Relationship between loneliness and mental health indicators in the elderly during the COVID-19 pandemic

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Abstract
Social isolation due to the global pandemic influenced not only the way how people interact, but it also brought a huge impact on the population's mental health, regardless of their age. This study aimed to evaluate the intensity of symptoms of depression and anxiety, perceived stress, levels of loneliness, and psychological well-being in the elderly during social distancing due to the COVID-19 pandemic. The study included 86 elderlies, aged 60 to 90 years old (*M*=70.95; *SD*=7.08), living in the southern region of the country. They were interviewed by a WhatsApp video call and responded about symptoms of stress, anxiety, loneliness, depression, and positive mental health. The results showed that 55.8% had high stress symptoms, 18.6% anxiety symptoms, 16.3% depression symptoms, and 5.82% moderate to severe loneliness. It was found that participants who felt more alone had lower well-being scores.
Keywords: mental health; loneliness; elderly; pandemic; COVID-19

Relação entre Solidão e Indicadores de Saúde Mental em Idosos durante a Pandemia da COVID-19

Resumo
O isolamento social causado pela pandemia mundial interferiu não somente na forma como as pessoas se relacionam, mas também trouxe grande impacto na saúde mental da população, independentemente da idade. Este estudo teve como principal objetivo avaliar a intensidade de sintomas de depressão e de ansiedade, estresse percebido, níveis de solidão e de bem-estar psicológico em idosos durante o distanciamento social devido à pandemia da COVID-19. Participaram do estudo 86 idosos, de 60 a 90 anos de idade (*M* = 70,95; *DP* = 7,08), moradores da região sul do país. Eles foram entrevistados por uma chamada de vídeo por *WhatsApp* e responderam sobre sintomas de estresse, ansiedade, solidão, depressão e saúde mental positiva. Os resultados mostraram que 55,8% apresentaram sintomas acentuados de estresse, 18,6% sintomas de ansiedade, 16,3% sintomas de depressão e 5,82% solidão moderada a grave. Verificou-se que os participantes que se sentiam mais sozinhos apresentaram menores escores de bem-estar.
Palavras-chave: saúde mental; solidão; idosos; pandemia; COVID-19

Relación entre la soledad y los indicadores de salud mental en ancianos durante la pandemia COVID-19

Resumen
El aislamiento social causado por la pandemia mundial ha interferido en la manera en que las personas se relacionan, teniendo un gran impacto en la salud mental de la población, independientemente de su edad. Este estudio tuvo como objetivo evaluar la intensidad de los síntomas de depresión y ansiedad, estrés percibido, niveles de soledad y bienestar psicológico en ancianos durante el distanciamiento social por la pandemia de COVID-19. El estudio incluyó a 86 personas mayores, de 60 a 90 años (*M*=70,95; *DS*=7,08), residentes en la región sur del país. Fueron entrevistados por una videollamada de WhatsApp y respondieron sobre síntomas de estrés, ansiedad, soledad, depresión y salud mental positiva. Los resultados mostraron que 55,8% tenía síntomas de estrés severo, 18,6% síntomas de ansiedad, 16,3% síntomas de depresión y 5,82% soledad moderada a severa. Se averiguó que los participantes que se sentían más solos tenían puntuaciones de bienestar más bajas.
Palabras clave:salud mental; soledad; ancianos; pandemia; COVID-19

Coronavirus 2 severe acute respiratory syndrome (SARS-CoV-2), popularly known as coronavirus (COVID-19) has spread rapidly from its origins in the city of Wuhan to the rest of the world (Singhal, 2020). On March 11, 2020, it was officially considered a pandemic (Liu et al., 2020). Although its prevalence in the community is uncertain, due to asymptomatic cases, and affects all age groups (Jones, 2020), the elderly are at greater risk of death, with a mortality rate five times higher than the general average for people over 80 years old. (World Health Organization, 2020a). The risk of contracting the disease is greater in this group due to

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physiological changes resulting from aging and possible underlying health conditions (Kluge, 2020).

In Europe and China, most fatalities due to COVID-19 included people over 60 years old, corresponding to 95% and 80% of cases respectively (Zazhi, 2020; WHO, 2020b). In Brazil, 74.2% of deaths from COVID-19 occurred between people aged 60 years or more, corresponding to 142,049 deaths up to January 2, 2021 (Brasil, 2021).

The high mortality among this age group, due to the coronavirus has been gaining prominence in the media, and the elderly are advised to take greater care and precaution (Mehra et al., 2020), such as not leaving home and not having had other people, not even family members (Kluge, 2020). As part of the risk group, the elderly were instructed to be more isolated to avoid contamination. Both in private homes and geriatric clinics, the suspension of visits was recommended, in addition to encouraging contacts via phone calls or video calls (Armitage & Nellums, 2020; Santini, et al, 2020).

Depression rates found in the elderly before the pandemic differ between different regions of Brazil, ranging from 15% to 30% among this population (Uchoa et al., 2019). Oliveira et al. (2018) point out that elderly people who perceive their poor health tend to demonstrate more anxiety than elderly people who perceive their health as good and regular. It is understood that stressful events are experienced by the elderly through the aging process, as they lead to routine consultations, examinations, and treatment of diseases, which can contribute to their withdrawal from physical activities and a decrease in perceived well-being (Ferreira et al., 2019).

Studies show that social isolation is a risk factor for the development of feelings of loneliness, considered one of the main predictors of anxiety and depression symptoms in the elderly (Barroso et al., 2018; Mehra et al., 2020; Santini et al., 2020; Simard & Volicer, 2020). A US study using data from 3,005 adults aged 57 to 85 years identified that isolation may be associated with symptoms of depression and anxiety (Santini et al., 2020). The researchers pointed out that elderly people who do not have a support network and who do not participate in social activities tend to feel lonely, reduce coping skills and increase stress responses. The results presented corroborate another research carried out in China which states that 37% of the elderly who participated in the study reported symptoms of depression and anxiety with the advent of the COVID-19 pandemic (Meng et al., 2020).

If, on the one hand, social interaction is an important factor for the regulation of emotions, stress management, and the development of resilience in difficult times, on the other, the social isolation of the elderly aggravates the stress load and increases the risk of feelings of loneliness, contributing to long-term negative health consequences (Van Bavel et al., 2020). As the pandemic continues and social isolation time is prolonged, feelings of loneliness can worsen symptoms of depression, stress, and anxiety or vice versa (Oliveira et al., 2021). Grolli, et al. (2021) reiterate that the biological mechanisms involved in depression, stress, and anxiety disorders, associated with advanced age, become important aggravating factors for the progression of COVID-19, in addition to the risks involving frequent chronic diseases in the elderly, such as Diabetes Mellitus and Systemic Arterial Hypertension.

To minimize the effects of social distancing, *online* interactions can be used, which promote an increase in psychological well-being and favor the sense of social interaction (Van Bavel et al., 2020). Online communication, such as video calls and text messages, helps to control levels of depression (Oliveira et al., 2021). Telephone calls can also be introduced as resources for social interaction and development of psychological interventions with the elderly, as recommended by Schmidt et al. (2020). However, the elderly's lack of familiarity with information technologies, access to the internet, ability and confidence to use technological means, becomes a barrier to the integration of the elderly in these spaces and can increase the feeling of isolation and loneliness (Oliveira et al., 2021; Van Bavel et al., 2020), in addition to leaving this population even further away from the possibilities of health care offered in times of pandemic.

Due to the need for social isolation, the mental health of the elderly becomes a major concern at this time of the pandemic. In this sense, it is necessary to identify the health-related behaviors adopted by the elderly during the pandemic, to support the development of psychosocial interventions to meet the needs of this most vulnerable group. The implementation of services such as online therapy could be performed to reduce loneliness and improve quality of life.

Thus, this study aims to assess the intensity of symptoms of depression and anxiety, perceived stress, levels of loneliness, and psychological well-being in elderly people during social distancing due to COVID-19. In addition, we sought to: a) characterize the sample in relation to sociodemographic, health, changes and

activities carried out during the pandemic; b) verifying the existence of relationships between loneliness, sociodemographic and health characteristics, changes, and carrying out activities during the pandemic, symptoms of depression and anxiety, perceived stress, levels of loneliness and psychological well-being and; c) Identify predictor variables of loneliness in the elderly during the COVID-19 pandemic.

Method

Outline

Cross-sectional and exploratory quantitative study.

Participants

The convenience sample consisted of 86 elderly people, aged between 60 and 90 years, and a mean age of 70.95 years (*SD*=7.08). Among the participants, 77 (89.50%) were female and 84 (96.6%) lived in the State of Rio Grande do Sul. Participants were recruited through social media.

The sample inclusion criteria were: a) being 60 years old or more; b) be literate; c) have access to WhatsApp; and d) agree to participate in the research. The following exclusion criteria were adopted: a) score below 15 points in the Mini Mental State Examination (Camozzato et al., 2011); and b) not responding to all instruments. One participant was excluded for presenting a score lower than 15 on the MMSE, which suggested cognitive impairment.

Instruments

Sociodemographic Data Questionnaire. It was used to characterize the study participants, obtaining information such as: age, sex, profession, education, marital status, income, housing situation, in addition to investigating whether the participant was exposed to or presented symptoms of COVID-19. Some questions sought to assess the participants' lifestyle through the following healthy behaviors: physical activity, food, sleep, oral hygiene, and practice of prayer and meditation.

Mini Mental State Examination (MMSE) telephone version (Roccaforte et al., 1992): It is an instrument that performs cognitive screening. The version used was adapted by Camozzato et al. (2011). The MMSE has reduced questions for application over the telephone, consisting of 22 questions that assess temporal orientation, spatial orientation, registration of three words, attention, and calculation, recall of three words, and language. In this study, the MMSE was used to exclude elderly people with scores suggestive of dementia.

Stress Perception Scale - EPS-10 (Luft et al., 2007). It is a five-point Likert scale (never, almost never, sometimes, almost always, and always), consisting of 10 items to be answered in relation to how often the individual perceived the current context as a stressful situation. It was validated for Brazilian Portuguese in a sample of elderly people, with validity in terms of clarity and construct, and a satisfactory reliability index (Cronbach's alpha coefficient = .82). The exploratory factor analysis of the scale demonstrated the existence of two factors, with the items appearing to be separated by positive and negative aspects.in relation to stress, varying from 07 to 41 points (Luft et al., 2007).

Geriatric Anxiety Inventory – GAI (Massena et al., 2015). It is made up of 20 statements with "agree" (one point) or "disagree" (zero points) response options. The sum of the answers agrees> 10 indicates symptoms of anxiety in the elderly. As for its psychometric parameters, the GAI had a Cronbach's alpha coefficient of .91 for the elderly population (Pachana et al., 2007).

Solitude Scale - UCLA-BR (Barroso et al., 2016). It consists of 20 statements about feelings or actions related to loneliness. The answers vary in alternatives, on a four-point Likert scale, between 0 (never) and 3 (often). The scale presented Cronbach's alpha coefficient of .94. The instrument's maximum score is 60 points and does not have a cutoff point, the interpretation is based on: the higher the score, the more feelings of loneliness.

Geriatric Depression Scale - GDS-15 (Almeida & Almeida, 1999). It is a measure used to identify and quantify depressive symptoms in the elderly. A version consisting of 15 questions was used, with dichotomous answers classified as 'yes' or 'no'. The total score is made from the sum of the answers given in the 15 items. The lowest possible score is zero, and the highest is 15. Scores above 5 points indicate the presence of symptoms of depression (Paradela et al., 2005). Fountoulakis et al. (1999) found .94 of internal consistency by Cronbach's alpha coefficient.

Positive Mental Health Scale (Machado & Bandeira, 2015). It consists of 14 items that are answered on a six-point Likert-type scale, ranging from "never" (1) to "every day" (6). The instrument has three subscales: a) emotional well-being (evaluates positive affects and satisfaction with life); b) psychological well-being (the individual's perception of their personal growth, life purpose, and other characteristics

related to their individual development) and; c) social well-being (identifies beliefs of affiliation, connectivity, and compatibility of values of the individual with his social group). Scale reliability was assessed by four different methods Cronbach's alpha, McDonald's omega, composite reliability, and item reliability in the Item Response Theory Assessment Scale model, and the results showed little systematic variance or error variance in scores and indicated high reproducibility in item order. To investigate the psychometric qualities of the scale, network analysis, of the items, exploratory factorial, evidence of convergent validity and precision, which pointed to the adequacy of its use in the Brazilian population.

Procedures

Data Collection

This study was approved by the Research Ethics Committee of the PUCRS (CEP-PUCRS) under the CAAE: 37857620.4.0000.5336. Data collection was performed remotely, through individual interviews via WhatsApp video calls. Participants were invited to participate in the survey through an online form shared through social networks, providing their telephone contact.

Initially, the Informed Consent Term (TCLE) was read and, after the participant's consent, the instruments were applied, which were read and presented in the following order: a) Sociodemographic Data Questionnaire; b) Mini Mental State Examination; c) Positive Mental Health Scale; d) Stress Perception Scale (EPS-10); e) Geriatric Anxiety Inventory (GAI); f) Solitude Scale (UCLA-BR) and; g) Geriatric Depression Scale (GDS-15). The interview was conducted individually in a single medium duration meeting of an hour and a half, except when there were problems related to internet connection.

Data analysis

Quantitative variables were described by mean and standard deviation and categorical variables by absolute and relative frequencies. Pearson's correlation test was performed between variables and multiple linear regression, Enter method.

Results

It was found that most participants were female (89.50%) and lived in the state of Rio Grande do Sul (96.50%). Among the participants, 51.20% had completed higher education and 75.60% were retired or pensioners.

Table 1 shows the diseases presented by the elderly, performing physical activities, and whether there were changes in activities with the pandemic. The mean Body Mass Index (BMI) was 28.22 (SD = 4.21), an index that represents overweight (overweight from 25 to 29.99). On average, the participants slept 7.11 hours (SD = 1.03), with an amplitude of 4.5 to 9 hours of sleep per night.

It is possible to see in Table 1, that of the diseases related to the worsening of the condition of people affected by COVID-19, most indicated that they did not have it. Lung disease, which affects patients with the virus, for example, was not mentioned by any participant, diabetes was mentioned by 17.4%, and hypertension by 37.2% of respondents. In relation to care, 97.7% of participants reported practice some type of physical activity, which has been considered a protective factor for mental health.

Regarding psychological aspects, Table 2 shows the average of participants in the cognitive and emotional assessment instruments (MMSE, EPS-10, UCLA-BR, GAI, GDS-15, and Positive Mental Health Scale). In relation to perceived stress, 55.8% of the participants had a rating above the average, that is, most participants had severe stress symptoms. As for emotional symptoms, 16 (18.6%) participants had symptoms of anxiety and 14 (16.3%) had symptoms of depression. By analyzing the loneliness scores, it was found that 69 (80.2%) participants had scores indicative of minimal loneliness,12 (13.9%) of mild loneliness, 2 (2.32%) of moderate loneliness, and 3 (3.50%) of severe loneliness.

Through the correlation of Pearson it was possible to verify relationships between the scores of the loneliness scale (UCLA-BR) with sociodemographic variables, cognitive functioning (MMSE) and emotional aspects (EPS-10, GAI, GDS-15 and Positive Mental Health Scale). The following correlations with loneliness were found:EPS-10 (r = .514; p < .01), GAI (r = .638; p < .01), GDS-15 (r = .628; p < .01), well-being (r = -.393; p < .01), social well-being (r = -.233; p < .05), psychological well-being (r = -.429; p < .01), MMSE (r = -.244; p < .05), BMI (r = .242; p < .01), having incomplete primary education (r = .350; p < .01) and changes in relation to food in the pandemic (r = -.234; p > .05). The other correlations can be found in table 3.

Multiple linear regression was performed using the Enter method to try to predict the level of explanation

Table 1.
Health Data, Performance of Activities and Changes that Occurred in Activities with the Pandemic (N = 86)

Variable *n* (%)		Yes	No
		n (%)	
Non-communicable disease	Do you have any?	31(36.0)	55(64.0)
	Diabetes	15(17.4)	71 (82.6)
	Hypertension	32(37.2)	54 (62.8)
	Chronic lung disease	0(0)	86 (100)
	Cardiac insufficiency	8(9.3)	78(90.7)
	Others	18(20.9)	68(79.1)
Perform physical activity		84(97.7)	2(2,3)
Changes in activities due to the pandemic	Changed the shopping style (for online or tele-delivery)?	36 (41.9)	50 (58.1)
	Physical activity	65 (75.6)	21(24.4)
	Daily food	42 (48.8)	44(51.2)
	Gluttony (desire to eat)	44(51.2)	42 (48.8)
	Consumption of alcoholic beverages	15(17.4)	71 (82.6)
	Sleep	42 (48.8)	44(51.2)
	Sugar consumption	0(0)	87 (100)
Do you practice activities such as meditation, yoga, relaxation practices, or prayer?		63 (73.3)	23(26,7)

of the UCLA-BR variable. The following variables were included: EPS-10, GAI, GDS-15 (r = .628; p < .01), well-being, social well-being, psychological well-being, MMSE, BMI, having incomplete primary education, and changes in relation to food in the pandemic. The results showed a significant model (F (10, 75) = 14.463, p < .001), with R^2 = .613. This implies that 61.30% of the total loneliness variance can be explained by the variables included in the model.

Analyzing the standardized regression coefficients (which indicate the association of the studied variables with stress), it was found that the GDS scores were the most important predictor in the regression equation. However, the loneliness variable was related to well-being, indicating that participants who felt more alone had lower well-being scores. These and other information about the regression model can be found in table 4.

Discussion

This study aimed to evaluate the intensity of symptoms of depression and anxiety, perceived stress, levels of loneliness, and psychological well-being in elderly people during social distancing due to COVID-19. The study also mapped the sociodemographic and health profile of the sample, verified changes and activities carried out during social isolation, and investigated predictor variables of loneliness in the elderly during the pandemic.

The results showed that most participants had severe stress symptoms. In addition, more than half of the sample reported perceiving themselves in an emotional state of greater tension or stress. Symptoms of depression, loneliness, and anxiety were also observed in the sample, but less frequently than symptoms of stress. In the present study, depression symptoms were

Table 2.
Average Score of Participants in Cognitive and Emotional Assessment Instruments

Scale	Construct	Min.	Max.	Average	*SD*
MMSE	Cognitive Screening	15	22	20.15	1.97
EPS-10	Perceived Stress	0	27	12.85	5.46
UCLA-BR	Loneliness	0	55	12.84	12.29
GAI	Anxiety	0	20	5.24	5.33
GDS-15	Depression	0	12	2.90	2.14
Positive Mental Health	Emotional Well-Being	10	18	15.71	1.79
Positive Mental Health	Psychological Well-Being	13	36	30.93	4.01
Positive Mental Health	Social Welfare	6	29	19.49	4.87

found to be the strongest predictor of stress. An *online survey* that investigated the mental health of Brazilian adults in the first months of social isolation due to the pandemic also found that stress symptoms were more prevalent than anxiety and depression symptoms (Filgueiras & Stults-Kolehmainen, 2020).

In the present study, depression symptoms were found to be the strongest predictor of stress. According to Grolli et al. (2021), prolonged periods of isolation associated with doubts and uncertainties about the future in the pandemic period, predispose the elderly population to stress. Older people are also more likely to experience stress during the pandemic because they constitute a risk group for the development of more severe forms of COVID-19, in addition to the disease's mortality rates being higher among the elderly (Qiu et al., 2020). Together, these factors worsen the mental health of the elderly, who become at risk for the development of symptoms of loneliness and anxiety, and depression disorders (Grolli et al., 2021; Oliveira et al., 2021).

The present study identified that 5.82% of the elderly presented moderate to severe loneliness. This prevalence is lower than that found by Ferreira and Casemiro (2021), who found 10.9% of moderate to severe loneliness in 156 elderly people in the Triângulo Mineiro community. and found that 10.9% had moderate to severe loneliness. These low levels of loneliness, from moderate to severe, found in the studies can be explained by access to new strategies that can alleviate feelings of loneliness, such as interacting more frequently via social media and WhatsApp video calls (Easterbrook-Smith, 2021; Raiol et al., 2020).

Regarding symptoms of depression, an online survey carried out only with elderly Brazilian internet users in the initial months of the pandemic identified the presence of symptoms of depression in 15.1% of the sample (Ferreira, 2021). This proportion was similar to that found in the present study (16.3%), although different instruments were used to measure depression symptoms.

This compares with a study carried out before the pandemic (Maximiano-Barreto et al., 2019), where elderly people who used private health services ($N = 85$) were evaluated for symptoms of depression (through the GDS- 15) and anxiety (through the GAI), it is noted that the proportions of elderly people with depression were very similar to that of the present study, since Maximiano-Barreto et al. (2019) identified a percentage of 16.4% of elderly people with depression. Regarding anxiety, it was identified that 18.6% of the elderly in the present sample had symptoms of anxiety, while the proportion of anxious elderly people in the study by Maximiano-Barreto et al. (2019) was equal to 20%. These data suggest that the prevalence of depression and anxiety symptoms in the elderly during the pandemic did not change.

However, it was noticed that the stress symptoms intensified. So, the planning and implementation of actions to mitigate the effects of the pandemic on the mental health of the elderly are still relevant (Armitage & Nellums, 2020). The pandemic context exposes the population to many risk factors for mental health,

Table 3.
Pearson's Correlation Table Between the Investigated Variables

	1	two	3	4	5	6	7	8	9	10	11	12	13	14
1. UCLA-BR	1													
2. EPS-10	.514**	1												
3. GAI	.638**	.514**	1											
4. GDS-15	.628**	.248*	.566**	1										
5. Positive Mental Health Scale	-.393**	-.308**	-.311**	-.258*	1									
6. Positive Mental Health Scale - Social	-.233*	-.059	-.188	-.279**	.304**	1								
7. Positive Mental Health Scale - Psychological	-.429**	-.330**	-.263*	-.260*	.247*	.254*	1							
8. MMSE	-.244*	-.002	-.241*	-.249*	-.213*	.025	-.116	1						
9. Hours of daily sleep	-.127	-.215*	-.192	-.080	.081	.101	.074	.136	1					
10. Body Mass Index	.242*	.102	.127	.252*	-.294**	-.223*	-.163	-.143	-.016	1				
11. Elementary school incomplete	.350**	.005	.373**	.395**	-.040	.033	-.298**	-.273*	.041	.265*	1			
12. Complete elementary school	-.106	-.103	-.068	-.058	.068	-.127	-.045	-.019	-.172	.106	-.047	1		
13. Incomplete high school	-.116	.176	.168	-.093	.070	.170	-.030	.049	-.163	-.133	-.052	-.068	1	
14. Complete high school	.081	-.074	-.057	.079	-.089	-.308**	.044	-.030	-.101	.215*	-.108	-.141	-.156	1
15. Incomplete higher education	-.045	-.085	-.011	.059	.068	-.168	-.045	-.196	.070	-.031	-.047	-.062	-.068	-.141
16. Complete higher education	-.074	.054	-.144	-.179	.023	.300**	.158	.170	.184	-.217*	-.195	-.254*	-.280**	-.582**
17. Master's	.021	.019	.022	.044	-.105	.016	-.094	.106	.059	-.105	-.029	-.038	-.042	-.088
18. Doctorate	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç	.ç
19. Physical activity	.118	.124	.036	-.044	-.025	.000	-.061	-.106	-.171	-.102	.029	.038	.042	-.092
20. Carrier of non-communicable diseases	.008	.021	-.066	.003	-.027	-.046	.098	-.070	-.081	-.211	-.143	.020	-.015	-.088
21. Changed the shopping style	.104	-.076	.115	.102	-.046	-.002	.109	-.079	.240*	.064	.161	.009	-.230*	-.121
22. Changed physical activities	.198	.268*	.245*	.238*	-.138	-.026	.017	-.025	-.031	.062	.108	-.090	.049	-.055
23. Changed daily food	-.234*	-.174	-.006	-.094	.029	-.170	.128	-.063	-.003	.071	-.186	-.044	.006	.040
24. Changed gluttony (desire to eat)	.035	.101	.207	.170	-.133	.089	.064	-.067	-.076	.236*	.059	-.155	-.006	.068
25. Has changed the consumption of alcoholic beverages	.026	.064	.031	.008	-.028	-.084	.054	.074	-.139	-.002	-.087	.017	-.006	.095
26. It has changed the quality of your sleep and your bedtime and waking hours	.123	.164	.222*	.113	-.154	-.046	-.181	-.075	-.230*	.016	.068	-.243*	.098	-.014
27. Changed sugar consumption	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28. Performs meditation, yoga, relaxing, or prayer activities	.054	-.002	-.056	-.067	.225*	.104	-.004	-.087	-.101	-.069	-.028	.150	-.041	-.085

(Continued)

Table 3.
Pearson's Correlation Table Between the Investigated Variables (Continuation)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1. UCLA-BR														
2. EPS-10														
3. GAI														
4. GDS-15														
5. Positive Mental Health Scale														
6. Positive Mental Health Scale - Social														
7. Positive Mental Health Scale - Psychological														
8. MMSE														
9. Hours of daily sleep														
10. Body Mass Index														
11. Elementary school incomplete														
12. Complete elementary school														
13. Incomplete high school														
14. Complete high school														
15. Incomplete higher education	1													
16. Complete higher education	-.254*	1												
17. Master's	-.038	-.158	1											
18. Doctorate	.ç	.ç	.ç	1										
19. Physical activity	.038	.004	.024	-	1									
20. Carrier of non-communicable diseases	.227*	.007	.045	-	.116	1								
21. Changed the shopping style	.110	.114	-.025	-	.025	.048	1							
22. Changed physical activities	.141	-.068	.088	-	-.088	.032	.011	1						
23. Changed daily food	.254*	-.069	.004	-	-.158	-.007	-.067	.014	1					
24. Changed gluttony (desire to eat)	.243*	-.117	-.004	-	.004	.007	-.075	.203	.396**	1				
25. Has changed the consumption of alcoholic beverages	.017	-.041	-.071	-	.071	-.026	-.107	-.095	.225*	.020	1			
26. It has changed the quality of your sleep and your bedtime and waking hours	.254*	-.023	-.151	-	-.004	.187	-.067	.014	.162	.210	.164	1		
27. Changed sugar consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	
28. Performs meditation, yoga, relaxing, or prayer activities	.038	-.012	.093	-	.081	.016	-.140	-.099	.170	.040	.001	-.145	-	1

Table 4.
Results of Regression Analyzes by the Enter Method

Variable	Predictors	F^{fThe}	R^2	*B*	BCa CI 95%	*SE*	β
UCLA-BR		14,463**	0.613				
	(Constant)			58.658	15,827 - 98,972	21,158	
	GDS			1,670*	.126 - 2.676	.633	.292
	IAG			.529	-.066 - 1.105	.284	.230
	EPS			.404	-.012 - .817	.213	.179
	Positive Mental Health Scale			-1,144*	-2.258 - -.104	.547	-.167
	Positive Mental Health Scale - Social			-.047	-.465 - .397	.229	-.019
	Positive Mental Health Scale - Psychological			-.561*	-1.068 - .063	.283	-.183
	MMSE			-1,110*	-1.974 - -.145	.463	-.178
	BMI			.068	-.375 - .513	.223	.023
	Incomplete Elementary School			.153	-10.008 - 16.735	6,493	.002
	Changed daily food			-3,960*	-7.802 - -.21	1,864	-.162

Note. BCa 95% CI = Confidence Interval calculated with Bootstrap Bias-Corrected accelerated (BCa), SE = Standard Error.

*$p < .05$; **$p < .01$.

[The] *For all F's*, degree of freedom 1 = 10, degree of freedom 2 = 75.

especially for those who already suffered from mental disorders before the pandemic and who now experience worsening stress levels (Mehra et al., 2020).

Regarding the changes brought about in activity practices as a result of the pandemic, the activities that were most frequently indicated as having undergone changes were the practice of physical activity, desire to eat (gluttony), visits to the dentist, daily meals, and sleep. With the social restrictions imposed to preserve the population from contagion by Coronavirus, it is expected that these changes will manifest themselves. The practice of physical activities, for example, requires changes during the pandemic period, as it becomes restricted to the home environment (Raiol et al., 2020). Thus, adaptations such as performing physical activity supervised by the professional with technological mediation (video calls) and replacing equipment from objects commonly found in the domestic context, come to represent some examples of necessary changes (Raiol et al., 2020).

Although sleep was not a significant variable to predict loneliness, many elderly people reported changes in sleep during the pandemic. A study indicates that the elderly are a risk group for the development of sleep disorders during the pandemic (Cardinali et al., 2020). According to these authors, elderly people are already more likely to develop sleep disorders because the production of melatonin (the hormone that regulates sleep) decreases as they age. In a pandemic, this problem can be aggravated by the stress arising from social isolation, changes in routine, and greater exposure to light at night (Cardinali et al., 2020). In this way, elderly people can report and perceive greater changes in their sleep routine, and it is important to assess how these changes may be impacting their health during the pandemic, and then seek intervention alternatives to alleviate this problem.

The elderly also frequently reported that there were changes in their eating habits (daily eating and greater desire to eat) during the period of confinement. This finding corroborates another Brazilian study carried out with women between 18 and 72 years old that identified that social isolation changed the eating behavior of all women in the sample, regardless of their weight or nutritional status, although "emotional eating" was more frequent in obese or overweight

participants (Mazzolani et al., 2020). The study also identified that the practice of diets fell 41%. In this sense, Mazzolani et al. (2020) hypothesized that this change in eating habits was due to the fact that restrictive menus were abandoned during the confinement period as a strategy to reduce the stress already caused by other factors inherent to the pandemic context. In this case, this change in eating habits could be seen as an adaptive attitude towards the various stressors that the pandemic brought (Mazzolani et al., 2020).

By examining predictor variables for symptoms of loneliness during the pandemic, this study identified that elderly people who did not notice changes in their daily diet were more likely to experience loneliness. In this sense, the same hypothesis raised by Mazzolani et al. (2020) on some dietary changes relieving the stress caused by the pandemic, could help explain why the non-perception of dietary changes is associated with worse mental health indicators. With the onset of the pandemic, the elderly began to deal with numerous sources of stress, such as social isolation and fear of the disease (Grolli et al., 2021; Oliveira et al., 2021). To better deal with these sources of stress, it would be important for the individual to develop coping strategies that better adapt to the stressful situation.

It may be that changes in eating habits that alleviate the sources of stress caused by the pandemic are adaptive to the individual, as such changes contribute to mental health. One study identified that during the pandemic there was an increase in the activity of baking bread, as a leisure strategy to relieve stress, seek comfort and maintain social connection, as many people cook and post the result of the task on social media (Easterbrook-Smith, 2021). Thus, by being at home for longer, the elderly person has more opportunities to develop household activities related to eating habits, such as cooking a different dish, trying a new recipe, acquiring new cooking skills, meeting with individuals that cohabit for a pleasurable meal, which in this case, represent examples of changes in eating habits that could favor mental health. On the other hand, the non-perception of changes in eating habits could reveal a difficulty in self-observation, rigidity, and cognitive inflexibility, which are personality characteristics associated with worse mental health outcomes (Kahlbaugh & Huffman, 2017).

It was also observed that higher levels of anxiety and depression and lower levels of psychological well-being significantly contributed to loneliness. These results are already supported by the literature, which points out significant relationships between well-being, depression, and anxiety with loneliness in a sample of adults (Barroso et al., 2018) and the elderly (Santini et al., 2020; Ferreira & Casemiro, 2021). Thus, this study showed that symptoms of anxiety and depression, in addition to the non-perception of changes in diet, are risk factors for the experience of loneliness in the elderly in the context of the pandemic, while higher levels of psychological well-being are present. as a protective factor for elderly people to experience loneliness in the pandemic context. Changes in the diet of the elderly during the pandemic context contributed to the increase in loneliness, a behavior that is still little explored.

Regarding the sociodemographic profile, it was noted that the sample was predominantly female, from the state of Rio Grande do Sul, and educated. Regarding the predominant health profile, most reported not having any chronic non-communicable disease. Almost the entire sample reported practicing physical activity and more than half of the participants reported engaging in some relaxation practice (meditation, yoga, prayer, among others). It is important to consider that, as this is a convenience sample, this sociodemographic profile is not representative of the Brazilian elderly population. However, the study brings as an important contribution to draw an initial scenario of the mental health profile and changes in activities performed by the elderly in the Brazilian context during the period of isolation caused by the COVID-19 pandemic, even from a convenience sample.

According to the results presented, it can be concluded that more than half of the elderly during the COVID-19 pandemic showed accentuated symptoms of stress. The most important predictor of stress was depressive symptoms. As for symptoms of anxiety and depression, there was the same pre-pandemic prevalence. It was observed that higher levels of anxiety and depression and lower levels of psychological well-being significantly contributed to loneliness. Also, the elderly who felt more alone had lower well-being scores.

Knowing the emotional profile of the elderly in the COVID-19 pandemic scenario is extremely relevant, even more related to the variables that can predispose to higher levels of symptoms of depression, anxiety, stress, and loneliness. In this sense, different strategies can be developed, such as teaching the use of technologies, or technological literacy, for insertion in the digital environment and virtual access to support networks.

Small changes in habits often make a difference in the lives of the elderly, such as taking care of food, exercising, and even online meetings, in an attempt to reduce moments of loneliness.

Other variables should be considered in future studies, such as the comparison between elderly people residing in Long-Term Care Institutions (ILP) with those who do not live in ILP. In addition, the small sample size and few regions surveyed can be pointed out as a limitation of the study. In this sense, it is also suggested the expansion of the states surveyed, as cultural differences can contribute to the understanding of the profile of the elderly in the pandemic context, as well as loneliness and symptoms of depression, anxiety and stress can impact daily life habits and consequently, in mental health. Still, it would be relevant to examine in greater depth the relationship between loneliness and eating habits in the elderly population, to verify, for example, whether this relationship is influenced by other mediating variables.

References

Almeida, O. P., & Almeida, S. A. (1999). Short versions of the geriatric depression scale: a study of their validity for the diagnosis of a major depressive episode according to ICD-10 and DSM-IV. *International Journal of Geriatric Psychiatry, 14*(10), 858-865. https://doi.org/10.1002/(sici)1099-1166(199910)14:10%3C858::aid-gps35%3E3.0.co;2-8

Armitage, R., & Nellums, L. B. (2020). COVID-19 and the consequences of isolating the elderly. *The Lancet Public Health*, *5*(5), e256. https://doi.org/10.1016/S2468-2667(20)30061-X.

Barroso, S. M., Andrade, V. S., Midgett, A. H., & Carvalho, R. G. N. (2016). Evidências de validade da Escala Brasileira de Solidão UCLA. *Jornal Brasileiro de Psiquiatria*, *65*(1), 68-75. https://doi.org/10.1590/0047-2085000000105

Barroso, S. M., Baptista, M. N., & Zanon, C. (2018). Solidão como variável preditora na depressão em adultos. *Estudos Interdisciplinares em Psicologia, 9*(3, Supl. 1), 26-37. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S2236-64072018000400003

Brasil (2021). *Boletim Epidemiológico Especial: Doença pelo Coronavírus COVID-19*. Secretaria de Vigilância em Saúde. Ministério da Saúde. Semana Epidemiológica 53 (27/12/2020 a 2/1/2021)

Camozzato, A. L., Kochhann, R., Godinho, C., Costa, A., & Chaves, M. L. (2011). Validation of a telephone screening test for Alzheimer's disease. *Aging, Neuropsychology, and Cognition, 18*(2), 180-194. https://doi.org/10.1080/13825585.2010.521814

Cardinali, D. P., Brown, G. M., Reiter, R. J., & Pandi-Perumal, S. R. (2020). Elderly as a High-risk Group during COVID-19 Pandemic: Effect of Circadian Misalignment, Sleep Dysregulation and Melatonin Administration. *Sleep Vigilance, 4*, 81–87. https://doi.org/10.1007/s41782-020-00111-7

Easterbrook-Smith, G. (2021) By Bread Alone: Baking as Leisure, Performance, Sustenance, During the COVID-19 Crisis. *Leisure Sciences, 43*(1-2), 36-42. https://doi.org/10.1080/01490400.2020.1773980

Ferreira, G. R. S., Costa, T. F. D., Pimenta, C. J. L., Silva, C. R. R. D., Bezerra, T. A., Viana, L. R. D. C., & Costa, K. N. D. F. M. (2019). Capacidade funcional e eventos estressores em idosos. *Revista Mineira de Enfermagem*, 23, 1-6. http://www.dx.doi.org/10.5935/1415-2762.20190086

Ferreira, H. G. & Casemiro, N. V. (2021). Solidão em Idosos e fatores associados. *REFACS, 9*(1), 90-98. https://doi.org/10.18554/refacs.v9i1.5199

Ferreira, H.G. (2021). Relações entre crenças e saúde mental de idosos na Pandemia da Covid-19. *Revista Psicologia e Saúde. 13*(1), 187-201. https://doi.org/10.20435/pssa.v13i1.1381

Filgueiras, A. & Stults-Kolehmainen, M. (2020). The Relationship Between Behavioural and Psychosocial Factors Among Brazilians in Quarantine Due to COVID-19. *The Lancet Psychiatry*. https://dx.doi.org/10.2139/ssrn.3566245

Fountoulakis, K. N., Tsolaki, M., Iacovides, A., Yesavage, J., O'Hara, R., Kazis, A., & Ierodiakonou, C. (1999). The validation of the short form of the Geriatric Depression Scale (GDS) in Greece. *Aging* (Milano), *11*(6), 367-72. https://doi.org/10.1007/BF03339814

Grolli, R. E., Mingoti, M. E. D., Bertollo, A. G., Luzardo, A. R., Quevedo, J., Réus, G. Z., & Ignácio, Z. M. (2021). Impact of COVID-19 in the Mental Health in Elderly: Psychological and Biological

Updates. *Molecular Neurobiology, 58*(5), 1905–1916. https://doi.org/10.1007/s12035-020-02249-x

Jones, D. S. (2020). History in a Crisis — Lessons for Covid-19. *The New England Journal of Medicine*, *382*(18), 1–2. https://doi.org/10.1056/NEJMp2004361

Kahlbaugh, P. & Huffman, L. (2017). Personality, Emotional Qualities of Leisure, and Subjective Well-Being in the Elderly. *The International Journal of Aging and Human Development, 85*(2), 164-184. https://doi.org/10.1177/0091415016685329

Kluge, H. H. P. (2020). Statement – Older people are at highest risk from COVID-19, but all must act to prevent community spread. *World Health Organization Europe.* http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/4/supporting-older-people-during-the-covid-19-pandemic-is-everyones-business

Liu, W. Yue, X. G., & Tchounwou, P. B. (2020). Response to the COVID-19 Epidemic: The Chinese Experience and Implications for Other Countries. *International Journal of Environmental Research and Public Health, 17*(7), 2-6. https://doi.org/10.3390/ijerph17072304

Luft, C. D. B., Sanches, S. de O., Mazo, G. Z., & Andrade, A. (2007). Versão Brasileira da Escala de Estresse Percebido: Tradução e validação para idosos. *Revista de Saúde Pública, 41*(4), 606–615. http://dx.doi.org/10.1590/S0034-89102007000400015

Machado, W. L., & Bandeira, D. R. (2015). Escala de Saúde Mental Positiva: Validação da Mental Health Continuum - Short Form. *Psico-USF, 20*(2), 259–274. http://dx.doi.org/10.1590/1413-82712015200207

Massena, P. N., Araújo, N. B. de., Pachana, N., Laks, J., & Pádua, A. C. de. (2015). Validation of the Brazilian Portuguese version of geriatric anxiety inventory–GAI-BR. *International Psychogeriatrics, 27*(7), 1113-1119. https://doi.org/10.1017/S1041610214001021

Maximiano-Barreto, M. A., Aguiar, I. M., Martins, K. C., Buarque, D. C., & Fermoseli, A. F. D. O. (2019). Ansiedade e depressão e a relação com a desigualdade social em idosos. *Psicologia, Saúde & Doenças, 20*(1), 209-219. http://dx.doi.org/10.15309/19psd200117

Mazzolani, B. C., Smaira, F. I., Esteves, G. P., Santo Andre, H. C., Amarante, M. C., Castanho, D., ... & Ferreira, C. N. (2020). Influence of nutritional status on eating habits and food choice determinants among Brazilian women during the COVID-19 pandemic. *medRxiv.* https://doi.org/10.1101/2020.11.03.20225136

Mehra, A., Rani, S., Sahoo, S., Parveen, S., Singh, A.P, Chakrabarti, S., & Grover, S. (2020). A crisis for elderly with mental disorders: Relapse of symptoms due to heightened anxiety due to COVID-19. *Asian Journal of Psychiatry,* (51), 1-2. https://doi.org/10.1016/j.ajp.2020.102114

Meng, H., Xu, Y., Dai, J., Zhang, Y., Liu, B., &, Yang, H. (2020). Analyze the psychological impact of COVID-19 among the elderly population in China and make corresponding suggestions. *Psychiatry Research, 289*, 1-2. Https://doi.org/10.1016/ j.psychres.2020.112983

Oliveira, D. V., Silva Oliveira, M., Silva, S. C., Nascimento Júnior, J. R. A., Granja, C. T. L., Bertolini, S. M. M. G., & Cavaglieri, C. R. (2018). Os fatores sociodemográficos e de saúde são intervenientes no nível de ansiedade de idosos da atenção básica a saúde?. *Revista Interdisciplinar de Estudos em Saúde*, *7*(2), 181-192. https://periodicos.uniarp.edu.br/index.php/ries/article/view/1444/882

Oliveira, V. V., Oliveira, L. V. V., Rocha, M. R., Leite, I. A., Lisboa, R. S., & Andrade, K. C. L. (2021). Impactos do isolamento social na saúde mental de idosos durante a pandemia pela Covid-19. *Brazilian Journal of Health Review, 4*(1), 3718-3727. https://doi.org/10.34119/bjhrv4n1-294

Pachana, N. A., Byrne, G. J., Siddle, H,, Koloski, N., Harley, E., Arnold, E. (2007). Development and validation of the Geriatric Anxiety Inventory. *International Psychogeriatrics*, *19*(1), 103-14. https://doi.org/10.1017/S1041610206003504

Paradela, E. M. P., Lourenço, R. A. & Veras, R. P. (2005). Validação da escala de depressão geriátrica em um ambulatório geral. *Revista de Saúde Pública*, *39*(6), 918-923. https://doi.org/10.1590/S0034-89102005000600008

Qiu, J., Shen, B., Zhao, M.,Wang, Z., Xie, B. & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy

recommendations. *General Psychiatry, 33*(2), 1-3. http://dx.doi.org/10.1136/gpsych-2020-100213

Raiol, R. A., Sampaio, A. M. L., & Fernandes, I. D. B. (2020). Alternativas para a prática de exercícios físicos durante a pandemia da COVID-19 e distanciamento social. *Brazilian Journal of Health Review, 3*(4), 10232-10242. https://doi.org/10.34119/bjhrv3n4-247

Roccaforte, W. H., Burke, W. J., Bayer, B. L., & Wengel, S. P. (1992). Validation of a telephone version of the Mini-Mental State Examination. *Journal of the American Geriatrics Society, 40*(7), 697-702. https://doi.org/10.1111/j.1532-5415.1992.tb01962.x

Santini, Z. I., Jose, P. E., Cornwell, E. Y., Koyanagi, A., Nielsen, L. Carsten Hinrichsen, C., Meilstrup, C., Madsen, K. R., &, Koushede, V. (2020). Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. *The Lancet Public Health, (5)*1, e62-e70. https://doi.org/10.1016/S2468-2667(19)30230-0.

Schmidt, B., Crepaldi, M. A., Bolze, S. D. A., Neiva-Silva, L. & Demenech, L. M. (2020). Saúde mental e intervenções psicológicas diante da pandemia do novo coronavírus (COVID-19). *Estudos de Psicologia, 37*(e200063), 1-13. https://doi.org/10.1590/1982-0275202037e200063

Simard, J., & Volicer, L. (2020). Loneliness and Isolation in Long-term Care and the COVID-19 Pandemic. *Journal of the American Medical Directors Association, 21*(7), 966–967. https://doi.org/10.1016/j.jamda.2020.05.006

Singhal, T. A. (2020). Review of Coronavirus Disease-2019 (COVID-19). *Indian Journal Pediatrics, 87*(4), 281–286. https://doi.org/10.1007/s12098-020-03263-6

Uchoa, V. S., Chaves, L. L., Botelho, E. P., Polaro, S. H. I., & de Oliveira, M. D. F. V. (2019). Fatores associados a sintomas depressivos e capacidade funcional em idosos. *Cogitare Enfermagem*, 24, e60868. http://dx.doi.org/10.5380/ce.v24i0.60868

Van Bavel, J.J., Baicker, K., Boggio, P.S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M.J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E.J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S.A., Jetten, J., . . . Willer, Robb. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour, 4*(5), 460–471. https://doi.org/10.1038/s41562-020-0884-z

World Health Organization. (2020a). *Statements, press and ministerial briefings.* http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/statements.

World Health Organization. (2020b). *COVID-19 Strategy Up Date. World Heal Organ.* https://www.who.int/pubhcations-detail/covid-19-strategy-update—14-april-2020.

Zazhi, Z. L. X. (2020). The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. *Epidemiology Working Group for ncip Epidemic Response, Chinese Center for Disease Control & Prevention*, *41*(2), 145–151. https://doi.org/10.3760/cma.j.issn.0254-6450.2020.02.003

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