Depression and generalized anxiety disorder in older adults by the COVID-19 infodemic

Depressão e transtorno de ansiedade generalizada em idosos pela infodemia de COVID-19

Depresión y trastorno de ansiedad generalizada en adultos mayores por la infodemia de COVID-19

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Abstract

Objective: To analyze the impacts of the COVID-19 infodemic on symptoms suggestive of depression and generalized anxiety disorder (GAD) in older adults who use digital media.

Method: Data collected by web-based survey, from July to December 2020, in the population over 60 years old (n=103,636) residing in the municipality of Juiz de Fora, in the countryside of Minas Gerais, Brazil. Sociodemographic variables, exposure to information about COVID-19 and the association with symptoms of depression and GAD were analyzed. The Geriatric Depression Scale (GDS) and the Geriatric Anxiety Inventory (GAI-BR) were used to screen for depression and GAD, respectively. For bivariate analysis, the chi-square test was used and, later, Poisson regression, controlled for possible confounding factors (adjusted PR) in the multiple analysis, with a 95% confidence interval.

Results: Of the 470 older adults who responded, 26.1% had symptoms of depression, and 18.4%, GAD. They were associated with symptoms of depression: time of exposure on social media; feeling affected by information about COVID-19 transmitted on social media and TV; and presenting positive screening for psychological distress caused and/or aggravated by exposure to information about COVID-19. For GAD, in addition to the positive screening for psychological distress, the variables that remained associated were: responses generated by dissemination of fake news on social media; and fear COVID-19-related fear published on the radio.

Conclusion: All variables associated with outcomes referred to exposure to information on COVID-19, indicating the evident infodemic impact on symptoms of depression and GAD in older adults.

Resumo

Objetivo: Analisar os impactos da infodemia de COVID-19 nos sintomas sugestivos de depressão e transtorno de ansiedade generalizada (TAG) em idosos que utilizam as mídias digitais.

Método: Dados coletados por *web-based survey*, de julho a dezembro de 2020, na população acima de 60 anos (n=103.636) residente no município de Juiz de Fora, interior de Minas Gerais, Brasil. Foram analisadas variáveis sociodemográficas, de exposição a informações sobre COVID-19 e a associação a sintomas de depressão e TAG. Para o rastreio de depressão e de TAG foram utilizados a Escala de Depressão Geriátrica (EDG) e o Inventário de Ansiedade Geriátrica (GAI-BR), respectivamente. Para análise bivariada utilizou-se o teste do qui-quadrado e, posteriormente, a regressão de Poisson, controlada por possíveis fatores de confusão (RP ajustada) na análise múltipla, com intervalo de confiança de 95%.

Resultados: Dos 470 idosos respondentes, 26,1% apresentou sintomas de depressão e 18,4% TAG. Mostraram-se associados a sintomas de depressão: tempo de exposição nas redes sociais, sentir-se afetado

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pelas informações sobre COVID-19 veiculadas nas redes sociais e na televisão, e apresentar rastreio positivo para sofrimento psíquico causado e/ou agravado pela exposição às informações sobre COVID-19. Já para TAG, além do rastreio positivo para sofrimento psíquico, as variáveis que permaneceram associadas foram: respostas geradas pela divulgação de notícias falsas nas redes sociais e de medo relacionado à COVID-19 veiculadas no rádio.

Conclusão: Todas as variáveis associadas aos desfechos se referiam à exposição às informações sobre COVID-19, indicando o evidente impacto da infodemia nos sintomas de depressão e TAG em idosos.

Resumen

Objetivo: Analizar los impactos de la infodemia de COVID-19 en los síntomas sugestivos de depresión y trastorno de ansiedad generalizada (TAG) en adultos mayores que utilizan los medios digitales.

Métodos: Datos recopilados por *web-based survey*, de julio a diciembre de 2020, en la población de más de 60 años (n=103.636) domiciliados en el municipio de Juiz de Fora, interior de Minas Gerais, Brasil. Se analizaron variables sociodemográficas, de exposición a información sobre COVID-19 y su relación con síntomas de depresión y TAG. Para el rastreo de depresión y de TAG se utilizó la Escala de Depresión Geriátrica (EDG) y el Inventario de Ansiedad Geriátrica (GAI-BR), respectivamente. Para el análisis bivariado se utilizó la prueba de Ji cuadrado y, posteriormente, la regresión de Poisson, controlada por posibles factores de confusión (RP ajustada) en el análisis múltiple, con intervalo de confianza del 95 %.

Resultados: De los 470 adultos mayores que lo respondieron, el 26,1 % presentó síntomas de depresión y el 18,4 % TAG. Se mostraron asociados a síntomas de depresión los factores: tiempo de exposición en las redes sociales, sentirse afectado por la información sobre COVID-19 difundida en redes sociales y televisión, y presentar un rastreo positivo de sufrimiento psíquico causado o agravado por la exposición a la información sobre COVID-19. Por otro lado, las variables que permanecieron asociadas al TAG, además del rastreo positivo de sufrimiento psíquico, fueron: respuestas generadas por la divulgación de noticias falsas en las redes sociales y del miedo relacionado con el COVID-19 difundidas en la radio.

Conclusión: Todas las variables asociadas a los desenlaces mencionaron la exposición a información sobre COVID-19, lo que indica el evidente impacto de la infodemia en los síntomas de depresión y TAG en adultos mayores.

Introduction

The pandemic caused by the new coronavirus (SARS-CoV2), since its decree in March 2020, has become a global challenge of containment and coping. Concomitantly with the rapid spread of the disease (COVID-19), there was a wide dissemination of information and misinformation in health. This superabundance of information, some accurate and some not, is known as infodemic. COVID-19 infodemic poses a threat, because in addition to the excess of information, untruths are disseminated that can compromise from the effectiveness of individual actions to public health measures.[1]

Infodemic, especially with regard to dissemination of disinformation, finds fertile ground in populations with low critical analysis and limitations attributed to little technical-scientific knowledge. Such conditions are often observed in the population of older adults.[2]

Even with the growth of internet access and the use of social media, older adults still find it difficult to implement digital inclusion, and one of them is related to obtaining information through unreliable ways or that have no commitment to science.[3] An American survey conducted in 2021 revealed that 73% of people aged 50 to 64 reported using social media sites, while among those aged 65 and over, only 45% said they made use of these sites.[4] In Brazil, internet use among older adults reached 97% in 2021.[5]

Regarding the old population, a study indicates some guiding strategies in the fight against infodemic such as: encourage older adults to verify the content origin; verify authorship and publication date; read the text beyond the title; confirm information on other content sites, ensuring the veracity; share only information whose veracity has been verified in official health communication vehicles.[2]

These strategies can help combat disinformation networks and increase confidence in serious sources of information. While exposure to infodemic can impact decision-making and bring consequences such as anxiety, fear, frustration, depression and stress.[6] In this regard, some groups such as older adults have an increased risk of developing the severe forms of COVID-19 and suffering the psychological effects caused by infodemic,[7] requiring actions and strategies aimed at protecting their health.[6]

Thus, the objective is to analyze the impacts of COVID-19 infodemic on older adults who use digital media, with regard to symptoms suggestive of depression and generalized anxiety disorder (GAD).

Methods

This is a cross-sectional study that is part of a research phase entitled "*Infodemia de COVID-19 e suas repercussões sobre a saúde mental de idosos: estudo multicêntrico Brasil/Portugal/Chile/México/Colômbia/Peru*", with a sequential transformative strategy.

Data were collected by web-based survey from July 13, 2020 to December 30, 2020. The non-probabilistic sample was calculated considering the finite population aged 60 years or older, estimated for the year 2019 in the municipality of the countryside of Minas Gerais, Juiz de Fora, with a 5% sampling error and a 95% confidence level. Respondents were invited, by sending a link to the electronic questionnaire, to participate in the survey via social media (WhatsApp, Facebook and Instagram) and/or email and/or telephone, using the virtual snowball strategy.[8] This methodology was chosen for generating a relevant sample quantity in a short time frame, in addition to the fact that the pandemic imposed restrictions on field research.

Aiming at greater representativeness of the sample, in a complementary character to the virtual snowball strategy, approaches were taken through the sharing of the link with scientific societies of geriatrics and gerontology and retirees associations located in the municipality of Juiz de Fora, in addition to the telephone approach, in which older adults were asked if they used social media and, if so, they could choose whether to answer the questionnaire over the phone or to receive the link via social media and/or email. Accessing the link, older adults were directed to accept or not the digital Informed Consent Form (ICF). If older adults preferred to participate in the telephone survey, this was done by researchers previously trained with pilot interviews conducted to adapt the questionnaire, minimizing potential sources of bias. Then, they received the ICF signed by the researcher by e-mail or social media. Only older adults who agreed to participate in the study had access to web-based survey issues. At the end of the questionnaire there was a request for the respondent to forward or share the link to their network of contacts.

Older adults aged 60 years and over, with access to social media and email and/or telephone and the ability to answer the questionnaire via social media or by telephone were included. Older adults who declared that they did not have the skills to answer the questionnaire through digital media or even by telephone were excluded. Moreover, after consulting members of the board of directors or the technical professional responsible for Nursing Homes (NHs), information was obtained that the number of independent, self-employed older adults with access to digital media and who demonstrated the digital literacy required to respond to research was very limited. Allied to the above, the fact that the process of institutionalization of older adults alone can contribute to the development or worsening of depressive and anxious conditions,[9] caused the questionnaires of older adults residing in NHs to be excluded from the study. A total of 517 questionnaires were received, of which 19 were excluded that were duplicates and 28 older adults living in NHs, 470 of which were included in the analysis.

A questionnaire was developed to collect sociodemographic data and exposure to news and information about COVID-19, with questions related to both the type of media used, as well as the time of exposure to them, physical, psychological and self-perceived physical and psychological impact and answers generated (fear, awareness, stress, safety and/or anxiety) in older adults, in addition to screening for indicators of psychological distress caused and/or aggravated by exposure to information about COVID-19

Through an instrument that randomly presents 34 signs and symptoms suggestive of psychiatric disorders and psychological problems, we tried to track the indicators of psychological distress caused and/or aggravated by exposure to information about COVID-19. The answers are related to the frequency with which these signs and symptoms have manifested in the last 15 days, reported on a four-point Likert scale (zero - never; one - few times; two – sometimes; and three – often). The score ranged from zero to 102, with higher scores indicating a higher load of psychological distress. The cut-off point used was 67/68 considering the

95th percentile of the crude score. The selection of these variables and their assessment method resulted from the analysis of some studies published in the context of the COVID-19 pandemic, since there are still no validated instruments for their measurement. The instrument presented adequate internal consistency: Cronbach's alpha (α = 0.964; CI 95% = 0.962 - 0.966), Greatest Lower Bound (glb = 0.981; CI 95% = 0.981 - 0.983), mean inter-item correlation (r = 0.441; 95% CI = 0.427 - 0.456) and corrected item-total correlation (0.346 ≤ 0.798).[10-12]

To assess depression, the Geriatric Depression Scale (GDS) was used, validated for Brazil in the reduced version of 15 items (GDS-15), in which ten of them receive scores if answered positively and the other five items score if answered negatively. It has a final score from zero to 15, in which zero represents the absence of depressive symptoms and fifteen indicates the highest burden of these symptoms. The cut-off point 5/6 (noncase/case) was adopted, which is indicated as ideal for detecting cases of depression in older adults in non-specialized environments. The GDS-15 presented psychometric characteristics that met the criteria of internal consistency and construct validity.[13,14]

GAD assessment in older adults was performed using the Geriatric Anxiety Inventory (GAI-BR) validated for Brazilian studies. The scale consists of 20 dichotomous items in which respondents must declare agreement or disagreement with the statements presented. The final score can range from zero to 20 points, with a cut-off point of 13 to identify individuals with GAD.[15]

The collected data were entered in IBM-SPSS Statistics Data Editor, version 20. Absolute and relative frequencies of independent variables were described, as well as the prevalence of outcomes. The chi-square test was used to analyze the association of dependent variables with independent variables in the bivariate analysis, according to the hierarchical model presented in Figure 1. The adopted confidence interval was 95%. In the multivariate analysis, the associations were adjusted to each other within each chunk and between chunks, using Poisson regression, and variables that presented $p<0.05$ were maintained in the final model.

This study was approved by the Brazilian National Research Ethics Commission (CONEP - *Comissão Nacional de Ética em Pesquisa*) under CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration 4,134,050, having comgone the ethical criteria of research.

Results

The sample was characterized by older adults predominantly aged between 60 and 69 years (61.3%), female (67.5%), with a spouse (56.2%), white race/color (71, 1%), living in their own property (81.5%) located in the urban area (97%), with higher education or more (40.6%), having only one
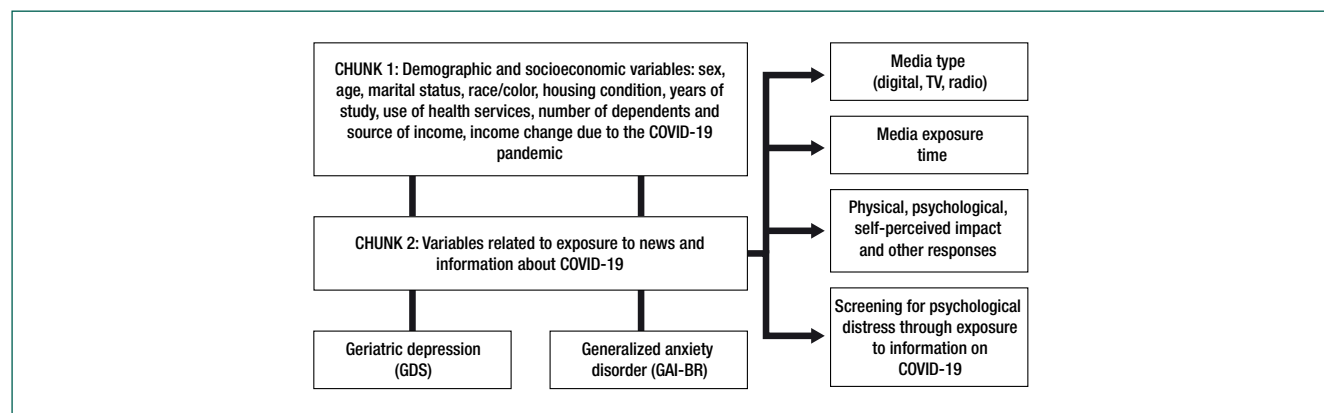

Figure 1. Theoretical model investigating the effects of independent variables on symptoms of depression and anxiety in hierarchical chunks

source of income (81.5%), with one to two dependents on their income (57.2%), users of paid and unpaid health services (41.3%) and no change in income due to the COVID-19 pandemic (78.3%). Most older adults considered themselves to be frequently exposed to information about COVID-19 both through TV (89.4%) and through social media (71.3%); however, they are more affected by this news when broadcast on TV (51%). TV remains the most used means of communication by older adults to access information (82.55%). However, social media appear soon after (68.30%), with WhatsApp and Facebook being the most cited. Exposure to information disseminated through social media generated in older adults, mainly, responses of awareness, fear, anxiety and stress, when referred both to the number of infected, dead individuals and COVID-19-related fear as well as photos, videos and fake news related to the disease pandemic. These results are demonstrated in Table 1. The GDS results (Table 2) showed that 26.1% of older adults had positive screening for depression. The mean GDS score in this study was 3.89. After multiple regression analysis, the variables that remained associated with depression (p≤0.05) with adjustment were: being exposed for more than four hours a day to information posted on social media; feel affected by information about COVID-19 broadcast on social media and TV; and screening for psychological distress. The mean GAI-BR score in this study was 6.13. For GAD screening, we found 86 respondents (18.4%) with suggestive symptoms. In the final model, the variables that remained associated with GAD (Table 3), after multiple regression analysis, were: feeling affected through information broadcast on the radio; responses generated by fake news disseminated through social media; responses generated through the dissemination of information on the radio about COVID-19-related fear; and present positive screening for psychological distress caused and/or aggravated by exposure to information about COVID-19. Positive screening for depression was significantly associated (p<0.001) with symptoms suggestive of GAD (adjusted PR = 10.776; IC95% 6.689-17,360).

Table 1. Sample characteristics according to independent variables

Demographic and socioeconomic variables	Depressive disorders (GDS)		Generalized anxiety disorders (GAD/GAI-BR)	
	Case n(%)	Noncase n(%)	Case n(%)	Noncase n(%)
Sex				
Female	93(29.4)	223(70.6)	61(19.3)	255 (80.7)
Male	29(19.1)	123(80.9)	25(16.4)	127(83.6)
Total	122(26.1)	346(73.9)	86(18.4)	382(81.6)
p-value	0.018*		0.524	
Age group				
60-69 years	80(27.8)	208(72.2)	50(17.4)	238(82.6)
70-79 years	30(20.7)	115(79.3)	23(15.9)	122(84.1)
≥80 years	12(32.4)	25(67.6)	13(35.1)	24(64.9)
p-value	0.183		0.021*	
Marital status				
With a partner	67(25.4)	197(74.6)	50(18.9)	214(81.1)
Without a partner	55(26.7)	151(73.3)	36(17.5)	170(82.5)
p-value	0.752		0.719	
Race/color				
White	94(28.1)	240(71.9)	61(18.3)	273(81.7)
Other	28(20.6)	108(79.4)	25(18.4)	111(81.6)
p-value	0.104		1.000	
Live				
alone	21(30.0)	49(70.0)	11(15.7)	59(84.3)
With 1 to 2 people	67(25.7)	194(74.3)	43(16.5)	218(83.5)
With 3 or more people	34(24.5)	105(75.5)	32(23.0)	107(77.0)
p-value	0.681		0.227	
Residence status				
Own residence	92(24.0)	291(76.0)	65(17.0)	318(83.0)
Other type	30(34.5)	57(65.5)	21(24.1)	66(75.9)
p-value	0.057*		0.126	
Residence region				
Urban area	117(25.7)	339(74.3)	82(18.0)	374(82.0)
Rural area	5(35.7)	9(64.3)	4(28.6)	10(71.4)
p-value	0.370		0.299	
Education level				
Elementary school	34(22.8)	115(77.2)	39(26.2)	110(73.8)
High school	32(24.6)	98(75.4)	19(14.6)	111(85.4)
Higher education or more	56(29.3)	135(70.7)	28(14.7)	163(85.3)
p-value	0.366		0.011*	
Use of health services				
Only the unpaid ones	22(18.2)	99(81.8)	22(18.2)	99(81.8)
Paid and/or both	100(28.7)	249(71.3)	64(18.3)	285(81.7)
p-value	0.030*		1.000	
Depend on older adults' income				
No dependent	10(15.4)	55(84.6)	6(9.2)	59(90.8)
1 to 2 dependents	81(30.1)	188(69.9)	50(18.6)	219(81.4)
3 or more dependents	31(22.8)	105(77.2)	30(22.1)	106(77.9)
p-value	0.032*		0.087*	
Income source				
Up to 1 income source	104(26.3)	291(73.7)	76(19.2)	319(80.8)
More than 1 income source	18(24.0)	57(76.0)	10(13.3)	65(86.7)
p-value	0.774		0.257	
Pandemic changed income				
No or increased	93(24.5)	286(75.5)	66(17.4)	313(82.6)
Decreased	29(31.9)	62(68.1)	20(22.0)	71(78.0)
p-value	0.183		0.365	

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Continuation.

Variables related to exposure to news and information about COVID-19	Depressive disorders (GDS)		Generalized anxiety disorders (GAD/GAI-BR)	
	Case n(%)	Noncase n(%)	Case n(%)	Noncase n(%)
Hours a day				
On social media				
Over 4 hours	39(31.7)	84(68.3)	35(28.5)	88(71.5)
Up to 4 hours	83(23.9)	264(76.1)	51(14.7)	296(85.3)
p-value	0.095*		0.001*	
On televesion				
Over 8 hours	16(29.6)	38(70.4)	16(29.6)	38(70.4)
Up to 8 hours	106(25.5)	310(74.5)	70(16.8)	346(81.7)
p-value	0.512		0.038*	
On the radio				
Over 4 hours	7(20.6)	27(79.4)	7(20.6)	27(79.4)
Up to 4 hours	115(26.4)	321(73.6)	79(18.1)	357(81.9)
p-value	0.546		0.652	
Frequency of exposure in the last week				
On social media				
Exposed	99(29.6)	236(70.4)	67(20.0)	268(80.0)
Unexposed	23(17.0)	112(83.0)	19(14.1)	116(85.9)
p-value	0.005*		0.148	
On TV				
Exposed	114(27.1)	306(72.9)	84(20.0)	336(80.0)
Unexposed	8(16.0)	42(84.0)	2(4.0)	48(96.0)
p-value	0.123		0.003*	
On the radio				
Exposed	46(22.9)	155(77.1)	38(18.9)	163(81.1)
Unexposed	76(28.3)	193(71.7)	48(17.8)	221(82.2)
p-value	0.203		0.810	
Feel affected through information				
From social media				
Yes	65(49.2)	67(50.8)	52(39.4)	80(60.6)
No	26(14.1)	158(85.9)	13(7.1)	171(92.9)
p-value	<0.001*		<0.001*	
From TV				
Yes	85(40.1)	127(59.9)	65(30.7)	147(69.3)
No	26(12.7)	178(87.3)	16(7.8)	188(92.2)
p-value	<0.001*		<0.001*	
From the radio				
Yes	30(44.8)	37(55.2)	29(43.3)	38(56.7)
No	25(16.0)	131(84.0)	17(10.9)	139(89.1)
p-value	<0.001*		<0.001*	
Answers generated - social media exposure				
Number of infected individuals				
Some answer	93(30.3)	214(69.7)	64(20.8)	243(79.2)
No answer	7(23.3)	23(76.7%)	6(20.0)	24(80.0)
p-value	0.532		1.000	
Number of dead people				
Some answer	95(30.2)	220(69.8)	66(21.0)	249(79.0)
No answer	5(20.0)	20(80.0)	5(20.0)	20(80.0)
p-value	0.365		1.000	
COVID-19-related fear				
Some answer	87(31.6)	188(68.4)	64(23.3)	211(76.7)
No answer	9(18.4)	40(81.6)	7(14.3)	42(85.7)
p-value	0.064*		0.192	

Continuation.

Variables related to exposure to news and information about COVID-19	Depressive disorders (GDS)		Generalized anxiety disorders (GAD/GAI-BR)	
	Case n(%)	Noncase n(%)	Case n(%)	Noncase n(%)
Pandemic-related photos				
Some answer	82(29.8)	193(70.2)	64(23.3)	211(76.7)
No answer	10(21.7)	36(78.3)	6(13.0)	40(87.0)
p-value	0.295		0.175	
Pandemic-related videos				
Some answer	85(30.6)	193(69.4)	65(23.4)	213(76.6)
No answer	9(18.8)	39(81.2)	5(10.4)	43(89.6)
p-value	0.120		0.055*	
Fake news				
Some answer	74(29.4)	178(70.6)	58(23.0)	194(77.0)
No answer	15(22.7)	51(77.3)	8(12.1)	58(87.9)
p-value	0.356		0.061*	
Answers generated - TV exposure				
Number of infected individuals				
Some answer	106(26.9)	288(73.1)	82(20.8)	312(79.2)
No answer	4(18.2)	18(81.8)	2(9.1)	20(90.9)
p-value	0.462		0.275	
Number of dead people				
Some answer	105(27.1)	283(72.9)	81(20.9)	307(79.1)
No answer	3(12.5)	21(87.5)	2(8.3)	22(91.7)
p-value	0.152		0.190	
COVID-19-related fear				
Some answer	104(28.6)	260(71.4)	79(21.7)	285(78.3)
No answer	6(14.0)	37(86.0)	4(9.3)	39(90.7)
p-value	0.046*		0.070*	
Pandemic-related photos				
Some answer	107(29.1)	261(70.9)	82(22.3)	286(77.7)
No answer	4(11.1)	32(88.9)	2(5.6)	34(94.4)
p-value	0.019*		0.017*	
Pandemic-related videos				
Some answer	103(28.6)	257(71.4)	77(21.4)	283(78.6)
No answer	4(10.8)	33(89.2)	3(8.1)	34(91.9)
p-value	0.019*		0.055*	
Fake news				
Some answer	92(27.9)	238(72.1)	73(22.1)	257(77.9)
No answer	11(18.3)	49(81.7)	9(15.0)	51(85.0)
p-value	0.152		0.233	
Answers generated - radio exposure				
Number of infected individuals				
Some answer	40(22.7)	136(77.3)	37(21.0)	139(79.0)
No answer	3(15.0)	17(85.0)	1(5.0)	19(95.0)
p-value	0.574		0.132	
Number of dead people				
Some answer	44(24.4)	136(75.3)	39(21.7)	141(78.3)
No answer	3(15.0)	17(85.0)	1(5.0)	19(95.0)
p-value	0.418		0.085*	
COVID-19-related fear				
Some answer	42(24.7)	128(75.3)	40(23.5)	130(76.5)
No answer	5(19.2)	21(80.8)	1(3.8)	25(96.2)
p-value	0.630		0.019*	
Screening for psychological symptoms				
Case	18(85.7)	3(14.3)	18(85.7)	3(14.3)
Noncase	104(23.2)	345(76.8)	68(15.1)	381(84.9)
p-value	<0.001*		<0.001*	

Table 2. Multiple regression analysis for the occurrence of depression

Demographic and socioeconomic variables	Unadjusted PR (95% CI)	p-value	Adjusted PR (95% CI)	p-value
Sex		0.018		0.299
Female	1.543 (1.066 – 2.232)		0.962 (0.893 – 1.035)	
Male	1		1	
Residence status		0.057		0.103
Own residence	0.697 (0.496 - 0.979)		0.916 (0.824 – 1.018)	
Other type	1		1	
Use of health services		0.030		0.857
SUS only	0.635 (0.420 - 0.959)		1.008 (0.921 – 1.103)	
Private and SUS+private	1		1	
Income dependents		0.030		0.074
None	0.675 (0.353 – 1.291)		1.046 (0.942 – 1.162)	
1 to 2	1.321 (0.932 – 1.891)		0.934 (0.869 – 1.004)	
3 and more	1		1	
Variables related to news exposure and information on COVID-19	**Unadjusted PR (95% CI)**	**p-value**	**Adjusted PR (95% CI)**	**p-value**
Hours a day on social media		0.095		0.044*
Over 4 hours	1.326 (0.962 - 1.826)		1.080 (1.002 – 1.163)	
Up to 4 hours	1		1	
Frequency of exposure to social media		0.005		0.955
Exposed	1.735 (1.154 – 2.607)		0.997 (0.909 – 1.095)	
Unexposed	1		1	
Information through social media affects them		<0.001		<0.001*
Yes	3.485 (2.345 - 5.178)		0.695 (0.603 – 0.801)	
No	1		1	
TV information affects them		<0.001		0.038*
Yes	3.146 (2.119 – 4.669)		1.156 (1.008 – 1.326)	
No	1		1	
Radio information affects them		<0.001		0.760
Yes	2.794 (1.787 – 4.368)		0.977 (0.842 – 1.134)	
No	1		1	
Answer due to fear (through social media)		0.064		0.406
Some answer	1.722 (0.931 – 3.187)		0.945 (0.828 – 1.079)	
No answer	1		1	
Answer due to fear (through TV)		0.046		0.149
Some answer	2.048 (0.958 - 4.377)		1.320 (0.905 – 1.926)	
No answer	1		1	
Answer due to exposure to photos (through TV)		0.019		0.294
Some answer	2.617 (1.025 – 6.683)		0.818 (0.563 – 1.190)	
No answer	1		1	
Answer due to exposure to videos (through TV)		0.019		0.085
Some answer	2.647 (1.034 – 6.773)		0.923 (0.843 – 1.011)	
No answer	1		1	

Continuation.

Variables related to news exposure and information on COVID-19	Unadjusted PR (95% CI)	p-value	Adjusted PR (95% CI)	p-value
Screening for psychological distress		<0.001		<0.001*
Case	3.701 (2.903 - 4.717)		0.658 (0.561 – 0.772)	
Noncase	1		1	

* Variables that remained associated with depression (p≤0.05)

Table 3. Multiple regression analysis for the occurrence of GAD

Demographic and socioeconomic variables	Unadjusted PR (95% CI)	p-value	Adjusted PR (95% CI)	p-value
Age group		0.020		0.087
60 to 69 years	0.494 (0.298 - 0.819)		1.217 (1.011 – 1.465)	
70 to 79 years	0.451 (0.254 – 0.803)		1.228 (1.022 – 1.476)	
80 years and older	1		1	
Education level		0.010		0.842
Elementary school	1.785 (1.155 – 2.760)		1.018 (0.887 – 1.168)	
High school	0.997 (0.582 – 1.708)		0.983 (0.901 – 1.073)	
Higher education and more	1		1	
Income dependents		0.080		0.210
None	0.418 (0.183 – 0.955)		1.089 (0.981 – 1.210)	
1 to 2	0.843 (0.563 – 1.261)		1.039 (0.967 – 1.117)	
3 and more	1		1	
Variables related to news exposure and information on COVID-19	**Unadjusted PR (95% CI)**	**p-value**	**Adjusted PR (95% CI)**	**p-value**
Hours a day on social media		0.001		0.505
Over 4 hours	1.936 (1.327 – 2.825)		0.974 (0.900 – 1.053)	
Up to 4 hours	1		1	
Hours a day on TV		0.038		0.406
Over 8 hours	1.761 (1.108 – 2.798)		0.966 (0.889 – 1.049)	
Up to 8 hours	1		1	
Frequency of TV exposure		0.003		0.545
Exposed	5.000 (1.269 – 19.703)		0.948 (0.798 – 1.127)	
Unexposed	1		1	
Information through social media affects them		<0.001		0.078
Yes	5.576 (3.169 – 9.812)		0.850 (0.709 – 1.019)	
No	1		1	
TV information affects them		<0.001		0.823
Yes	3.909 (2.343 – 6.524)		1.018 (0.869 – 1.193)	
No	1		1	
Radio information affects them		<0.001		0.041*
Yes	3.972 (2.348 – 6.720)		0.863 (0.749 – 0.994)	
No	1		1	
Answer to exposure to videos (through social media)		0.055		0.673
Some answer	2.245 (0.953 – 5.286)		1.036 (0.879 – 1.222)	
No answer	1		1	

Continuation.

Answer due to fake news (through social media)		0.061	0.043*
Some answer	1.899 (0.955 – 3.777)		0.909 (0.828 – 0.997)
No answer	1		1
Answer due to fear (through TV)		0.070	0.161
Some answer	2.333 (0.899 - 6.054)		1.174 (0.938 – 1.468)
No answer	1		1
Answer due to exposure to photos (through TV)		0.017	0.652
Some answer	4.011 (1.029 – 15.632)		1.047 (0.858 – 1.277)
No answer	1		1
Answer due to exposure to videos (through TV)		0.055	a
Some answer	2.638 (0.876 – 7.946)		a
No answer	1		a
Answer due to the number of dead people (through the radio)		0.085	0.355
Some answer	4.333 (0.629 – 29.867)		1.071 (0.926 – 1.240)
No answer	1		1
Answer due to fear (through the radio)		0.019	0.014*
Some answer	6.118 (0.878 – 42.610)		0.803 (0.674 – 0.957)
No answer	1		1
Screening for psychological distress		<0.001	0.045*
Case	5.666 (4.277 – 7.489)		0.785 (0.619 – 0.994)
Noncase	1		1

* Variables that remained associated with GAD (p≤0.05); ᵇMultivariate analysis unfeasible by the number of subjects.

Discussion

In the present study, an association of symptoms suggestive of depression was found with the fact of being exposed for over four hours a day to information conveyed by social media, feeling affected by the information of COVID-19 conveyed by TV and social media, in addition to positive screening for psychological distress caused and/or aggravated by exposure to pandemic information. However, none of the variables related to sociodemographic characteristics were associated with the outcome analyzed.

Internet use among Brazilian older adults has progressively increased, reaching 97% in 2021.[5] If on the one hand access to digital media can lead to greater autonomy, availability of information and foster interpersonal relationships, on the other, it

can bring challenges. The infodemic, in addition to making it difficult to control the quality of information[16], can cause older adults to do not know what orientation to follow, being vulnerable to actions that potentiate infection by SARS-CoV-2, with implications for their mental health.[17]

Social media can quickly disseminate information and misinformation on a particular subject, and repeated exposure to a disease can exacerbate stress, fear, and depression and anxiety disorders answers. This suffering fueled by the media, in addition to the risk of exposure to misinformation, can promote behaviors that negatively affect collective and individual health, such as the indiscriminate use of medication and decreased compliance with social distancing recommendations.[18]

The prevalence of depressive symptoms among older adults was 26.1%, higher than that found in other national studies prior to the COVID-19 pandemic, which used the same tool to operationalize the outcome. In a study conducted in southern Brazil in 2014, using GDS, a prevalence of 15.2% of depressive symptoms in older adults was found.[19] In northeastern Brazil, in 2019, the prevalence was 25% of depressive symptomatology in this age group.[20]

In studies conducted in different countries during the pandemic, prevalences of depressive symptoms were found in very discrepant older adults, ranging from 7.7% to 47.2%. In the UK, a study found worsening symptoms of depression and anxiety, especially among younger older adults, due to social isolation as pandemic containment.[21] In India, older adults presented, during the pandemic, a prevalence of 15.2% for symptoms of depression, with a negative association with age.[22] However, it is important to emphasize that divergences in the findings can be attributed to the different theoretical models, types of studies, characteristics and criteria for selecting the sample, the operational tools adopted to measure depression and the period of data collection and evolution of the pandemic itself.[23]

A national health survey, with data collection by a self-completed virtual questionnaire, analyzed answers from 9,173 older adults about the COVID-19 pandemic impact on their lives. It found that the

recurrent feeling of sadness and depression was reported in 27.5% of older adults, being more frequent in the female population (35.1%). The feeling of isolation of family and friends was related to sadness and depression in older adults.[24]

Another national study also identified that older adults in social isolation had a higher score for the symptoms of depression as a result of the pandemic. Moreover, symptoms of anxiety and depression were exacerbated by repeated exposure to news about COVID-19.[25] A study indicates that, due to a scenario of uncertainties exacerbated by exposure to misinformation, there may be an increase in anxiety and in the consumption of information itself, negatively affecting individual answers to the recommended protection measures.[26]

The present study found a prevalence of 18.4% for GAD. A narrative review found a prevalence of anxiety symptoms ranging from 8.3% to 49.7% in older adults during the pandemic period, and one of the risk factors associated with this result would be the longer time of exposure to information on COVID-19.[27]

GAD is the most common anxiety disorder among older adults and is characterized by excessive anxiety and exaggerated concern about daily events.[28] The prevalence of GAD in older adults, reported in international literature in years prior to the pandemic, ranged from 2.8%[28] to 8.4%[29] being observed an increase in prevalence from the year 2020.[27] An Irish study found that older adults over 65 years old had higher levels of COVID-19-related anxiety.[30] On the other hand, a study conducted in China reported a higher prevalence of GAD and depressive symptoms in younger people.[31]

In the present study, an association between depressive symptoms and GAD was found. All variables associated with outcomes in this study referred to exposure to news and information about COVID-19, indicating the evident infodemic impact on symptoms of depression and anxiety in older adults. The variable that was associated with both depression and GAD symptoms was positive screening for psychological distress caused and/or aggravated by exposure to information about COVID-19.

A national study with older adults over 80 years old found that people with GAD tended to have more associated depressive conditions.[32] Results of a survey conducted in Singapore, using GDS and GAI, indicated that depression and anxiety were associated in the pre-COVID-19 period. However, absolute values of association were higher during the social isolation measures imposed by the pandemic.[33]

The results evidenced by the present study indicate the need to protect older adults' mental health during the COVID-19 pandemic. In the context of health care, where nurses play an important role in the health education process, transmitting clear and reliable information about COVID-19 can help prevent a scenario of panic or compliance with inappropriate conduct.[34] Scientifically based guidelines regarding signs and symptoms, forms of contagion, treatment and prevention contribute to fighting the disease, both in terms of combating COVID-19,[2] rregarding the diffusion of feelings of tranquility and security that collaborate to protect older adults' mental health.[34]

Authors suggest that, when possible, we seek to reduce the time spent on COVID-19 information available in the media, especially in social media, and that positive reinforcing activities, such as listening to music, watching movies and doing hands-on tasks, be encouraged. Furthermore, it is important to create strategies to teach older adults how to select and prioritize relevant news and recognize and not share fake news.[35]

It is noteworthy that this study has limitations inherent to its methodological design, such as the fact that it has a non-probabilistic sample and is research carried out by web survey, which allows a bias in the selection of participants and does not guarantee the external validity of results. To minimize these limitations, the decision was made to use previously validated self-completed questionnaires. It is understood the need to generate information that is useful for the community even in this pandemic moment, with a series of restrictive measures.

Respondents who were characterized as suggestive of depression and GAD will be contacted during the qualitative phase of this study. Additionally, the dissemination of results in the media should alert the

population about the possibility of seeking guidance/care in services offered by the institutions involved.

Future research can analyze the profile of older adults with greater resilience at the time of the pandemic and assess which interventions are effective in mitigating the COVID-19 infodemic impact on older adults' depressive and anxious states.

Conclusion

The variables that were associated with symptoms of depression in older adults who use digital media were: daily exposure for over four hours on social media to information about COVID-19; feel affected by this information when broadcast on social media or TV; and present positive screening for psychological distress caused and/or aggravated by this information. This last variable was also associated with GAD as well as: feeling affected both by information broadcast on the radio, especially those referring to COVID-19-related fear, and by fake news about the disease disseminated by social media. It is believed that older adults are exposed to COVID-19 infodemia, which can lead to impacts on depressive and anxious symptoms. Thus, the present study justifies its relevance to understanding the effects of exposure to information about COVID-19 on older adults' lives, a contemporary and little explored theme. The increase in internet access has not always been accompanied by older adults' digital literacy, leaving them more vulnerable to the infodemic repercussions on their mental health. The understanding of these repercussions is necessary to propose effective interventions in the individual and collective spheres to cope with the infodemic in this population group.

Collaborations

Kitamura ES, Faria LR, Cavalcante RB and Leite ICG collaborated with study conception, data analysis and interpretation, article writing, relevant critical review of intellectual content and approval of the final version to be published.

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