9)	45 (83.3)	39 (72.2)		53 (80.3)	143 (72.6)	
Feel horrified due to the COVID-19, n (%)											
Yes	83 (52.9)	54 (50.9)	0.802	67 (61.5)	25 (54.3)	16 (29.6)	29 (53.7)	0.002	29 (43.9)	108 (54.8)	0.155
No	74 (47.1)	52 (49.1)		42 (38.5)	21 (45.7)	38 (70.4)	25 (46.3)		37 (56.1)	89 (45.2)	
Feel apprehensive due to the COVID-19, n (%)											
Yes	83 (52.9)	54 (50.9)	0.802	63 (57.8)	27 (58.7)	15 (27.8)	32 (59.3)	0.001	33 (50.0)	104 (52.8)	0.776
No	74 (47.1)	52 (49.1)		46 (42.2)	19 (41.3)	39 (72.2)	22 (40.7)		33 (50.0)	93 (47.2)	
Feel helpless due to the COVID-19, n (%)											
Yes	74 (47.1)	49 (46.2)	0.900	56 (51.4)	26 (56.5)	17 (31.5)	24 (44.4)	0.049	32 (48.5)	91 (46.2)	0.777
No	83 (52.9)	57 (53.8)		53 (48.6)	20 (43.5)	37 (68.5)	30 (55.6)		34 (51.5)	106 (53.8)	

1 Chi-square test or Chi-square test for trend was used for variables except for IES score. 2 P-value was based on unpaired t-test. 3 P-value was based on GLM univariate analysis test.

Table 2.

Results from Analysis of Covariance in resilience, anxiety, depression, stress and sleep quality based on following age-groups – 18–34 years (n = 492), 35–54 years (n = 665), and 55 years or above (n = 270).

Scales	Sum of Squares	Df	Mean Squares	f	Partial η^2	R^2
BRCS**	10.552	2	52.76	6.87	0.10	0.20
STAI***	7077.09	2	3538.54	18.16	0.25	0.59
PHQ***	551.53	2	275.76	9.18	0.01	0.22
PSS***	2169.14	2	1084.57	27.29	0.03	0.28
PSQI*	93.76	2	46.84	3.84	0.00	0.07
UCLA-LS***	138.57	2	69.28	20.42	0.03	0.03

Abbreviations used: BRCS – Brief Resilient Coping Scale, STAI – State-Trait Anxiety Scale, PHQ – Patient Health Questionnaire, PSS – Perceived Stress Scale, PSQI – Pittsburgh Sleep Quality Index, UCLA-LS – Loneliness Scale.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

The impact of COVID-19 epidemic on mental health in terms of age gender and education level
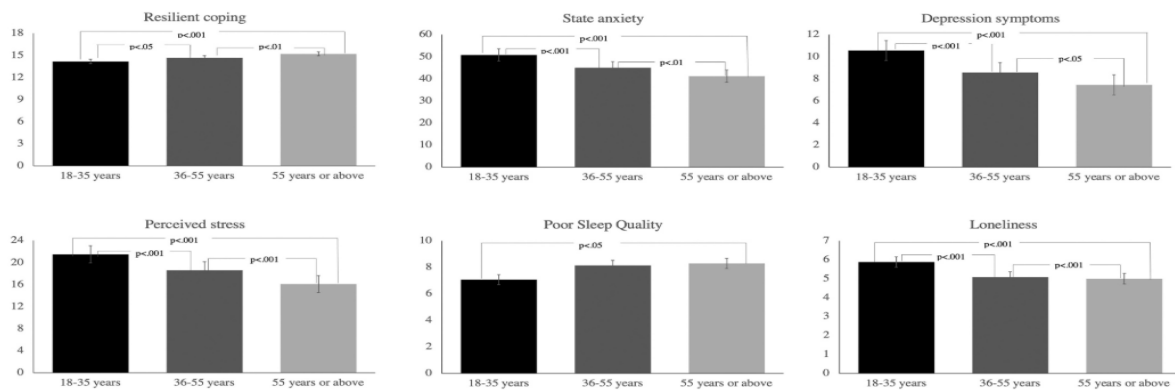
Table 3.

Fig. 3. Group differences in anxiety symptoms, resilient coping, depression symptoms, perceived stress, sleep quality and loneliness. People in the youngest age group reported higher levels of anxiety, depression and stress, whereas older individuals reported higher resilient coping but poorer sleep quality.

Table 4. Gender differences in psychological profiles.

Variable	Male	Female	t	p
Level of perceived danger in the COVID-19 Pandemic	6.49 ± 2.03	7.20 ± 1.65	3.089	0.002
Extraversion	5.88 ± 1.71	5.27 ± 1.69	−2.906	0.004
Agreeableness	6.24 ± 1.55	6.56 ± 1.577	1.673	0.096
Conscientiousness	6.39 ± 1.89	7.08 ± 1.69	3.132	0.002
Neuroticism	5.74 ± 2.12	6.72 ± 2.27	3.609	0.000
Openness to experience	6.96 ± 1.69	7.48 ± 1.76	2.471	0.014
AAQII	23.36 ± 8.90	24.22 ± 11.04	0.702	0.483
UCLA	4.47 ± 1.76	4.47 ± 1.61	−0.033	0.974
ZUNG	41.73 ± 4.47	42.70 ± 5.23	31.945	0.234

AAQII (Acceptance and Action Questionnaire II); UCLA (UCLA Loneliness Scale); STAI (Spielberger State-Trait Anxiety Inventory); ZUNG (Zung Depression Scale).

Table 5.

Logistic regression analysis for the effect of gender-age on PTSS and depressive symptoms.

Variables	Model 4-PTSS		Model 5-Depression	
	OR (95% CI)	Cohen's d	OR (95% CI)	Cohen's d
Gender*age [Female (18–25)]				
Female (26–30)	1.505 (0.904, 2.505)	0.225	0.971 (0.630, 1.495)	−0.016
Female (31–40)	1.403 (0.835, 2.359)	0.187	1.004 (0.645, 1.563)	0.002
Female (41–50)	0.863 (0.450, 1.655)	−0.081	0.861 (0.506, 1.466)	−0.083
Female (≥51)	1.118 (0.521, 2.401)	0.061	**0.448* (0.220, 0.911)**	−0.443
Male (18–25)	**2.647*** (1.711, 4.097)**	0.537	**1.766** (1.219, 2.560)**	0.314
Male (26–30)	**2.846*** (1.725, 4.695)**	0.577	**2.024** (1.317, 3.111)**	0.389
Male (31–40)	**1.962** (1.181, 3.259)**	0.372	**1.620* (1.050, 2.500)**	0.266
Male (41–50)	**1.880* (1.050, 3.364)**	0.348	1.101 (0.658, 1.843)	0.053
Male (≥51)	1.323 (0.644, 2.717)	0.154	0.777 (0.411, 1.467)	−0.139

The combine effect of gender and age was not significant in logistic regression analysis for insomnia, thus the results are not presented in this table; all confounding variables were controlled in the above models. The values of coefficients and 95% confidence interval in bold represent statistically significant at 0.05 level. *p < 0.05, **p < 0.01, ***p < 0.001.

The impact of COVID-19 epidemic on mental health in terms of age gender and education level
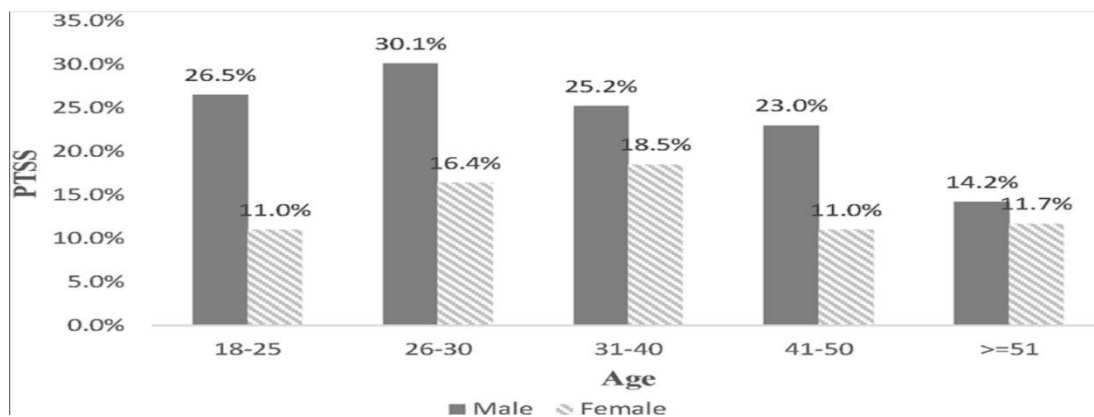
Table 6.

Logistic regression analysis for risk factors of PTSS, depression and insomnia.

Variables	Model 1-PTSS OR (95% CI)	Cohen's d	Model 2-Depression OR (95% CI)	Cohen's d	Model 3-Insomnia OR (95% CI)	Cohen's d
Wuhan exposure (No)						
Yes	**0.694* (0.501, 0.961)**	−0.201	0.883 (0.668, 1.168)	−0.069	0.995 (0.739, 1.340)	−0.003
Impact on livelihood (None)						
Some	**1.499** (1.123, 1.999)**	0.223	**1.393** (1.089, 1.781)**	0.183	1.146 (0.882, 1.490)	0.075
Relatively large	**3.054*** (2.275, 4.101)**	0.616	**2.482*** (1.914, 3.218)**	0.051	**1.579** (1.193, 2.089)**	0.252
Very large	**2.590*** (1.879, 3.571)**	0.525	**2.255*** (1.693, 3.003)**	0.448	**1.632** (1.202, 2.216)**	0.270
Prior exposure (No)						
Yes	1.204 (0.851, 1.705)	0.102	1.068 (0.772, 1.477)	0.036	0.789 (0.548, 1.134)	−0.131
Direct exposure	**1.186** (1.069, 1.315)**	0.094	**1.187** (1.077, 1.308)**	0.095	**1.257*** (1.138, 1.389)**	0.126
Media exposure (Frequently)						
Sometimes	**0.768* (0.601, 0.981)**	−0.034	0.941 (0.758, 1.168)	−0.034	0.793 (0.625, 1.007)	−0.128
Less	0.936 (0.656, 1.333)	−0.036	1.298 (0.947, 1.778)	0.144	0.863 (0.605, 1.231)	−0.081
Very less	0.813 (0.546, 1.210)	−0.114	0.915 (0.638, 1.312)	−0.049	0.807 (0.547, 1.191)	−0.118
Ethnicity (Han)						
Else	0.919 (0.546, 1.545)	−0.047	1.005 (0.918, 1.101)	0.003	0.969 (0.590, 1.591)	−0.017
Gender (Female)						
Male	**1.824*** (1.477, 2.251)**	0.331	**1.698*** (1.405, 2.052)**	0.292	**1.390** (1.131, 1.707)**	0.182
Age (≥51)						
18–25	1.471 (0.846, 2.559)	0.213	**2.245*** (1.348, 3.739)**	0.446	0.714 (0.432, 1.179)	−0.186
26–30	**1.796* (1.103, 2.925)**	0.323	**2.369*** (1.500, 3.739)**	0.476	0.718 (0.465, 1.106)	−0.183
31–40	1.419 (0.894, 2.253)	0.193	**2.166*** (1.407, 3.333)**	0.426	0.965 (0.652, 1.430)	−0.020
41–50	1.124 (0.679, 1.860)	0.064	**1.631** (1.024, 2.597)**	0.270	0.761 (0.493, 1.174)	−0.151
Marriage (None spouse)						
Have a spouse	**1.368** (1.022, 1.831)**	0.173	1.212 (0.931, 1.577)	0.106	1.050 (0.789, 1.398)	0.027
Education (Postgraduate and above)						
Junior high school and below	1.540 (0.933, 2.540)	0.238	1.251 (0.807, 1.939)	0.123	1.471 (0.912, 2.371)	0.213
High school/Technical school	**2.373** (1.573, 3.581)**	0.476	**1.818** (1.268, 2.607)**	0.330	**2.028*** (1.364, 3.016)**	0.390
Junior College	**1.940** (1.305, 2.885)**	0.365	1.379 (0.979, 1.943)	0.177	**1.901** (1.304, 2.773)**	0.354
Undergraduate	**1.679** (1.193, 2.363)**	0.286	1.309 (0.985, 1.739)	0.148	1.351 (0.978, 1.867)	0.166
Job (Medical workers)						
Nonprofessional employees	**1.721* (1.129, 2.621)**	0.299	1.421 (0.967, 2.089)	0.194	**0.643* (0.421, 0.982)**	−0.243
Social service workers	1.488 (0.938, 2.358)	0.219	1.175 (0.777, 1.777)	0.089	0.978 (0.641, 1.492)	−0.012
Teachers and operators	1.335 (0.927, 1.921)	0.159	1.032 (0.747, 1.426)	0.017	0.757 (0.544, 1.054)	−0.153
Students	1.231 (0.752, 2.017)	0.115	1.030 (0.669, 1.587)	0.016	0.647 (0.402, 1.042)	−0.240
Workers and farmers	1.346 (0.890, 2.037)	0.164	1.290 (0.890, 1.871)	0.140	0.804 (0.546, 1.182)	−0.120
Unemployed and others	1.036 (0.699, 1.535)	0.019	1.108 (0.787, 1.559)	0.057	**0.629* (0.438, 0.903)**	−0.256
Income (Not poor)						
Poor	1.276 (0.953, 1.709)	0.134	1.098 (0.834, 1.447)	0.052	**1.377* (1.028, 1.846)**	0.176
Prior psychological problems (No)						
Yes	1.316 (0.992, 1.745)	0.151	**1.930*** (1.498, 2.486)**	0.363	**1.572** (1.199, 2.062)**	0.249
Post psychological problems (No)						
Yes	**2.026*** (1.609, 2.552)**	0.389	**2.168*** (1.762, 2.668)**	0.427	**1.658*** (1.321, 2.080)**	0.279
Chronic disease (No)						
Yes	0.741 (0.528, 1.039)	−0.165	1.204 (0.904, 1.602)	0.102	**1.412* (1.058, 1.884)**	0.190
Two-week illness (No)						
Yes	**1.554* (1.074, 2.248)**	0.243	**1.829*** (1.303, 2.566)**	0.333	**1.766** (1.249, 2.497)**	0.314

The values of coefficients and 95% confidence interval in bold represent statistically significant at 0.05 level. *p < 0.05, **p < 0.01, ***p < 0.001.

Table7.

The combine effect of gender and age on PTSS.

Bar chart showing PTSS percentages by Age group for Male and Female:
- 18–25: Male 26.5%, Female 11.0%
- 26–30: Male 30.1%, Female 16.4%
- 31–40: Male 25.2%, Female 18.5%
- 41–50: Male 23.0%, Female 11.0%
- ≥51: Male 14.2%, Female 11.7%

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

Table 8.

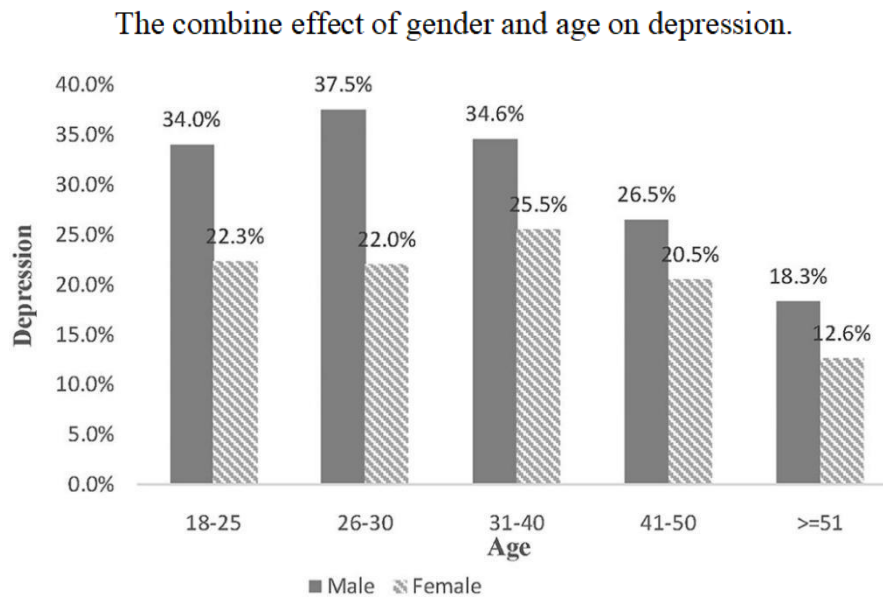

The combine effect of gender and age on depression.

Table 9.

Association between demographic variables and the psychological impact of the COVID-19 pandemic as well as mental health status during the pandemic (N = 3055).

Variables	N (%)	Impact of event				Stress				Anxiety				Depression			
		M (SD)	t/F*	p	g/η²*	M (SD)	t/F*	p	g/η²*	M (SD)	t/F*	p	g/η²*	M(SD)	t/F*	p	g/η²*
Education level																	
No studies	3	52.33 (7.09)^d	4.92[1]	<0.001	0.01	28 (10)^{ab}	4.37[1]	<0.001	0.01	11.33 (17.93)^{abc}	4.46[1]	<0.001	0.01	27.33 (12.86)^{abc}	10.92[1]	<0.001	0.02
Primary education	29	24.24 (19.56)^{eg}				7.93 (9.08)^{ab}				6 (8.78)^{abc}				8.56 (9.83)^{abc}			
Secondary compulsory education	91 (3)	32.01 (20.78)^{bcde}				11.98 (10.31)^{ab}				9.30 (9.19)^a				12.41 (11.51)^c			
Secondary post-compulsory education	294 (9.6)	28.50 (19.60)^{bcde}				11,13 (10.35)^{ab}				6.49 (9.10)^{ab}				11.66 (11.22)^c			
Professional training	439 (14.4)	27.47 (20.14)^{bcde}				10.55 (10.33)^{ab}				6.22 (8.22)^{ab}				9.87 (10.51)^{bc}			
University degree	1435 (47)	29.12 (19.47)^{bde}				11.68 (10.30)^a				6.49 (8.23)^{ab}				10.52 (10.05)^c			
Master's degree	610 (20)	26.13 (17.59)^{acde}				10.38 (9.23)^{ab}				5.56 (7.63)^{bc}				8.15 (8.53)^b			
Ph.D	154 (5)	22.40 (16.76)^{afg}				8.66 (8.20)^b				4.01 (6.35)^c				5.80 (6.88)^a			
Montly income*																	
<1000 €	293 (9.6)	30.41 (19.74)^{bc}	5.97[1]	<0.001	0.01	12.78 (10.77)^a	3.58[1]	<0.01	0.01	7.80 (8.80)^b	6.63[1]	<0.001	0.01	12.81 (11.26)^a	10.27[1]	<0.001	0.02
1000 – 1500 €	496 (16.2)	29.83 (20.51)^{bc}				11.52 (10.42)^{ab}				7.12 (8.98)^{bd}				11.25 (10.57)^{ab}			
1500 – 2000 €	524 (17.2)	30.35 (19.55)^b				11.71 (9.98)^{ab}				6.99 (8.56)^{bcd}				10.36 (10.02)^{bc}			
2000 – 2500 €	491 (16.1)	26.37 (17.92)^{ac}				10.33 (9.98)^b				5.63 (7.55)^{ad}				9.36 (9.84)^{bcd}			
2500 – 3000 €	380 (12.4)	27.54 (19.07)^{abc}				10.75 (9.99)^{ab}				5.95 (8.31)^{ab}				9.02 (9.33)^{cd}			
3000 – 3500 €	302 (9.9)	26.26 (18.75)^{ac}				10.36 (9.24)^{ab}				5.36 (7.51)^{ac}				8.65 (8.97)^{cd}			
>3500 €	541 (17.7)	25.10 (18.24)^a				10.08 (9.68)^b				5.01 (7.33)^a				8.18 (9.13)^d			

The impact of COVID-19 epidemic on mental health in terms of age gender and education level

Table 10.

Association between sociodemographic characteristics and the psychological impact of the 2019 coronavirus disease (COVID-19) in the DASS-21 subscales.

Variables	n (%)	DASS Stress Mean^a	SE	B	95% IC	DASS Depression Mean^a	SE	B	95% IC (Bootstrap)	DASS Anxiety Mean^a	SE	B	95% IC (Bootstrap)
Country													
Italy	420 (26.1)	20.60	1.32	11.16**	9.59 to 12.86	18.49	1.23	8.87**	7.14 to 10.59	10.08	1.20	2.36**	0.83 to 3.75
United States	158 (9.8)	14.99	1.39	5.54**	3.71 to 7.64	14.26	1.29	4.65**	2.75 to 6.78	10.72	1.26	2.95**	1.31 to 4.78
Ecuador	149 (9.2)	16.3	1.48	6.85**	4.43 to 9.34	13.73	1.41	4.11**	1.80 to 6.28	13.39	1.36	5.62**	3.51 to 7.69
Norway	107 (6.6)	16.58	1.36	7.17**	5.11 to 9.51	16.56	1.27	6.95**	4.67 to 9.53	10.04	1.29	2.26*	0.18 to 4.52
Iran	216 (13.4)	17.2	1.40	7.75**	5.57 to 9.76	13.99	1.37	4.38**	2.51 to 6.39	11.14	1.32	3.37**	1.64 to 5.28
Australia	130 (8.1)	16.86	1.50	7.41**	5.21 to 9.74	14.98	1.36	5.36**	3.04 to 7.70	10.71	1.32	2.93**	1.06 to 5.00
China	432 (26.8)	9.45	1.30			9.62	1.22			7.77	1.23		
Gender													
Male	644 (40)	15.00	1.22	−1.20**	−3.13 to −0.99	14.03	1.11	−0.98	−2.10 to 0.09	10.11	1.13	−0.87	−1.77 to 0.00
Female	968 (60)	17.00	1.20			15.01	1.12			10.99	1.12		
Declared income													
Low	190 (11.8)	16.77	1.30	2.96	−1.27 to 6.84	15.16	1.24	1.30	−1.71 to 4.29	11.44	1.19	3.76**	1.50 to 6.20
Medium-low	358 (22.2)	16.29	1.24	2.48	−1.52 to 5.95	15.00	1.20	1.14	−1.93 to 4.09	11.54	1.19	3.87**	1.78 to 6.21
Medium	808 (50.1)	16.90	1.14	3.09	−0.45 to 6.49	14.61	1.08	0.75	−1.97 to 3.55	11.38	1.10	3.70**	1.75 to 5.86
Medium-high	228 (14.1)	16.22	1.28	2.41	−1.36 to 5.88	13.96	1.23	0.09	−2.84 to 3.12	10.73	1.23	3.05**	0.91 to 5.30
High	28 (1.7)	13.81	2.11			13.86	1.66			7.67	1.46		
Education													
No answer	48 (3)	15.12	1.65	−0.02	−2.79 to 2.95	12.67	1.43	0.22	−2.38 to 2.81	8.81	1.36	−0.96	−3.29 to 1.57
Primary school	6 (0.4)	19.54	4.31	4.40	−2.52 to 13.79	19.87	3.48	7.42*	1.74 to 14.78	15.42	4.68	5.65	−2.48 to 16.55
Middle school	15 (0.9)	18.68	2.45	3.54	−1.61 to 8.35	17.30	3.12	4.86	−1.53 to 11.25	11.36	2.36	1.59	−2.25 to 6.79
High school	358 (22.2)	14.74	1.06	−0.40	−2.31 to 1.39	13.60	0.97	1.16	−0.66 to 2.87	9.96	0.92	0.20	−1.48 to 1.73
Bachelor's degree	432 (26.8)	14.78	0.97	−0.36	−2.06 to 1.19	13.52	0.86	1.07	−0.72 to 2.85	9.66	0.85	−0.10	−1.67 to 1.22
Master's degree	514 (31.9)	13.98	1.06	−1.16	−2.84 to 0.28	12.23	0.97	−0.21	−1.70 to 1.17	8.87	0.91	−0.90	−2.24 to 0.39
Ph.D. or post-graduated school	239 (14.8)	15.14	1.13			12.44	1.07			9.77	1.00		
Employment													
No answer	44 (2.7)	15.52	1.86	−0.32	−3.30 to 3.36	15.23	1.73	1.08	−1.98 to 4.24	10.52	1.74	0.33	−2.86 to 3.41
Unemployed	117 (7.3)	16.61	1.39	0.77	−1.12 to 2.74	15.82	1.31	1.67	−0.16 to 3.52	10.76	1.33	0.58	−1.27 to 2.55
Student	732 (45.4)	15.96	1.24	0.12	−1.02 to 1.24	14.22	1.16	0.07	−1.11 to 1.32	11.01	1.18	0.82	−0.25 to 1.88
Student worker	130 (8.1)	16.06	1.41	0.22	−1.73 to 1.97	13.19	1.29	−0.96	−2.76 to 0.91	10.27	1.29	0.09	−1.68 to 1.72
Workers	589 (36.5)	15.84	1.18			14.14	1.06			10.19	1.11		
Do you have children?													
No	1351 (83.8)	15.59	1.19	−0.82	−2.15 to 0.56	14.90	1.07	0.77	−0.58 to 2.06	10.19	1.11	−0.72	−1.99 to 0.52
Yes	261 (16.2)	16.41	1.26			14.14	1.18			10.91	1.18		
What is the larger open-air space in your home?													
No open-air spaces	230 (14.3)	16.90	1.35	1.03	−0.52 to 2.56	15.78	1.27	1.49*	−0.02 to 3.01	11.04	1.26	1.06	−0.42 to 2.55
Balconies and terraces	529 (32.8)	15.65	1.22	−0.22	−1.25 to 0.98	13.90	1.14	−0.38	−1.42 to 0.78	10.21	1.12	0.24	−0.69 to 1.31
Condominium courtyard	268 (16.6)	15.58	1.26	−0.28	−1.59 to 1.28	14.11	1.12	−0.17	−1.47 to 1.22	10.98	1.15	1.00	−0.14 to 2.32
Private garden	585 (36.3)	15.86	1.23			14.28	1.14			9.98	1.16		
Do you know anyone infected with COVID-19?													
Yes	509 (31.6)	16.59	1.26	1.17*	0.05 to 2.21	14.78	1.16	0.53	−0.57 to 1.50	11.19	1.16	1.27*	0.26 to 2.16
No	1103 (68.4)	15.41	1.16			14.25	1.06			9.92	1.10		

Note: Results refer to the 3 regression linear models with DASS stress, DASS depression and DASS anxiety as dependent variables, linked to ANCOVA model. Covariates in the model are MAAS, Brief-COPE Avoidant and Brief-COPE Approach. To obtain the group means (^a), covariates are evaluated on the following values: MAAS = 61.16, Brief-COPE Avoidant = 26.15, Brief-COPE Approach = 35.40. Confidence intervals at 95% are obtained with bootstrap standard errors with 500 resamples. T-tests are evaluated at 5% (*$p<.05$), 1% (**$p<.01$), and 0.1% (***$p<.001$).