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THE RELATIONSHIP BETWEEN BEHAVIOURAL AND PSYCHOSOCIAL FACTORS AMONG BRAZILIANS IN QUARANTINE DUE TO COVID-19
--Manuscript Draft--

Abstract:	Summary Background During quarantine, both physical and mental health are a concern. To the same extent that physicians are a scarce resource during this crisis, psychiatrists and psychologists are also limited in number. In order to help practitioners and public managers to decide where to put their mental health resources, the present research investigated the relationship between stress, depression and state anxiety levels with sociodemographic and behavioural variables. Methods Data were collected in Brazil between March 18 and 22, 2020 in 1,468 volunteers during quarantine. Participants with history or current mental health illnesses were excluded leaving 1,460 individuals in the final sample. The online assessment included instruments for psychological stress, depression and state anxiety; whereas, a sociodemographic and behavioural questionnaire with 15 items was used to assess other factors. A multiple linear regression was performed for each psychological dimension so a hierarchy of independent variables could be developed. Findings Stress, depression and state anxiety levels were all predicted by gender (women higher than men), quality of nutrition, attendance in tele-psychotherapy, exercise frequency, presence of elderly persons in quarantine with the person, obligation to work outside, level of education (more educated, lesser risk for mental illness) and age (younger age, greater risk). Having a perceived risk factor for COVID-19 predicted depression and state anxiety, but not stress. Finally, the presence of children in quarantine with the participant was a protective factor for depression. Interpretation Even though this research is limited by its cross-sectional design, it is possible to infer that mental health varies by demographic attributes, obligations and health behaviours. Those who report higher distress must work outside during quarantine, live with an elderly person and carry a risk factor for COVID-19, among other factors. Identifying those who are most vulnerable would help to prioritize those who may need the greatest psychological aid and assist public health practitioners in developing support strategies.

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Summary

Background:

During quarantine, both physical and mental health are a concern. To the same extent that physicians are a scarce resource during this crisis, psychiatrists and psychologists are also limited in number. In order to help practitioners and public managers to decide where to put their mental health resources, the present research investigated the relationship between stress, depression and state anxiety levels with sociodemographic and behavioural variables.

Methods:

Data were collected in Brazil between March 18 and 22, 2020 in 1,468 volunteers during quarantine. Participants with history or current mental health illnesses were excluded leaving 1,460 individuals in the final sample. The online assessment included instruments for psychological stress, depression and state anxiety; whereas, a sociodemographic and behavioural questionnaire with 15 items was used to assess other factors. A multiple linear regression was performed for each psychological dimension so a hierarchy of independent variables could be developed.

Findings:

Stress, depression and state anxiety levels were all predicted by gender (women higher than men), quality of nutrition, attendance in tele-psychotherapy, exercise frequency, presence of elderly persons in quarantine with the person, obligation to work outside, level of education (more educated, lesser risk for mental illness) and age (younger age, greater risk). Having a perceived risk factor for COVID-19 predicted depression and state anxiety, but not stress. Finally, the presence of children in quarantine with the participant was a protective factor for depression.

Interpretation:

Even though this research is limited by its cross-sectional design, it is possible to infer that mental health varies by demographic attributes, obligations and health behaviours. Those who report higher distress must work outside during quarantine, live with an elderly person and carry a risk factor for COVID-19, among other factors. Identifying those who are most vulnerable would help to prioritize those who may need the greatest psychological aid and assist public health practitioners in developing support strategies.

Keywords: COVID-19; SARS-CoV-2; Psychology; Quarantine; Mental Health

Introduction

Mental health can be defined as an internal state of well-being, balance and cognitive and coping abilities used in harmony with the universal values of society which allows individuals to work, cope and solve problems in everyday tasks [1,2]. According to the World Health Organization (WHO), 14% of the global burden of disease can be attributed to mental health disorders [3, 4]. Consequently, the WHO developed the Mental Health Gap Action Programme (mhGAP), which is a project that aims to raise awareness about the deficit between physical and mental health. Moreover, the programme aims to provide evidence-based practices and guidelines to help mental health practitioners in their everyday work [4]. Of particular emphasis in this report is the urgent need to "scale up" mental health interventions, which requires acute knowledge of situational factors, the needs of population and identifying those most at risk.

Due to the outbreak of the Corona Virus Disease 2019 (COVID-19), quarantine was adopted as a strategy to avoid its spread in several countries in the first quarter of 2020 [5, 6]. Although it became clear that public policies to prohibit people from going outside their homes were necessary [6], physicians, nurses, physical therapists and other healthcare providers remained working to protect the physical health of COVID-19 (SARS-CoV-2) and other inpatients [7]. However, other members of the workforce, such as supermarket employees, public servants and police, are also on the streets to maintain a functioning society, exposing them to a greater risk of contracting COVID-19 than those in quarantine [5-8].

Social isolation poses an additional big challenge to workers both inside and outside of the home [7-11]. Some research has been conducted in quarantined samples [9]; however, the current condition is one of the few times when a large amount of the global population has been confined to their own homes. Therefore, those in quarantine are facing stressful living conditions confronted without any previous training and little time for preparations [7]. For example, in 2016 Jeong, Yim, Song and colleagues investigated anxiety and anger in participants confined for two weeks due to Middle East Respiratory Syndrome (MERS). The results showed that both psychological variables were higher during confinement. Anxiety measured during confinement had a prevalence of 7.6% and 3.0% out of isolation; whereas, anger was reported among 16.6% of confined participants decreasing to 6.4% six months after the end of isolation [12]. This is the only Longitudinal quantitative study of psychological symptoms in participants obliged to social isolation thus far in the literature [10]. However, similar studies with cross-sectional sampling have been conducted to assess different

psychological conditions and states among participants in quarantine. Hawryluck, Gold, Robinson et al. collected post-traumatic stress and depression symptom-like data from 129 participants supposedly exposed to SARS and prohibited to leave quarantine for an average of ten days. Results showed a greater amount of symptoms when compared to normative data [13]. Other papers presented similar results for: stress [12-17], depression [12, 16], anxiety [12, 13] and hopelessness [16]. Although the present paper does no compare its results to normative data due to the lack of norms in some of the measures, it is important to highlight the need to understand the role of behavioural and psychosocial factors to predict mental health in people going through confinement and social isolation.

Even though people in quarantined conditions seem to have higher levels of stress, anxiety and depression-like symptoms [10], mental health practitioners are not a limitless resource. In fact, the current availability of resources may be only a small fraction of what is needed at the peak of a crisis. Consequently, public policies and strategies should be adopted to appropriately match psychology and psychiatry professionals with those most vulnerable. Regarding mental health, or more specifically distress, anxiety and depression, some demographics (e.g., gender [18-20], age [21], education, number of people in confinement with the person [11], other variables [15, 22]) and behavioural (balanced nutrition [23], regular exercise [24, 25], psychotherapy [26], and telepsychology [27, 28]) outcomes seem to be associated with or directly reduce or increase its levels. However, the vast majority of this evidence was gathered with people who were not in confinement at home. Altogether, this evidence leads to the question: which demographic and behavioural variables predict stress, anxiety and depression levels among people in quarantine?

Method

Participants

Participants of the present study were 1,468 volunteers in different levels of government-mandated confinement at home. Inclusion criteria were adults (two volunteers were not included due to this criterion), Brazilian Portuguese speakers who were in quarantine or who lived with another person in quarantine for at least 3 days due to COVID-19 outbreak. Included participants signed a consent form (two individuals refused and were not included). The exclusion criteria were volunteers under psychiatric treatment or any history of previous treatment (four volunteers were excluded based on these criteria) which lead to the final number of 1,460 participants.

Procedure

The project of the present research was approved by the institution's Ethics Committee before data collection. All procedures follow the Brazilian Legislation (i.e., Resolution #196/96 of the Brazilian National Health Council [29]) and the Declaration of Helsinki. After the approval, a website in Google Forms presented the following instruments in the same order for all participants: (i) Consent form, (ii) stress measure (Perceived Stress Scale-10), (iii) depression measure (Filgueiras Depression Inventory), state anxiety measure (State and Trait Anxiety Inventory: state subscale), (iv) sociodemographic information. After beginning, no answer could be left blank, so the entire form had to be filled in order to complete and send it to the server. The recruitment for volunteers occurred through the first author's and his laboratory's social media, which consequently lead to a convenience sample. Data collection happened between March 18th and March 22nd of 2020, from 3 to 7 days after the COVID-19 quarantine Lockdown declared by the Brazilian States Governors on National Television. The spreadsheet generated by the Google Drive was saved in Microsoft Excel format for further analysis.

Instruments

Four instruments were adopted: three psychometric assessment measures and one sociodemographic questionnaire. The characteristics of those instruments are presented below:

Perceived Stress Scale-10 items version (PSS-10)[30]: The PSS-10 is a 10-item self-reporting scale with questions regarding the frequency which one perceives stressful variables in daily activities in the last month. The participant answers to those questions in a 5-point Likert-type scale that ranges from "0-never" to "4-very often". Sample of questions are: "In the last month, how often have you been able to control irritations in your life?" and "In the last month, how often have you felt that you were unable to control the important things in your life?". Items 4, 5, 7 and 8 are reverse-scored before summing the 10 items to generate the total score.

Filgueiras Depression Inventory (FDI)[31]: The FDI is a 20-item inventory of words that are related to depression-like symptoms according to the DSM-V. The participant associates each one of these twenty words to his own feelings in the last fortnight through a Likert-type scale of six categories of endorsement ranging from "0-not related to me at all" to "5-totally related to me". Sample of the 20-item words list are: "Melancholy", "Sadness", "Disgust", "Displeasure" and "Death". The total score is simply the sum of all items.

The Spielberg State and Trait Anxiety Inventory – State Subscale (SSTAI)[32]: The SSTAI is one in a set of two subscales developed to assess two dimensions of anxiety: trait and state. The trait anxiety refers to personality characteristics of an individual that facilitates the

occurrence of anxiety-like symptoms and behaviours. On the other hand, state anxiety comprises how one feels in the moment the inventory is completed rather than enduring aspects of personality. The state anxiety subscale has a 20-item structure that is answered in a 4-category Likert scale. Specifically, the SSTAI, responses range from "1-not at all" to "4-very much so". Sample of items are: "I feel calm", "I feel nervous" and "I am presently worrying over possible misfortunes". Items 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20 are reverse-scored before summing the answers of all items to provide the total score.

Sociodemographic questionnaire: Due to potential social and demographic characteristics found in the literature linked to stress, anxiety and depression among diverse samples, including recent studies about COVID-19 [7-12]. A simple "yes" or "no" dichotomous response was provided for the following questions: "Is an elderly person in quarantine with you?", "Are children in quarantine with you?" and "Do you have any risk factors for COVID-19?". A question about quarantine status at home was asked with two possible responses: either "Yes (I am not going outside)" or "No (I do go outside, even if rarely)". A 3-category response ("yes", "sometimes" and "no") was used for two questions: "Does your job require you to go outside?" and "Have you used telemedicine services yet?". Another three questions provided the participant a 3-category response options, although they were presented differently. The item called "Nutrition" offered the following options: "Balanced meals every time", "Balanced meals sometimes" and "Meals that are not balanced". The item called "Exercise" provided these possible responses: "At least 4 times a week", "Between 1 and 3 times a week" and "No exercise". The question "Do you attend psychotherapy (online)?" had these options for responding: "Regularly", "Only for emergencies" and "No psychotherapy at all". Gender was also collected with three possible categories: "men", "women" and "other". Education had five response levels: "Elementary school", "High school", "Bachelor's degree", "Master's degree" and "Doctoral degree". Finally, there were four items of the sociodemographic questionnaire that required a numeric response: "Age", "Total number of members in the nuclear family" (not necessarily with the participant at home), "Number of family members in quarantine with you" and "Number of days in quarantine".

Data Analysis

Descriptive statistics for stress, anxiety and depression levels were calculated for each categorical variable: mean and standard deviation (S.D.). Continuous demographic variables (i.e., age, total number of members in the nuclear family, number of family members in quarantine with you and number of days in quarantine) and total scores of psychometric measures were also described in terms of average and S.D.

Null-hypothesis tests were performed to compare means of PSS-10, FDI and SSTAI for different categories in demographic variables. Specifically, for independent variables with two categories the *t*-test was used and effect-size was measured by Cohen's d; for independent variables with more than two categories, a one-way ANOVA was chosen to compare groups and Cohen's f was used for effect-size. Significant differences were considered when the *p*-value was below 0.05; whereas effect-size interpretation followed the cut-offs from Cohen [33]: for Cohen's d, the values indicate a small effect-size between 0.20 and 0.50, between 0.50 and 0.80 is interpreted as a moderate size and above 0.80 depicts a large effect-size; for Cohen's f, the values are considered a small effect-size between 0.10 and 0.25, between 0.25 and 0.40 is understand as a moderate size and above 0.40 entails a large effect-size.

Three multiple linear regressions were performed to identify which sociodemographic and behavioural variables predict stress, state anxiety and depression independently. The stepwise method was adopted to retain variables if they contributed significantly to predict the dependent variable (i.e., improve the statistical linearity of the function in comparison to the constant). Inclusion and exclusion of variables was based on *t*-test *p*-values; whereas, the level of contribution of the sociodemographic or behavioural variables was assessed through Beta. Because most of variables used in the regression were categorical, Positive Beta does not necessarily mean positive association and *vice-versa*; it applies only when variables were continuous. The coefficient of determination (r^2) was also calculated to reveal the amount of variance explained by the independent variables. Acceptable values of r^2 for social sciences and clinical studies with humans may vary between 0.20 and 0.40, although the closer to 1.0, the better [34]. Three dispersion graphs with the line of tendency were plotted with the total score of PSS-10, FDI and SSTAI in the axis y and the results of the linear function in the axis x.

Results

Participants reported an average of 4.09 (S.D. = 0.97) days in quarantine. The sample's mean for age was 32.9 (S.D. = 12.1), number of members in the nuclear family was 3.9 (S.D. = 3.3) and for family members in quarantine with the person was 3.1 (S.D. = 1.7). PSS-10, FDI and SSTAI descriptive statistics stratified for each categorical independent variable, along with null-hypothesis tests, are presented in Table 1. Two information are important to depict: (i) even though "other" was an option for gender, it was not checked in this data collection, (ii) Five factors had effect sizes above 0.2 for all 3 indicators of mental health: gender, nutrition, exercise frequency, being quarantined with an elder and having perceived risk factors for COVID-19.

PLEASE, INSERT TABLE 1 ABOUT HERE

Multiple Linear regression revealed that several variables were predicted mental health variables. Specifically, stress was predicted by gender, nutrition, quarantine along with an elderly person, exercise frequency, level of education, a job requirement to work outside, the use of tele-psychotherapy and age, in order by strength of standardized betas. The coefficient of determination (r^2) was 0.23. The protective factors based on the strength of standardized betas were: being man, having a balanced diet, attending to tele-psychotherapy (or tele-psychological counseling), having children at home during quarantine and higher levels of education. On the opposite side, risk factors for mental illness during quarantine were: being women, living with elders, job requirement to go outside, caring any risk factor for COVID-19 and being younger.

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In terms of depression, gender, nutrition, presence of children in quarantine with the participant, use of tele-psychotherapy, whether the person carries a perceived risk factor for COVID-19, exercise frequency, level of education, presence of an elderly person in quarantine with the participant, the need to go outside the home due to job commitments and age, respectively. The coefficient of determination (r^2) for the depression model was 0.24. Finally, state anxiety was significantly linked to the same variables of Depression with exception of the presence of children or elderly in quarantine with the participant. The coefficient of determination (r^2) for the SSTAI model was 0.21. Table 2 presents regression coefficients (Beta), *t*-test and *p*-values for variables predicting each psychological dependent variable. Figure 1 presents the dispersion graphs of the three regressions: (a) stress, (b) depression and (c) state anxiety.

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Discussion

The current study helps to identify factors associated with poorer mental health among people in quarantine. First, women scored significantly higher for stress, depression and state

anxiety levels when compared to men. Indeed, there is ample evidence that gender and gender have a relationship with mental health [18-20]. Such a finding may suggest that psychological care be tailored by gender. The second most relevant variable based on the strength of standardized betas to predict all three psychological variables was nutrition. A balanced diet and regular feeding habits are linked to better mental health indices [23]. Although exercise appeared as an important factor to predict stress, depression and state anxiety levels [24], it was not as relevant according to betas as other sociodemographic and behavioural variables, such as characteristics of people in quarantine or the use of telepsychology.

Evidence from epidemiological research on COVID-19 suggests that elderly individuals are more susceptible to the virus than other age groups [6, 11]. The findings depicted here reveal that stress and depression levels are associated with the presence of older people in quarantine with participants. In fact, this variable had the third strongest beta in the PSS-10 multiple regression model. Probably two main factors are to be considered: leaving an elder at home and coming back later is stressful due to the risk of contagion, so, people who lives with elders tend to feel more stressed because they can contaminate those who have greater risk of health problems due to COVID-19 [6]. In addition, taking care of elderly implicates more time dedicated to cleaning and organizing the house to avoid contamination [11]. Also, regarding age-related variables, the presence of children in quarantine with volunteers was, interestingly, a protective whether than a depressive factor. People who had children among them in confinement reported less depression levels than those without children. It is a surprising finding, since it is a stressful condition to take care of children in quarantine [22]; however, in this sense, perhaps parents perceive that the condition of their offspring is safer so it might decrease worry or increase happiness. Age itself is also a demographic variable that predicts psychological outcomes, however it is negative associated and it has the smallest correlation in the regression when compared to other variables. TYounger people are a little bit more stressed, depressed and anxious with the quarantine situation than those who are older, which actually contradicts the literature [21]. On the other hand, the economic impact of COVID-19 and the growing trend of hopelessness among young adults [11] may explain the present findings.

Interestingly, higher levels of education seems to be protective for psychological distress, depression and state anxiety. The current results showed significant differences between participants with post-graduate education (Master's and Ph.D. degrees) and those who completed lower levels (bachelor's and high school). Accordingly, Steele, Dewa, Lin and colleagues [35] found evidence that those completing higher levels of education were more likely to seek psychological or psychiatric help. It actually corroborates with another finding of

the present study: the efficacy of tele-psychotherapy. All three dependent variables were partially predicted by the attendance of the participant in tele-psychotherapy (or online psychotherapy). Previous studies have shown the relevance of this kind of practice [26-28]; however, the results depicted here highlight the importance of psychological interventions during quarantine and isolation. In fact, telepsychology seems to be more associated with depression and anxiety levels than exercise, age and education.

Finally, factors relevant for one's personal exposure to the novel coronavirus predicted all 3 indicators of mental health. There is already evidence in the scientific literature that COVID-19 raises levels of distress among people in quarantine also due to the lethal threat it poses to the population and to the person himself [11]. Two pertinent risk variables were predictive of stress, depression and anxiety: job obligation to leave the home and having perceived risk factors for SARS-CoV-2. Participants whose jobs obliged them to go outside the home to work showed higher stress, depression and state anxiety levels when compared to those who were not required to leave home. Worse mental health was also reported for those who perceived themselves as having risk factors for COVID-19. Recent evidence implicates several physical factors that render a person more vulnerable to a viral infection: age, obesity, diabetes, heart diseases, asthma, bronchitis and other breathing disorders, chronic and autoimmune diseases [5-6]. Consequently, participants who classified themselves as having one or more of these illnesses also reportedmore depression and anxiety than those volunteers who categorized themselves without these vulnerabilities. It is understandable that a disease that is newly emerging, not fully understood by science and poses a real and lethal threat to people is perceived as very stressful - even more to those who have greater infection risk and have to face death [11]. Unfortunately, PSS-10 and SSTAI do not have any normative data to Brazilian population, so, neither prevalence nor comparison to norms were possible in the present study. Regardless, the number of participants who presented values above FDI's cut-off point for depression was 4.1% [31], similar number to the prevalence of major depression among Brazilians [36].

Although this research provides a step further to understand psychological needs during quarantine of COVID-19, it also has several limitations. All data were self-report and not verifiable from other sources. Furthermore, no other psychological and environmental variables were considered, such as personality traits, economic conditions, size of the city and proximity of contamination that could provide more information regarding possible relationships between psychological, physical, behavioural and demographic dimensions [5, 6-10]. Another problem is the design of the study: data were cross-sectional (no comparison group) and the analysis was

composed of a linear regression technique, which limits inferences about causality. Thus, everything that this paper can state is the level of association between variables. Future studies may benefit from longitudinal designs.

Differently from previous studies with people in quarantine [10-17], the present study aimed to identify and quantify the strength of associations of various risk factors with mental health outcomes. Based on the findings here depicted, mental health services, either public or private, may be able to prioritize their services to those in greater danger to developing mental illness. The results suggest that less educated women who have unbalanced diets, do not exercise, have no psychological aid, work outside, are in quarantine with older people, have perceived physical risk factors for COVID-19 contamination and are at young age are more likely to report higher levels of distress, depression and state anxiety. Effect sizes observed suggests that several factors were of a moderate magnitude: levels of education, nutrition, practicing exercise regularly, the presence of elders in quarantine living with participants and caring any risk factor for COVID-19. Those factors may need special consideration. Regardless, the sociodemographic and behavioural variables identified in the current study should be carefully considered when establishing strategies to provide psychological help to those at greater risk for developing mental illness.

Contributors

AF designed the method, collected data, performed statistical analyses and wrote the manuscript. MSK performed analyses and wrote the manuscript.

Declaration of interest

The authors declare no competing interests.

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References

1   World Health Organization. *Promoting mental health: concepts, emerging evidence, practice (Summary Report)*. Geneva: World Health Organization, **2004**.

2   Galderisi S, Heinz A, Kastrup M, et al. Toward a new definition of mental health. *World Psychiatry* **2015**; **14**: 231-33.

3   Prince M, Patel V, Saxena S, et al. No health without mental health. *The Lancet* **2007**; **370**: 859-77.

4   World Health Organization. *mhGAP: Mental Health Gap Action Programme: Scaling up care for mental, neurological, and substance use disorders*. Geneva: World Health Organization, **2008**.

5   Wilder-Smith A, Freedman D. Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *Journal of travel medicine* **2020**; **27:** taaa020.

6   World Health Organization. *Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19): interim guidance, 19 March 2020* (WHO/2019-nCoV/IHR_Quarantine/2020.2). Geneva: World Health Organization, **2020**.

7   Rubin G, Wessely S. The psychological effects of quarantining a city. *Bmj* **2020**; **368**.

8   Webster R, Brooks S, Smith L, et al. How to improve adherence with quarantine: Rapid review of the evidence. *medRxiv* **2020**; **23**.

9   Xiao C. A Novel Approach of Consultation on 2019 Novel Coronavirus (COVID-19)-Related Psychological and Mental Problems: Structured Letter Therapy. *Psychiatry investigation* **2020**; **17**: 175.

10   Brooks S., Webster R., Smith L., et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet* **2020**; **395**: 14-20.

11   Qiu J, Shen B, Zhao M, et al. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Bmj* **2020**; **33**: e100213.

12   Jeong H, Yim HW, Song Y-J, et al. Mental health status of people isolated due to Middle East respiratory syndrome. *Epidemiol Health* 2016; 38: e2016048.

13   Hawryluck L, Gold W, Robinson S, et al. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis* **2004**; **10**: 1206-12.

14 Reynolds D, Garay J, Deamond SL, et al. Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect* **2008**; **136**: 997-1007.

15 Taylor M, Agho K, Stevens G, et al. Factors influencing psychological distress during a disease epidemic: data from Australia's first outbreak of equine influenza. *BMC Public Health* **2008**; **8**: 347.

16 Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* **2009**, **54**: 302-11.

17 Wang Y, Xu B, Zhao G, et al. Is quarantine related to immediate negative psychological consequences during the 2009 H1N1 epidemic? *Gen Hosp Psychiatry* **2011**; **33**: 75-7.

18 Nolen-Hoeksema S. Gender differences in depression. *Current directions in psychological science* **2001**; **10**: 173-76.

19 Almeida D, Kessler R. Everyday stressors and gender differences in daily distress. *Journal of personality and social psychology* **1998**; **75**: 670-80.

20 McLean CP, Anderson ER. Brave men and timid women? A review of the gender differences in fear and anxiety. *Clinical psychology review* **2009**; **29**: 496-505.

21 Christensen H, Jorm A, Mackinnon A, et al. Age differences in depression and anxiety symptoms: a structural equation modelling analysis of data from a general population sample. *Psychological medicine* **1999; 29**: 325-39.

22 Timmer SG, Ho LK, Urquiza AJ, et al. The effectiveness of parent–child interaction therapy with depressive mothers: The changing relationship as the agent of individual change. *Child Psychiatry & Human Development* **2011**; **42**: 406-23.

23 Lim S, Kim E, Kim A, et al. Nutritional factors affecting mental health. *Clinical nutrition research* **2016**; **5**: 143-52.

24 Paluska SA, Schwenk TL. Physical activity and mental health. *Sports medicine* **2000**; **29**: 167-80.

25 Stults-Kolehmainen M, Sinha R. The effects of stress on physical activity and exercise. *Sports medicine* **2014**; **44**: 81-121.

26 Lambert MJ, Bergin AE, Garfield SL. *The effectiveness of psychotherapy: Encyclopedia of Psychotherapy.* New York, NY: Elsevier Science, **1994**.

27 Bolton AJ, Dorstyn DS. Telepsychology for posttraumatic stress disorder: A systematic review. *Journal of telemedicine and telecare* **2015**; **21**: 254-67.

28   Varker T, Brand RM, Ward J, et al. Efficacy of synchronous telepsychology interventions for people with anxiety, depression, posttraumatic stress disorder, and adjustment disorder: A rapid evidence assessment. *Psychological services* **2019**; **16**: 621-35.

29   National Council of Health. *Resolução nº 196, de 10 de Outubro de 1996*. Brasilia: Ministry of Health of Brazil, **1996**.

30   Cohen S, Williamson GM. Perceived stress in a probability sample of the United States. In: Spacapan S, Oskamp S. *The social psychology of health: Claremont Symposium on Applied Social Psychology* (pp. 31–67). Newbury Park: Sage, **1988**.

31   Filgueiras A, Hora G, Fioravanti-Bastos AC, et al. (2014). Development and psychometric properties of a novel depression measure. *Trends in Psychology* **2014**; **22**: 249-69.

32   Spielberger CD, Gorsuch, RL, Lushene RD. *STAI: manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press, **1970**.

33   Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. New York, NY: Lawrence Erlbaum Associates, **1988**.

34   Hamilton DF, Ghert M, Simpson AHRW. Interpreting regression models in clinical outcome studies. *Bone Joint Res* **2015**; **4**: 152-3.

35   Steele LS, Dewa CS, Lin E, et al. Education level, income level and mental health services use in Canada: Associations and policy implications. *Healthcare Policy* **2007**, **3**: 96.

36   Barros BAB, Lima GL, De Azevedo CSA, et al. Depression and health behaviors in Brazilian adults – PNS 2013. *Rev Saude Publica* **2017**; **51**: 8s.

Groups (samples)	Stress (PSS-10)			Depression (FDI)			Anxiety (SSTAI)		
	Average (S.D.)	p-value	effect-size	Average (S.D.)	p-value	effect-size	Average (S.D.)	p-value	effect-size
Whole Sample (N=1460)	20.29 (8.51)	-	-	51.57 (23.08)	-	-	53.54 (12.93)	-	-
Education									
High School (N=204)	24.08 (8.31)			60.12 (22.19)			57.25 (11.84)		
Bachelor (N=1024)	20.14 (8.40)	< 0.01	0.25	51.80 (23.34)	<0.01	0.24	53.47 (13.07)	<0.01	0.16
Master (N=170)	17.25 (8.32)			43.75 (19.88)			50.18 (12.62)		
Doctorate (N=62)	17.65 (6.00)			39.55 (17.20)			50.42 (11.18)		
Gender									
Women (N=1064)	20.96 (8.69)	<0.01	0.33	53.07 (23.47)	<0.01	0.28	54.65 (12.81)	<0.01	0.34
Men (N=386)	18.19 (7.61)			46.72 (21.04)			50.24 (12.69)		
Exercise									
At least 4 times a week (N=280)	17.04 (8.77)			44.66 (22.12)			48.81 (13.77)		
Between 1 and 3 times a week (N=292)	18.51 (7.72)	<0.01	0.22	45.73 (20.18)	<0.01	0.23	51.37 (12.05)	<0.01	0.22
No exercise (N=888)	21.83 (8.24)			55.56 (23.36)			55.65 (12.40)		
Nutrition									
Balanced meals every time (N=448)	16.73 (7.87)			41.63 (18.50)			47.60 (12.51)		
Balanced meals sometimes (N=566)	20.47 (8.17)	<0.01	0.33	52.33 (23.06)	<0.01	0.61	54.19 (12.19)	<0.01	0.36
Meals are not balanced (N=446)	23.49 (8.12)			60.38 (23.41)			58.49 (11.83)		
Do you attend to psychotherapy (online)?									
Regularly (N=260)	17.89 (7.61)			43.93 (22.09)			45.80 (12.56)		
Only for emergencies (N=142)	21.54 (8.14)	<0.01	0.22	52.54 (23.48)	<0.01	0.19	56.19 (12.45)	<0.01	0.17
No psychotherapy at all (N=1058)	22.69 (8.32)			55.71 (23.07)			56.87 (11.27)		
Quarantine									
Yes (not going outside) (N=1240)	20.08 (8.50)	=0.08	0.12	51.39 (22.99)	=0.65	0.03	53.14 (12.95)	<0.05	0.18
No I do go outside, even if rarely) (N=220)	21.17 (8.34)			52.15 (23.53)			55.40 (12.55)		
Are elderly in quarantine with you?									
Yes (N=412)	21.86 (8.04)	<0.01	0.27	55.56 (23.27)	<0.01	0.25	55.27 (12.42)	<0.01	0.20
No (N=1048)	19.61 (8.57)			49.91 (22.81)			52.78 (13.04)		
Are children in quarantine with you?									
Yes (N=1068)	20.09 (8.53)	=0.24	0.07	49.90 (22.00)	<0.05	0.10	54.36 (13.02)	=0.12	0.09
No (N=392)	20.67 (8.35)			52.28 (23.41)			53.16 (12.86)		
Do you have any risk factor for COVID-19?									
Yes (N=692)	21.53 (8.61)	<0.01	0.29	55.58 (24.23)	<0.01	0.34	55.67 (12.63)	<0.01	0.33
No (N=768)	19.09 (8.20)			47.83 (21.33)			51.52 (12.85)		
Does your job require you to come outside?									
Yes (N=446)	20.83 (8.65)			52.90 (24.29)			55.11 (12.86)		
Sometimes (N=332)	20.48 (7.75)	=0.10	0.13	51.47 (20.68)	=0.26	0.07	53.68 (12.94)	<0.05	0.09
No (N=682)	19.76 (8.70)			50.61 (23.20)			52.33 (12.83)		
Did you use telemedicine services so far?									
Often (N=76)	18.21 (8.95)			46.00 (24.16)			51.53 (14.49)		
Sometimes (N=146)	19.23 (7.95)	=0.06	0.08	48.26 (22.97)	<0.05	0.07	52.19 (12.57)	=0.15	0.07
No (N=1238)	20.25 (9.95)			52.22 (22.95)			53.76 (12.84)		

Table 1: Descriptive statistics and null-hypothesis tests of stress, depression and state anxiety for all categorical variables. Interpretation for Cohen's d (*t*-test) is: below 0.20 no effect; between 0.20 and 0.50 small effect-size; between 0.50 and 0.80 moderate effect-size; above 0.80 high effect-size. Regarding Cohen's f (one-way ANOVA): below 0.10 no effect; between 0.10 and 0.25 small effect-size; between 0.25 and 0.40 moderate effect-size; above 0.40 high effect-size.

Variables	Multiple Linear Regression		
	Beta	t-test	p-value
Perceived Stress (PSS-10)			
(Intercept)	18.96	16.96	<0.001
Gender	2.76	6.07	<0.001
Nutrition	1.82	6.34	<0.001
Are elderly in quarantine with you?	1.57	3.56	<0.001
Exercise	-1.49	5.45	<0.001
Education	-0.93	2.86	<0.005
Does your job require you to come outside?	0.75	3.24	<0.005
Do you attend to psychotherapy (online)?	-0.33	4.13	<0.001
Age	-0.17	9.52	<0.001
Depression (FDI)			
(Intercept)	51.82	15.63	<0.001
Gender	6.61	5.36	<0.001
Nutrition	5.45	6.99	<0.001
Are children in quarantine with you?	-3.87	3.19	<0.005
Do you attend to psychotherapy (online)?	-3.43	2.07	<0.050
Do you have any risk factor for COVID-19?	3.38	2.89	<0.005
Exercise	-2.68	2.88	<0.005
Education	-2.55	2.88	<0.005
Are elderly in quarantine with you?	2.54	1.99	<0.050
Does your job require you to come outside?	1.65	2.64	<0.010
Age	-0.48	9.67	<0.001
State Anxiety (SSTAI)			
(Intercept)	41.46	25.23	<0.001
Gender	4.34	6.16	<0.001
Nutrition	3.53	7.96	<0.001
Do you have any risk factor for COVID-19?	2.38	3.80	<0.001
Do you attend to psychotherapy (online)?	-2.20	2.32	<0.050
Exercise	-1.64	3.78	<0.001
Does your job require you to come outside?	1.63	4.56	<0.001
Education	-0.21	2.17	<0.050
Age	-0.17	6.21	<0.001

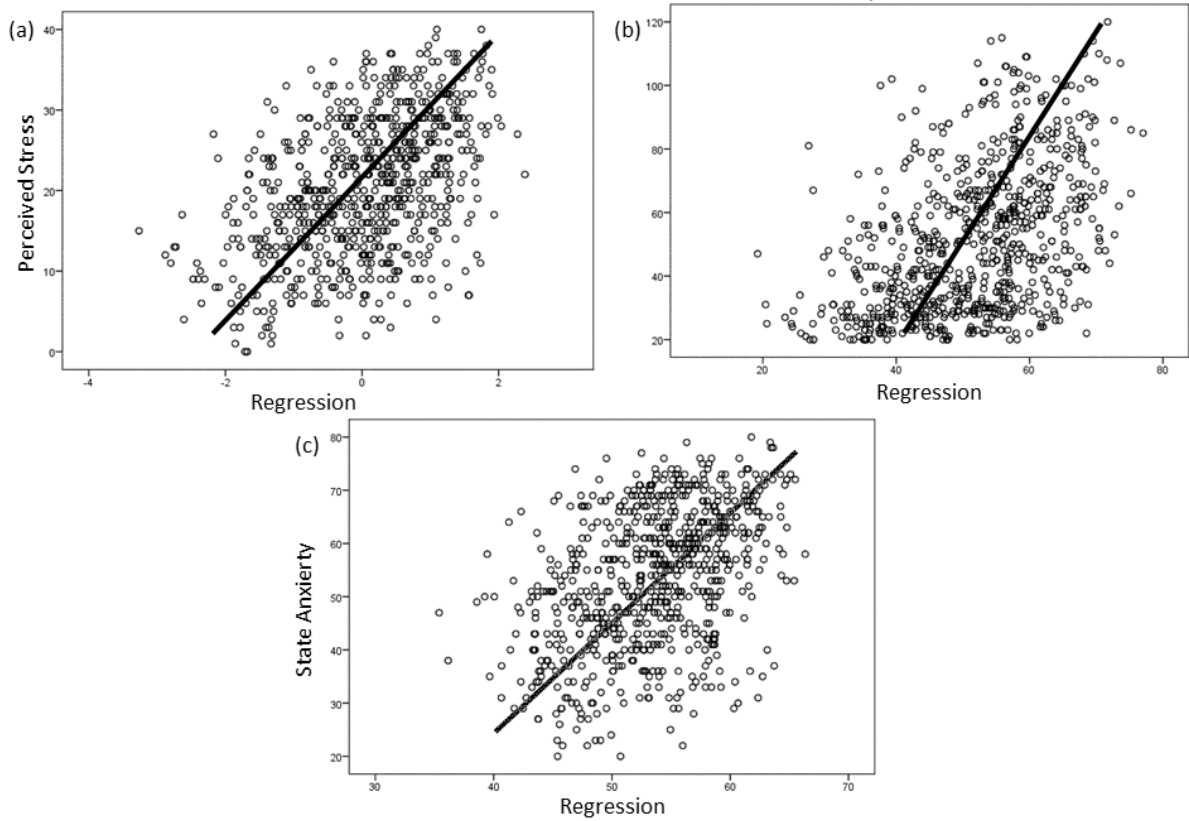***Table 2*:** Results of the multiple linear regression divided by dependent variable.

***Figure 1*:** Dispersion graphs with line of tendency plotted with the total score of PSS-10, FDI and SSTAI in the axis y and the results of the linear function in the axis x.