Headache in Brazilian older people in the context of COVID-19 infodemic

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Abstract

Objective: Analyze the prevalence and factors associated with headache in Brazilian older people in the context of COVID-19 Infodemic. *Methods*: This is a cross-sectional study carried out with 3,307 elderly Brazilians using a virtual questionnaire, self-completed using a cell phone, tablet or computer with internet access. Data collection was developed between June 2020 and January 2021. The analysis model consisted of variables distributed into four blocks: exogenous variables, primary determinants, health behaviors and health conditions. Poisson regression with robust variance was used to estimate the associations. *Results:* The prevalence of headache was 31.7%. The outcome was associated with the use of psychotropic drugs, concern with information about covid-19, symptoms of depression and anxiety, and perception of stress. *Conclusion:* Anxiety, depression and stress are thought to be associated with headache in older adults who are exposed to excess information and fake news about covid-19.

Keywords: covid-19; Headache; Aged.

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Research funding: National Council for Scientific and Technological Development (CNPQ). Process Nº: 312355/2021-1; 403323/2021-5.

The authors declare that there is no conflict in the design of this work.

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Received: December 1, 2021
Approved: March 15, 2022

http://dx.doi.org/10.1590/1981-22562021024.210240.en

INTRODUCTION

Information about the coronavirus, in the current digital age, spreads rapidly through different types of media, including false theories, causing misinformation, panic and confusion, generating the phenomenon characterized as infodemic[1-3]. In this context, there is a great concern with the older population, since there are already more than 1 billion people aged 60 years or more in the world[4], and it is noteworthy that the presence of older people as Internet users has been growing[5]. The dissemination of fake news puts the health of older people at risk, causing emotional and mental overload, leading to symptoms such as anxiety and depression[5]. Anxiety and depression are psychological disorders that in older people can be accompanied by symptoms such as isolation and lack of social connections, feelings of sadness and hopelessness, irritation and apathy[6].

The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020[7]. Older people suffer much more from the adverse effects of the pandemic, ranging from more serious complications of the disease and higher mortality[8] to impacts on mental health, such as anxiety, loneliness and sadness. In addition to these aspects, older people suffer from the fear of illness and even the fear of death[9-12].

COVID-19 is associated with perceptions of older people with headaches about social isolation, negative emotions and feelings[13]. Thus, headache appears as an important outcome in studies on the mental health of older people in times of a pandemic. Cephalalgia, popularly known as headache, is the most common neurological symptom affecting 46% of the world population[14]. In Brazil, the average prevalence of headache in one year is 70.6%[15]. Although the prevalence decreases with age, headache is the 10th and 14th most common pain symptom reported among older women and men, respectively[16]. In addition, investigating headache in a context of a COVID-19 pandemic, with high risk for the older population, social and economic restrictions, with exposure to infodemics, can contribute to the knowledge about this silent and often intense and persistent human suffering. Thus, the objective of the present study was to analyze the prevalence and factors associated with headache in Brazilian older people in the context of COVID-19 Infodemic.

METHODS

This is a cross-sectional study carried out with 3,307 Brazilian older people, between June and December 2020, using a virtual questionnaire, self-completed using a cell phone, tablet or computer with Internet access. This study presents the results from Brazil, from phase 1 of the investigation "COVID-19 infodemic and its repercussions on the mental health of older people: a Brazil/Portugal/Chile/Mexico/Colombia/Peru multicenter study". The sample size was estimated considering a 20% prevalence of depressive symptoms at the level of primary prevention in older people[17]. A 9% error was used and, therefore, a range of 0.33–0.51 was estimated. The sample was proportionally calculated in all eight surveyed host cities. In each municipality, 20% was added for eventual refusals and a 1.5 deff in order to protect precision, considering the structure of the sampling plan, totaling 2,976 respondents for the 8 municipalities. As it is a sampling by the virtual snowball method[18], there was an increase in the final sample in the study of 10.01% extrapolating the host cities (Figure 1). It is worth noting that these municipalities are the headquarters of the research collaborating centers where there were groups of older people accompanied by researchers and who started data collection.

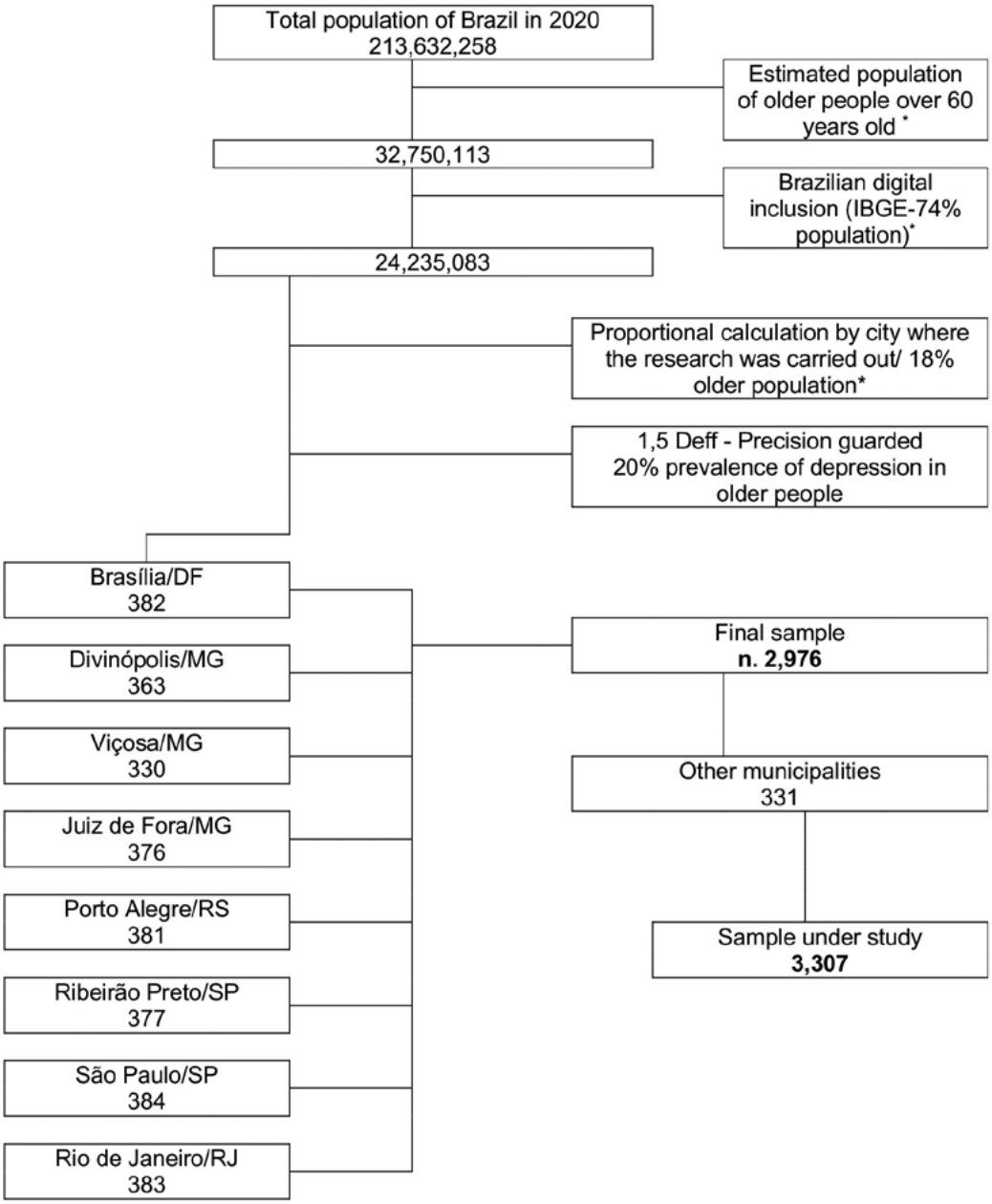

Figure 1. Sample flowchart for studying the mental health of older people exposed to information regarding the COVID-19 Infodemic. Brazil, 2020.

* Source: Preliminary estimates prepared by the Ministry of Health /SVS/DASNT/CGIAE, 2000 to 2019.

Data were collected through a web-based-survey. This survey was accessed through a link containing questions about: sociodemographic variables, exposure to news and information related to COVID-19, screening for depression, stress and anxiety. In this assumption, the headache was self-assessed through the question: "In the last 15 days, has information about COVID-19 and coronavirus caused me a headache?" (Yes or No).

The demographic and socioeconomic variables used were: age group (in years: 60 to 64, 65 to 69, 70 to 74, 75 to 79 or ≥80 years according to World Health Organization study protocols[10]), sex, race / self-reported skin color (white or non-white), marital status (married or not), education (incomplete elementary school, complete elementary school, complete high school, complete higher education, complete specialization or complete master's/

doctoral/postdoctoral studies), receives retirement/pension (yes or no) and income reduction due to the COVID-19 pandemic (yes or no).

Health behaviors included: increased alcohol/tobacco consumption during the COVID-19 pandemic, ("In the past 15 days has information about COVID-19 caused me to consume more alcohol/tobacco?" yes or no); use of psychotropic drugs (In the last 15 days, has information about COVID-19 caused me to use psychotropic drugs (eg, sleeping pills and/or anxiety)? yes or no); frequency of exposure to information or news was assessed on social media, television and radio ("How often have you been exposed in the last week to news or information about COVID-19"? (none, little/some or frequent).

Health conditions encompass the assessment of concern with information about COVID-19, depression, anxiety and stress. Concern about information about COVID-19 was assessed with the question "In the last 15 days has information about COVID-19 caused me concern?" (never, few times, sometimes or many times). The Geriatric Depression Scale (GDS-15), validated in Brazil, was used to detect the presence of depressive symptoms. Composed of 15 questions with binary answers (yes or no). The scores range from 0 to 5, classifying the older person as "without depressive symptoms", from 6 points "with depressive symptoms", with 5 being considered as a cutoff point[19]. The Geriatric Anxiety Inventory (GAI) was used to screen for anxiety symptoms with a cutoff point >8 and was dichotomized in the presence or absence of symptoms[20]. The instrument contains 20 questions with dichotomous responses with possible answers (0=agree; 1=disagree) with scores ranging from 0 to 20[20].

The Perceived Stress Scale-PSS, validated for Brazilian older people, evaluated the perception of stress. The PSS has 14 questions with response options ranging from zero to four (0=never; 1=almost never; 2=sometimes; 3=almost always 4=always). The scale total is the sum of the scores for these 14 questions and the scores can range from 0 to 56[21].

The hierarchical analysis used in this study was based on the theoretical model proposed by Andersen and Davidson (2007)[22]. The model was composed of variables distributed in four blocks: exogenous variables; primary determinants; health behaviors; and health conditions. The first block of the model was composed of exogenous and more distal variables: age, sex and self-reported color/race. In the second block, the primary health determinants, represented by marital status, education, receive retirement/pension and reduced income due to the pandemic. The third block of analysis was composed of health behaviors, represented by higher consumption of alcohol/tobacco, use of psychotropic drugs and frequency of exposure to news/information about COVID-19. In the proximal block, that is, in the fourth, the variables of health conditions were included, which include concern with information about COVID-19, suggestion of symptoms of depression, anxiety and perception of stress. And the assessed outcome was the presence or absence of self-reported headache in times of COVID-19 infodemic (Figure 2).

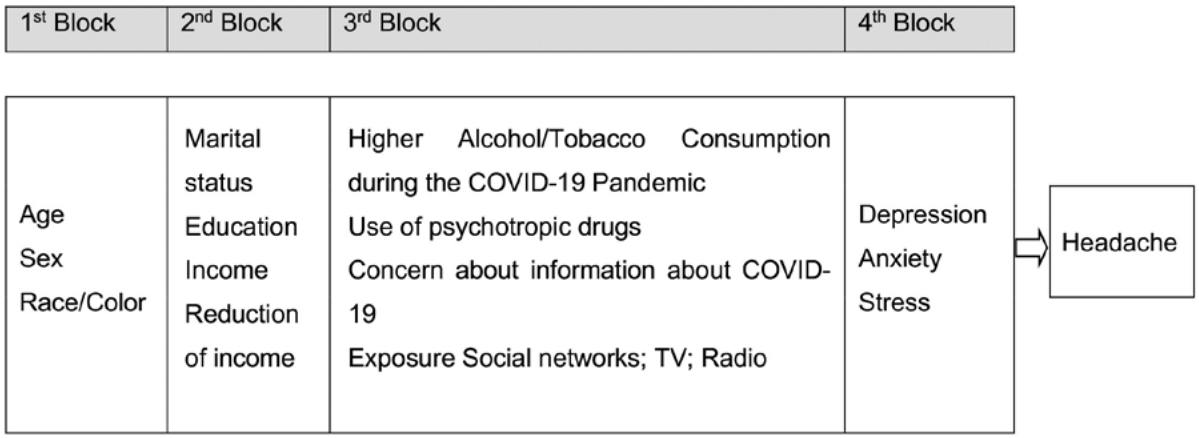

Figure 2. Theoretical model for headache analysis in older people in times of COVID-19 infodemic. Adapted from Andersen and Davidson (1997).

The chi-square test was performed to assess differences in the variables studied and when its assumptions were violated, Fisher's exact test was used, both with a 5% significance level. Poisson regression with robust variance was used to calculate crude and adjusted Prevalence Ratios (PR) and their respective 95% confidence intervals. The variables remained in the model when the p value of the Wald test was <0.10. A significance level of $p<0.05$ and a 95% confidence interval (CI) were considered, with calculation of adjusted prevalence ratios. To assess the quality of fit of the final model, the Goodness-of-fit test was used. In the analysis, the Omnibus test was also considered, which was useful to suggest whether the model fit or not. Thus, under the assumption of the non-collinearity model between the independent variables, the Omnibus test, when it presents significance, suggested that the model was adjusted to the data. The Goodness-of-fit test was used to analyze the residuals and the quality of fit of the final model. In the cases of Generalized Linear Models (GLM), some different types of residuals are defined capable of evaluating the fit of the model, the residual deviance. This was a measure capable of detecting atypical observations that influence the fit of the model. The reliability of the EDG-15, GAI and PSS instruments was evaluated using Cronbach's Alpha Coefficient, respectively, 0.72; 0.93 and 0.86.

The study was approved by the National Research Ethics Committee (CONEP) of the Ministry of Health. (CAAE 31932620.1.1001.5147).

RESULTS

In a descriptive panorama, the study highlights that the older people studied reflect the majority of women (68.40%), age group between 60-69 (66.70%), white (71.48%), basic, elementary school and/or high school (2.9%) with own income (77.56%). In the scenario of the COVID-19 pandemic, for the sample studied, income did not decrease (76.11%), there was no greater consumption of alcohol/tobacco (80.91%) and there was no use of psychotropic drugs (72.30%) and there was sometimes concern about information about the pandemic (28.69%). Still within this scenario, it was observed that most people do not show signs and symptoms of depression (60.20%), anxiety (70.09%), as well as perceived stress (50.65%) (Table 1).

This study analyzed the association between headache and health behaviors and conditions of 3307 older people in Brazil. Headache prevalence was 31.7% (95% CI: 30–33) (n=1047) in the context of the COVID-19 infodemic. In the bivariate analysis, the factors that were associated with the outcome were the use of psychotropic drugs, concern about information about COVID-19, depression, anxiety, and stress (Table 1).

In the multivariate analysis, no positive and statistically significant association was found in all blocks, all the results are described in Table 2. The variables that showed a statistically significant positive association, in the crude analysis and in the adjusted analysis, belonged to blocks 3 (health behaviours) and 4 (health conditions). The highest headache prevalence ratio was among older people who used psychotropic drugs (PR=1.64; 95%CI:1.48-1.82), concerned about information about COVID-19 (PR=2.67; 95%CI : 2.06-3.53), with symptoms of depression (PR=1.24; 95%CI: 1.09-1.41) and anxiety (PR=1.43; 95%CI: 1.27-1.61) and who perceived stress (PR=1.68; 95%CI: 1.43-1.97) (Table 2).

Table 1. Frequency distribution and association between exogenous variables, primary determinants, health behaviors, health conditions and headache reporting in the context of a COVID-19 infodemic. Brazil, 2020.

Variables	Headache report		Total	*p-value*
	Yes n(%)	No n(%)		
Age group (in years)				
60-64	385(30.0)	900(70.0)	1285	0.213
65-69	302(32.8)	619(67.2)	921	
70-74	166(33.0)	337(67.0)	503	
75-79	100(29.9)	234(70.1)	334	
> 80	96(36.4)	168(63.6)	264	
Sex				
Female	701(31.2)	1549(68.8)	2250	0.153
Male	343(33.0)	696(67.0)	1039	
Race/Color				
White	738(31.2)	1626(68.8)	2364	0.173
Not White	311(33.0)	632(67.0)	943	
Marital status				
Married	580(31.6)	1255(68.4)	1835	0.453
Not married	469(31.9)	1003(68.1)	1472	
Education				
Basic not completed	99(33.6)	196(66.4)	295	0.464
Basic/Fundamental	240 (33.7)	473 (66.3)	713	
High school	209 (29.1)	509 (70.9)	718	
Higher	202 (31.3)	443(68.7)	645	
Specialization	169(33.0)	343(67.0)	512	
Master's / Doctorate	130(30.7)	294(69.3)	424	
Income				
Yes	818(31.9)	1747(68.1)	2565	0.382
No	231(31.2)	509(86.8)	740	
Reduction of income				
Yes	238(30.2)	549(69.8)	787	0.164
No	810(32.2)	1707(67.8)	2517	
Higher consumption of Alcohol/Tobacco				
Yes	312(50.0)	312(50.0)	624	<0.001
No	713(27.0)	1932(73.0)	2645	
Use of psychotropic drugs				
Yes	543(60.8)	350(39.2%)	893	<0.001
No	488(20.4)	1903(79.6%)	2391	
Social networks exposure				
None	280(34.1)	542(65.9)	822	0.082
Little	436(29.8)	1028(70.2)	1464	
Frequent	333(32.6)	688(67.4)	1021	

to be continued

Continuation of Table 1

Variables	Headache report		Total	*p-value*
	Yes n(%)	No n(%)		
TV exposure				
None	121(30.7)	273(69.3)	394	0.151
Little	435(30.2)	1005(69.8)	1440	
Frequent	493(33.5)	980(66.5)	1473	
Radio exposure				
None	638(32.6)	1318(67.4)	1473	0.409
Little	290(30.3)	666(69.7)	956	
Frequent	121(30.6)	274(69.4)	395	
Concern information about COVID-19				
Never	58(8.7)	611(91.3)	669	<0.001
Few times	207(23.0)	693(77.0)	900	
Sometimes	356(37.5)	593(62.5)	949	
Often	419(54.0)	357(46.0)	776	
Depression				
Yes	680(51.7)	636(48.3)	1316	<0.001
No	369(18.5)	1622(81.5)	1991	
Anxiety				
Yes	591(59.8)	398(40.2)	989	<0.001
No	458(19.8)	1860(80.2)	2318	
Stress				
Yes	802(49.1)	830(50.9)	1632	<0.001
No	247(14.7)	1428(85.3)	1675	

Table 2. Crude and adjusted prevalence ratio of variables associated with headache outcome in older people in the context of the COVID-19 Infodemic. Brazil, 2020.

	Variables	Crude PR (95% CI)	*p*-value	Adjusted PR (95%CI)*	*p*-value
Block 1	Age group (in years)				
	60-64	1.00			
	65-69	1.01 (0.90-1.13)	0.906		
	70-74	1.04 (0.90- 1.13)	0.587		
	75-79	0.91 (0.76-1.08)	0.283		
	≥80	1.06 (0.89-1.26)	0.534		
	Sex				
	Female	1.00		1.00	
	Male	1.09 (0.99-1.20)	0.084	1.10 (1.00-1.21)	0.053
	Race/SkinColor				
	White	1.00			
	Not white	1.01 (0.91-1.16)	0.895		

to be continued

Continuation of Table 2

	Variables	Crude PR (95% CI)	*p*-value	Adjusted PR (95%CI)*	*p*-value
Block 2	Marital status				
	Not Married	1.00			
	Married	1.02 (0.93-1.12)	0.746		
	Education				
	Basic not completed	1.00			
	Basic/Fundamental	1.05 (0.88-1.25)	0.592		
	High school	0.98 (0.81-1.18)	0.825		
	Higher	1.04(0.86-1.26)	0.690		
	Specialization	1.07 (0.87-1.32)	0.524		
	Master's / Doctorate	0.98 (0.79-1.21)	0.842		
	Income				
	No	1.00			
	Yes	0.99 (0.88-1.12)	0.903		
	Income reduction				
	No	1.00		1.00	
	Yes	0.91 (0.81-1.01)	0.071	0.91 (0.82-1.01)	0.073
Block 3	Higher consumption of alcohol/tobacco				
	No	1.00		1.00	
	Yes	1.10 (1.00-1.20)	0.050	1.10 (1.00-1.20)	0.050
	Use of psychotropic drugs				
	No	1.00		1.00	
	Yes	1.63 (1.47-1.81)	0.001	1.64 (1.48-1.82)	<0.001
	Social media exposure				
	None	1.00			
	Little/Some	0.93 (0.82-1.10)	0.259		
	Frequent	0.96 (0.83-1.10)	0.520		
	TV exposure				
	None	1.00			
	Little/Some	1.10(0.95-1.28)	0.194		
	Frequent	1.11 (0.96-1.29)	0.157		
	Radio exposure				
	None	1.00			
	Little/Some	0.96 (0.87-1.07)	0.491		
	Frequent	0.90 (0.77-1.05)	0.163		
	Concern about information about COVID-19				
	Never	1.00		1.00	
	Few times	2.04 (1.55-2.67)	<0.001	2.05 (1.56-2.68)	<0.001
	Sometimes	2.54 (1.95-3.31)	<0.001	2.53 (1.94-3.31)	<0.001
	Often	2.69 (2.06-3.51)	<0.001	2.67 (2.06-3.53)	<0.001

to be continued

Continuation of Table 2

	Variables	Crude PR (95% CI)	*p*-value	Adjusted PR (95%CI)*	*p*-value
Block 4	Symptoms of depression				
	Absence	1.00		1.00	
	Presence	1.24 (1.09-1.41)	<0.001	1.24 (1.09-1.41)	<0.001
	Symptoms of anxiety				
	Absence	1.00		1.00	
	Presence	1.43 (1.27-1.62)	<0.001	1.43 (1.27-1.61)	<0.001
	Perception of stress				
	Absence	1.00		1.00	
	Presence	1.68 (1.43-1.97)	<0.001	1.68 (1.43-1.97)	<0.001

* Adjusted for the same level block and the top level. Model adjustment parameters using the Akaike Information Criteria (AIC) and the Bayesian Information Criteria of Schwarz (BIC): initial model (AIC = 3.860; BIC =4.036) and final model (AIC = 3.830; BIC = 3.897).

DISCUSSION

Related to the infodemic, the prevalence of headache found in this study is expressive and needs to be considered in any of the age groups in older people. The prevalence found was lower than that reported in two studies on the association between headache in older people[23,24]. Regarding the gender variable, no differences were found as reported in the aforementioned studies. According to the proposed analysis model, it was possible to identify that the use of psychotropic drugs, concern about information about the pandemic, depressive and anxiety symptoms and the perception of stress in older people in a COVID-19 infodemic scenario generate headaches. In the block that represents health behaviors, the increase in alcohol/tobacco consumption had no expressive prevalence and there was no association with headache in the proposed analysis model. No evidence was found in the known literature showing a relationship between higher alcohol/tobacco consumption and headache in older people.

Before the COVID-19 pandemic, anxiety and depression, within the spectrum of cognitive function in older people, were already associated with headache[25]. It is noteworthy that headache in older people is positively associated with indicators of stress, anxiety and depression[12,26], which is in line with the results of this study. Furthermore, the COVID-19 infodemic can lead people to become anxious and depressed[27] and the pandemic leads older people to develop feelings of loneliness and anxiety[28]. The mental health of older people and the association with headache and other variables is shown to be relevant in times of the COVID-19 pandemic[12,29-32]. However, no studies were found in the literature on the prevalence of self-reported headache in older people associated with the variables analyzed in the present study.

The use of psychotropic drugs by older people, associated with headache in times of COVID-19 infodemic, is something new in the literature. In addition, information related to drug therapy interventions deserve special attention from health authorities for the correct guidance on drug use during the pandemic[33]. In this sense, the association found between headache and use of psychotropic drugs highlights the association with mental health, and it is necessary to investigate drug therapeutic interventions in the context of the COVID-19 pandemic, as well as self-medication.

In times of COVID-19, a study on parafunctional habits, which can lead to facial and headaches, points out that the report of anxiety was not significantly associated with headaches in older people, being more prevalent in younger people[30]. These data are different from the findings of the present study, as there was a positive association between anxiety and headache in older people. It is believed that older people in stressful moments that generate anxiety such as the fact of living in a COVID-19

infodemic context can acquire parafunctional habits such as unilateral chewing, teeth clenching (type of bruxism) among others, which can lead to joint, facial and headache pain. Regarding the fact of being concerned with information about COVID-19, no study aimed at the older population was found in the main databases, but one study showed that 52.15% of respondents with an average age of 37 years old feel horrified and concerned about the pandemic[31]. It should be noted that false information about COVID-19 can cause psychological disorders, stress and depression regardless of age[5,34].

This work has some limitations. The first consists of the exclusive use of the virtual questionnaire to carry out data collection, as the older people who did not have access to the internet were excluded. Additionally, the researchers were unable to help the participant when he/she did not understand a research item. It is believed that those older people with some limitation of activities of daily living had support from other people to answer the questionnaires. However, as shown in other studies with collections over the Internet, there is a need to confirm whether the group of subjects in the network sample represents the general population[35]. However, as older people are considered a risk group, the use of the virtual collection resource was an important alternative source to assess older people in the context of the COVID-19 pandemic. It should be noted that to overcome these limitations, the authors relied on the fact that the use of collection through virtual snowballs is feasible for non-probabilistic sampling[35]. In this process, in an attempt to ensure that the questionnaires were answered directly by older people, the links were initially triggered by social networks of partner institutions in the research, such as: Open Universities for older people; Non-governmental organizations for the conviviality of older people; and Associations of retired civil servants of the host municipalities, among others. In this way, the researchers were able to access a large number of active older people with access to social networks to answer the questionnaires. New studies should expand this search for other profiles of older people, for example, institutionalized older people, making the results more robust. It is important to consider the limitations between the comparison of these results due to contextual differences and in the way of measurement.

CONCLUSIONS

It is concluded that anxiety, depression and stress, in the analysis model proposed by the study, are associated with headache in older people who are exposed to excess information and false information about COVID-19. Thus, it is considered that in the scenario of the COVID-19 Infodemic, headache in older people who have access to information is shown to be an important marker of mental health associated with suggestions of depression, anxiety and stress. The results show the importance of planning coping strategies and organizing the health care model, as the psychological implications of the pandemic on the mental health of older people are not yet known.

Edited by: Marquiony Marques dos Santos

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