COVID-19 related media consumption and mental health in older adults.

Erta Cenko[1]*, Emily J Smail[2], Christopher N Kaufmann[2], Torie Livingston Adam Wolach[3], Todd M Manini[3]

[1]Department of Epidemiology, University of Florida, Florida, USA

[2]Department of Health Outcomes and Biomedical Informatics, University of Florida, Florida, USA

[3]Department of Aging, University of Florida, Florida, USA

Abstract

Background: At the beginning of the COVID-19 pandemic, media consumption rose dramatically as people worked to stay informed and connected during lockdowns. However, though media may have provided respite from social isolation, previous research links media consumption with worse mental health outcomes. Therefore, our objective was to examine whether non-social (e.g. television news, radio) and social media consumption during COVID-19 impacted anxiety and depression symptoms relative to before the pandemic onset.

Methods: We conducted an anonymous, cross sectional survey in May-June 2020. Participants (n=1,168, 73.2 years, 56.8% women, 94.9% white) were asked to estimate their time spent consuming pandemic related media and to report on anxiety and depressive symptoms before and after the pandemic began. We calculated change scores for anxiety and depression by summing scores from individual items asking about change during the pandemic.

Results: Respondents with high pandemic related media consumption (>3 hrs) were more likely to have increased anxiety symptoms compared to those with low (<1 hr) media consumption (OR:1.57, 95% CI:1.09-2.23). Similarly, respondents with increased social media consumption during the pandemic were 64% more likely to report depressive symptoms than those who did not use social media. Interestingly, those who reduced their social media use were 45% less likely to have depressive symptoms and 26% less likely to have anxiety symptoms than those who never used social media.

Conclusion: Older adults consuming more pandemic related media had increased anxiety symptoms compared to those with less consumption. Increased social media consumption was associated with elevated depressive symptoms. The potential benefits of media consumption may be countered by unintended negative consequences on mental health; future research should provide recommendations for optimizing media consumption.

Introduction

Over the past two years, the COVID-19 pandemic has posed substantial challenges for public health globally. In addition to health consequences, the pandemic had an unprecedented social and economic impact. The COVID-19 outbreak was declared a pandemic in the US in March 2020 [1]. At the time, consuming social and traditional media (e.g. television news, radio and newspapers) was critical not only for receiving updates on the infection rates and governmental measures but also for identifying precautionary behaviors to reduce the spread of the virus [2-4]. However, despite being a rapid and accessible medium for real time information during the pandemic, media exposure can paradoxically be associated with misperceptions that are detrimental to public health efforts.

Types of media vary in their ability to provide accurate and timely information to the population regarding an emergent issue. Historically, television, radio and print served as reliable and often regulated sources of information and recommendations. But in recent years, social and digital media has expanded rapidly and similar to the rise of cable news in the 1980's, has supplanted many roles of traditional media by introducing new tools and information sources [5-7]. For example, social media has been utilized for several innovative purposes, such as influencing health related attitudes and behaviour, promoting communication and socialization in the absence of physical contact with others and providing a channel through which to share opinions, personal experiences, fears and moments of happiness. This trend was reflected during the pandemic with a dramatic increase in COVID-19 related posts, reaching up to several million on these channels

in the span of one month, between March 1 and March 31, 2020 [8-10]. While social media has become a universal tool for community engagement and combating feelings of loneliness and isolation, it may also negatively affect the health of the most active users.

Multiple recent studies have investigated the potentially detrimental effects of pandemic related media on mental health. A population based study in China found a positive correlation between social media usage and symptoms of depression and anxiety [11]. In a similar study involving German younger adults, Bendau and colleagues found that COVID-19 related media was associated with anxiety, depression and fear symptoms. Other studies have shown that pandemic related media coverage has mental health consequences for most people. Older adults and other vulnerable groups may experience accentuated mental health outcomes. Indeed, the outbreak of COVID-19 identified older adults as the group more at risk of developing severe health consequences and less likely to survive in case of infection. Like the general population, older adults rely on media to stay updated during the pandemic to protect their health [12-14]. The negative consequences of media on mental health might be exacerbated in older adults, who are more prone to pandemic related health risks.

To shed light on the association of mental health risks with pandemic related media consumption among older adults, we conducted an anonymous online survey of 1,168 older adults living in North-Central Florida [15]. First, we sought to evaluate the effect of pandemic related media coverage on symptoms of anxiety and depression among community dwelling older adults. Second, we asked whether change in social media usage was associated with worsening mental health of older adults. In both cases, we hypothesized that higher amounts of pandemic related traditional media and social media consumption would be associated with worsening anxiety and depression symptoms [16-18].

Materials and Methods

Older adults in the North-central region of Florida were surveyed from May to June 2020 to assess healthcare behaviors during the COVID-19 outbreak. The university of Florida institutional review board approved the survey and all participants gave informed consent. At the survey's release (05/21/2020), there were cumulatively 48,675 COVID-19 cases (1,204 per week) and 2,144 deaths (48 per week) in Florida [19]. We used data from an online survey to understand changes in behaviors, social activities, health care, medication use, food security, depression, technology/telehealth utilization and mobility patterns during the COVID-19 pandemic [20-22]. This survey is listed in the NIH repository of COVID-19 research tools under coping with COVID-19: Impact on technology use, mobility, food security, depression and social isolation. "The survey contains questions from existing questionnaires such as PROMIS (Patient Reported Outcomes Measurement Information System) that were either populated in their exact form or modified to fit into the context of the COVID-19 pandemic [23]. Respondents took the online survey

voluntarily after it was distributed *via* the university of Florida Research Electronic Data Capture (REDCAP) secure system. We used different means for advertising the survey. In addition to social media, e-mail lists and websites, as well as health articles released by UF health, a marketing list with addresses of adults 60+ years of age was purchased to advertise to older adults who are less likely to learn about the study through online sources. Direct mail postcards (70,000) that announced the online survey were sent the second week of May 2020 [24-26]. The first response was on 5/21/2020 and the last reply was on 6/24/2020. Analyses were restricted to respondents who were 60 years of age or older.

Anxiety and depression questions were adapted based on the PROMIS anxiety short form and PROMIS depression short form. There were 32 questions assessing feelings of emotional distress in the online survey, with 16 questions assessing feelings of emotional distress before the COVID-19 outbreak and 16 questions assessing the change in these feelings after the COVID-19 outbreak. For example: "In a normal week, about a month before the COVID-19 outbreak, I felt worthless". The potential answers to this question were: "Never", "rarely", "sometimes", "often" and "always". Then, respondents were asked, "How has this changed since after the COVID-19 outbreak?" The options for the changes were "it's gotten a lot worse", "it's gotten a little worse", "stayed the same", "it's gotten a little better" and "it's gotten a lot better". Identical questions were asked for other feelings, including feeling helpless, depressed, hopeless, unhappy, nervous and tense [27-30].

Based on PROMIS scoring recommendations, pre COVID-19 questions were summarized by adding responses and assigning values (e.g. "never" and "rarely" were assigned a value of 0, while "sometimes", "often" and "always" were assigned a value of 1). There were 16 questions assessing depression and anxiety symptoms before the COVID-19 outbreak, 8 questions for each domain. Cumulative scores range from 0 to 8, with 0 representing no symptoms and 8 representing the highest level of anxiety or depression symptoms. For changes in symptoms after the COVID-19 outbreak, symptoms were categorized as worsening (value of 1) or stayed the same/got better (value of 0). Separately for depression and anxiety, responses were summed to create a cumulative score (ranging from 0 to 8) representing the number of worsening symptoms after the COVID-19 outbreak [31-33].

Pandemic related media coverage was assessed using the question: "How many hours per day of media coverage did you watch or listen to about the COVID-19 outbreak?" Possible answers to this question were: "None", "some, but no more than one hour per day", "one to three hours per day" and "More than three hours per day". Because very few people (n=39) endorsed "none", responses were combined into the following categories: "<1 hour per day", "1-3 hours per day" and "more than 3 hours per day". Questions on social media consumption first asked, "Do you ever use social media sites like Facebook, Twitter or LinkedIn?". Those who responded in the affirmative were then asked, "How has this changed since after the COVID-19 outbreak?" with possible responses of "decreased a

lot", "decreased a little", "stayed the same", "increased a little" and "increased a lot". These two questions were combined into three categories: "No social media use", "decreased/stayed the same" and "increased a little/a lot" to include those who did not engage in social media and account for the small number of responses at the extremes [34].

Additional variables were used as covariates. Respondents provided information about their: Age, gender (male or female), race (African American/black, Asian, native American/Alaskan native, native Hawaian/Pacific Islander, white, other (specify) or I don't want to say), marital status (married, separated, divorced, widowed, never married, other specify or I don't want to say), education (No formal education (00), high school/equivalent (09-12), college (13-16), post graduate, I don't want to say or other (specify below), employment (yes or no), income (Less than $5,000, $5,000 to$9,999, $10,000 to $14,999, $15,000 to $24,999, $25,000 to$34,999, $35,000 to $49,999, $50,000 to $74,999, $75,000 or greater or I don't know or I don't want to say) and community type (small city, rural, suburb near a large city, large city (Urban). Other questions were included to adjust for health status. Participants rated their overall health in a typical month before the COVID-19 outbreak, the presence of selected health conditions (hypertension, high cholesterol, cardiovascular disease, stroke, pulmonary disease, metabolic conditions such as diabetes, osteoarthritis, mental health conditions, neuromuscular conditions and cancer) and pre-Covid depression and anxiety symptoms assessed using questions from the Patient Reported Outcomes Measurement Information System (PROMIS) [35].

T-tests were used for continuous variables and *chi-squared* tests for categorical variables to evaluate potential differences in participant characteristics and health conditions across the media/social media user groups. We used ordered logistic regression to separately assess the association between two types of media (*i.e.* non-social and social) and each mental health outcome (*i.e.* anxiety and depressive symptoms). All models adjusted for gender, education and previous depression diagnosis. Results are presented as odds ratios and can be interpreted as the likelihood of having worsening depressive or anxiety symptoms for a specific media category. All analyses were conducted with stata 13.0 software (Stata Corporation, college station, TX).

Results

Participants (1,168) were, on average, 73.2 (min=60, max=94) years old, 56.3% of the participants were women and 94.9% reported being White. Demographic characteristics were similar between the media consumption groups (Table 1). However, respondents with higher pandemic related media consumption were less likely to report excellent or very good health and more likely to report that their health worsened after the COVID-19 outbreak. While household income was similar between media consumption groups, those consuming more media had a lower employment rate before the COVID-19 outbreak. Participants in the highest media consumption category had a higher prevalence and total number of health conditions, including mental health conditions such as depression, bipolar disorder, memory disorder or dementia. The supplementary materials also provide a table comparing participant characteristics across social media use and post COVID consumption.

Table 1. *Demographic characteristics of those reporting <1 hour, 1-3 hours and >3 hours of media coverage during COVID-19 pandemic.*

Variables	Media coverage		
	<1 hour per day	1-3 hours per day	>3 hours per day
	N=483	N=501	N=166
Age, mean (SD)	72.85 (6.14)	73.36 (6.10)	73.7 (6.72)
Gender, female	258 (53.64%)	287 (57.75%)	101 (60.84%)
Race, white	458 (94.82%)	479 (95.61%)	155 (93.37%)
Married	293 (60.66%)	321 (64.07%)	104 (62.65%)
Education			
High school	59 (11.99%)	57 (11.24%)	30 (17.75%)
College	206 (44.40%)	201 (41.53%)	63 (38.65%)
Higher than college	199 (42.89%)	226 (46.69%)	70 (42.94%)
Employed before the pandemic	179 (37.21%)	182 (36.55%)	51 (30.91%)
Household income			
Less than 24,999	37 (7.56%)	23 (4.56%)	10 (5.98%)
$25,000-34,999	34 (6.95%)	32 (6.34%)	9 (5.38%)

$35,000-49,999	48 (9.81%)	51 (10.11%)	20 (11.97%)
$50,000-$74,999	97 (19.83%)	102 (20.23%)	28 (16.76%)
$75,000+	202 (41.30%)	231 (45.83%)	80 (47.90%)
Not reported	71 (14.51%)	65 (12.89%)	20 (11.97%)
Community			
Small city	264 (53.76%)	281 (55.97%)	96 (57.14%)
Rural area	81 (16.49%)	62 (12.35%)	21 (12.5%)
Suburb	100 (20.36%)	117 (23.30%)	41 (24.40%)
Large city/Urban	46 (9.36%)	42 (8.36%)	10 (5.95%)
Tested positive for SARS-CoV-2	1 (0.2%)	2 (0.4%)	2 (1.2%)
Self-rated overall health before COVID-19 outbreak			
Excellent	93 (21.37%)	88 (20.04%)	19 (12.5%)
Very good	186 (42.75%)	193 (43.96%)	60 (39.47%)
Good	114 (26.20%)	118 (26.87%)	52 (34.21%)
Fair	39 (8.96%)	36 (8.20%)	16 (10.52%)
Poor	3 (0.68%)	4 (0.91%)	5 (3.28%)
Self-rated overall health after COVID-19 outbreak			
Improved	18 (4.13%)	22 (5.01%)	6 (3.94%)
Remained the same	392 (89.91%)	380 (86.56%)	128 (84.21%)
Worsened	26 (5.96%)	37 (8.43%)	18 (11.84%)
Health conditions			
Hypertension	239 (48.57%)	250 (49.30%)	88 (52.07%)
High cholesterol	237 (48.17%)	236 (46.54%)	85 (50.29%)
Any cardiovascular condition[1]	128 (26.02%)	129 (25.44%)	49 (28.99%)
Stroke[2]	20 (4.06%)	34 (6.71%)	9 (5.32%)
Pulmonary disease	39 (7.92%)	35 (6.90%)	21 (12.42%)
Metabolic conditions[3]	69 (14.02%)	58 (11.44%)	27 (15.98%)
Osteoarthritis	20 (4.06%)	31(6.11%)	15 (8.88%)
Mental conditions[4]	45 (9.15%)	59 (11.64%)	29 (17.16%)
Neuromuscular conditions[5]	47 (9.55%)	37 (7.30%)	25 (14.80%)
Cancer[6]	53 (10.77%)	60 (11.83%)	26 (15.38%)
Total comorbidities[7]- Mean (SD)	1.99 (1.81)	2.01 (1.80)	2.45 (2.09)
Use of social media, Yes	145 (30.52%)	170 (35.05%)	48 (28.74%)

Note: [1]Any cardiovascular condition includes: Angina or chest pain; heart attack or myocardial infarction; congestive heart failure; Coronary artery disease or plaque buildup on the arteries; palpitations, irregular heartbeat or atrial fibrillation; poor circulation (claudication) or peripheral arterial disease.

[2]Stroke includes: Stroke; transient ischemic attack; TIA or mini-stroke.

[3]Metabolic conditions include: Diabetes, sugar in urine or high blood sugar; Kidney failure.

[4]Mental conditions include: Depression, bipolar disorder, memory disorder or dementia.

[5]Neuromuscular conditions include: Neuropathy and Parkinson's disease.

[6]Cancer includes: Lung cancer, breast, cervical, uterine or ovarian cancer, prostate and colon cancer.

[7]Total comorbidities: Total number of comorbidities.

Participants whose social media consumption levels increased after the COVID-19 outbreak were younger, more likely to be female and less likely to be married (Table 2). Participants across all three social media categories had similar educational levels and socioeconomic status and did not differ significantly in terms of the community where they lived. Those who reported increased social media levels were more likely to have been employed before the pandemic compared to respondents who reported decreased or similar levels of social media after the COVID-19 outbreak and those who reported no social media use. Participants across the social media categories did not differ in their self-reported overall health before the COVID-19 outbreak. However, participants who experienced increased levels of social media were approximately two times more likely to report worsened self-rated overall health after the COVID-19 epidemic compared with those in other social media categories. Participants whose social media levels increased had significantly fewer morbid conditions but more mental health conditions such as depression, bipolar disorder, memory disorder or dementia.

Table 2: *Demographic characteristics of those reporting no social media use, decrease/stayed same and increased social media use during COVID-19 pandemic.*

Variables	Social media		
	No social media use	Decreased/stayed the same	Increased
	N = 363	N = 512	N=248
Age, mean (SD)	74.70 (6.40)	73.0 (5.94)	71.38 (5.90)
Gender, female	159 (43.92%)	309 (60.82%)	172(69.35%)
Race, white	344 (94.76%)	496 (96.87%)	231 (93.14%)
Married	237 (65.28%)	318 (62.10%)	139 (56.04%)
Education			
High school	41 (11.71%)	70 (14.40%)	26 (11.21%)
College	145 (41.43%)	222 (45.68%)	86 (37.07%)
Higher than college	164 (48.86%)	194 (39.92%)	120 (51.72%)
Employed before the pandemic	112 (31.11%)	196 (38.43%)	100 (40.32%)
Household income			
Less than 24,999	20 (5.55%)	28 (5.51%)	19 (7.69%)
$25,000-34,999	24 (6.66%)	36 (7.08%)	12 (4.85%)
$35,000-49,999	28 (7.77%)	53 (10.43%)	35 (14.17%)
$50,000-$74,999	60 (16.66%)	108 (21.26%)	51 (20.64%)
$75,000+	163 (45.27%)	220 (43.30%)	111 (44.94%)
Not reported	65 (18.05%)	63 (12.40%)	19 (7.69%)
Community			
Small city	199 (55.43%)	285 (55.77%)	135 (54.44%)
Rural area	54 (15.04%)	67 (13.11%)	37 (14.92%)
Suburb	75 (20.89%)	122 (23.87%)	50 (20.16%)
Large city/Urban	31 (8.64%)	37 (7.24%)	26 (10.48%)
Tested Positive for SARS-CoV-2	3 (0.85%)	1 (0.2%)	1 (0.4%)
Self-rated overall health before COVID-19 outbreak			
Excellent			

Excellent	78 (23.49%)	83 (17.77%)	39 (17.73%)
Very good	141 (42.47%)	207 (44.33%)	88 (40.0%)
Good	76 (22.89%)	130 (27.84%)	75 (34.09%)
Fair	34 (10.24%)	40 (8.56%)	17 (7.73%)
Poor	3 (0.9%)	7 (1.5%)	1 (0.45%)
Self-rated overall health after COVID-19 outbreak			
Improved	9 (2.71%)	22 (4.70%)	14 (6.36%)
Remained the same	301 (90.66%)	416 (88.89%)	179 (81.36%)
Worsened	22 (6.63%)	30 (6.41%)	27 (12.27%)
Comorbid conditions			
Hypertension	186 (51.24%)	266 (51.95%)	120 (48.39%)
High cholesterol	180 (49.59%)	266 (51.95%)	109 (43.95%)
Any cardiovascular condition[1]	107 (29.48%)	137 (26.76%)	59 (23.79%)
Stroke[2]	26 (7.16%)	24 (4.68%)	13 (5.24%)
Pulmonary disease	28 (7.71%)	44 (8.59%)	20 (8.06%)
Metabolic conditions[3]	39 (10.74%)	79 (15.43%)	35 (14.11%)
Mental conditions[4]	29 (7.99%)	67 (13.09%)	36 (14.52%)
Neuromuscular conditions[5]	40 (11.02%)	49 (9.57%)	20 (8.06%)
Cancer[6]	45 (12.40%)	66 (12.89%)	26 (10.48%)
Total comorbidities[7]- Mean (SD)	2.11 (1.83)	2.20 (1.88)	2.00 (1.82)

Note: [1]Any cardiovascular condition includes: Angina or chest pain; heart attack or myocardial infarction; congestive heart failure; coronary artery disease or plaque buildup on the arteries; palpitations, irregular heartbeat or atrial fibrillation; poor circulation (claudication) or peripheral arterial disease.

[2]Stroke includes: Stroke; transient ischemic attack; TIA or mini stroke.

[3]Metabolic conditions include: Diabetes, sugar in urine or high blood sugar; Kidney failure.

[4]Mental conditions include: Depression, bipolar disorder, memory disorder or dementia.

[5]Neuromuscular conditions include: Neuropathy and Parkinson's disease.

[6]Cancer includes: Lung cancer, breast, cervical, uterine or ovarian cancer, prostate and colon cancer.

[7]Total comorbidities: Total number of comorbidities.

Estimates from adjusted ordinal logistic regression showed that participants who consumed more pandemic related media (One to three hours per day) had marginally significantly different odds of depressive symptoms (1.31, 95% CI: 0.99-1.73) compared to those who consumed less than one hour a day. In contrast, participants consuming more than one hour per day of pandemic related media had higher odds of anxiety symptoms (1-3 hours:1.50, 95% CI: 1.15-1.96; >3 hours: 1.56, 95% CI: 1.09-2.23) relative to those consuming less than one hour (Table 3).

Table 3. *Association between media use categories and depression and anxiety.*

Variables	Depression		Anxiety	
	Odds ratio (95% CI)	p-value	Odds ratio (95% CI*)	p-value
Time consumption of media covering COVID-19 pandemic				
<1 hour per day	1.0		1.0	

	1.31 (0.99-1.73)	0.055	1.50 (1.15-1.96)	0.002
>3 hours per day	1.12 (0.75-1.66)	0.557	1.56 (1.09-2.23)	0.013
Social media usage after COVID-19 outbreak				
No social media use	1.0		1.0	
Decreased or stayed the same	0.55 (0.40-0.76)	0	0.73 (0.55-0.97)	0.035
Increased a little or a lot	1.64 (1.15-2.30)	0.005	1.30 (0.93-1.80)	0.119
Note: Models are ordinal logistic regressions adjusted for: Education, gender, age and previous status of depression. *CI=Confidence Interval.				

Participants who reported increased social media use after the COVID-19 outbreak had a 64% higher risk of depressive symptoms (OR:1.64, 95% CI: 1.15-2.30) than those not using social media. The association between increased social media use and anxiety was not significant (OR:1.30, 95% CI: 0.93-1.80). In contrast, decreasing use of social media after the COVID-19 outbreak was associated with reduced odds of worsening depressive symptoms (OR: 0.55, 95% CI: 0.40-0.76) and anxiety symptoms (OR:0.73, 95% CI: 0.55-0.97) compared to those who never used social media.

Discussion

Social and traditional media are important tools for building public knowledge and mitigating the potential impact of an emergent public health issue. Media plays an important role in shaping beliefs and encouraging precautions that lower the susceptibility and severity of infection. For example, news attention on previous outbreaks, like the H1N1 influenza, positively influenced the implementation of preventative behaviors. However, such exposure could affect symptoms of depression and anxiety, particularly during a prolonged pandemic like COVID-19. The potential detrimental health effects of media exposure during catastrophic events have been investigated in several studies. For example, following the Boston Marathon bombing, surprisingly, people who learned of the event through media coverage experienced more acute stress than individuals living in Boston at the time of the bombing. Moreover, a series of studies have shown media exposure to mass trauma is associated with negative psychological responses ranging from fear to post-traumatic stress disorder [36].

There are several mechanisms through which media consumption affects mental health. First, media can fear and panic, exacerbating any existing anxiety and depressive symptoms. Second, media consumption, especially social media, can deprive individuals from spending time on activities that can bolster mental health, such as physical activity, social connections or spending time in nature. For example, a study exploring the association between social media consumption and perception of social isolation among older adults, found that those with more problematic social media use experienced the highest perceived social isolation levels. Similarly, another study investigating electronic technology use and connection to nature in Canadians young adults found that time spent with electronic devices poses barriers to spending time outdoors and may deprive individuals from the benefits for mental health that come with being connected to nature.

We found that higher pandemic related media consumption showed significant associations with anxiety symptoms and marginally significant associations with depressive symptoms. This finding supports general concepts in the literature and provides further knowledge by demonstrating this association in older adults across different media types. Our results agree with findings from a web based study (4872 participants 18+ years) conducted in China by Gao and colleagues in 2020. This study differs from ours because it focused only on social media exposure; over 80% of the participants were younger than 51 years old. However, similar to our findings, it showed that higher social media exposure was associated with more severe anxiety and depression symptoms. Similarly, in a study of adults aged 18-82, Nekluidov and colleagues found that anxiety was strongly associated with the amount of time spent watching or reading news about COVID-19 in over 40,000 Russian adults. Our study extends these findings by uniquely observing an older adult population and comparing multiple media outlets. In another study conducted in Germany, Bendau and colleagues found a significant association between pandemic related media consumption and anxiety. However, the sample was primarily young (average age 36) and not representative of older adults, who have often been underrepresented in this type of research. Our findings might serve to better tailor recommendations related to media consumption in older adults, especially those more vulnerable to mental health conditions. Properly conveying the content and amount of health information to older adults in times of crisis should be carefully considered to diminish potential adverse effects of over exposure.

In addition to our findings on non-social media, the present study found that increased social media was associated with worsening anxiety and depression. Several studies demonstrate the potential detriments of social media use on mental health outside the context of the pandemic. For example, in 2018, Shensa and colleagues found that higher frequency and intensity of social media use were associated with increased depression and anxiety symptoms in adults aged 19 to 32. A similar study on US young adults by Lin and collaborators found social media use to be associated with increased depression. In light of COVID-19, the adverse effects of social media on mental health may be heightened. In a recent study,

Zhong and colleagues found that extensive social media use during the pandemic was related to depression and secondary trauma in a large population group in Wuhan, China. Another study from China found social media to be associated with an elevated risk of depression, public fear and panic. There are fewer studies on older adults, given their lower representation in social media research, but the over exposure to social media consequences is also relevant to this population. A recent study on older adults from Hong Kong showed that older adults who rely on social media for COVID-19 related information exhibited more anxiety symptoms compared to those who use other sources of information. As mentioned above, the present study found a similar association between social media exposure and anxiety. Interestingly, this association appeared to be dose dependent, with decreased social media being associated with a lower amount of worsening anxiety and depression symptoms, even compared to no social media use. This finding implies that reducing social media use during a pandemic could benefit mental health. Previous literature supports our findings and sheds light on the benefits of limited or inexistent news consumption. For example, in a qualitative study, Woodstock found that limited news consumption might be associated with better mental health. More recently, de Bruin and colleagues found that news avoidance during the COVID-19 pandemic was associated with mental well-being. While these findings support lowering social media consumption, they should be exercised with caution, taking into consideration its positive impact on the information of the general population, health promotion and prevention strategies publicized through social media and socialization opportunities.

The strengths of this study include quantifying exposure to both traditional and social media early in the pandemic, surveying a large population of older adults and assessing changes in both anxiety and depression symptoms. However, this study's limitations might impact the interpretation of the results. First, our sample may not represent responses from older adults with different cultural backgrounds, as our sample was overwhelmingly white, well-educated and reported high income. Second, we did not have information on the quality of exposure to media or the content (e.g. news, entertainment, cable TV, national news on major networks). Finally, our study was cross sectional and while we oriented the survey to reflect temporal changes in media and mental health symptoms (*i.e.* inquiring about both before and after the pandemic onset), the results cannot fully evaluate causality.

Conclusion

In summary, we found that consuming higher pandemic related media and increasing social media use during the COVID-19 pandemic were associated with worsening anxiety and depressive symptoms in older adults. Our findings have implications for public health strategies to improve and protect the mental health of older adults during a pandemic or other national tragedy (e.g. shootings, hurricanes, earthquakes). They may also serve to educate responsible parties that create media content and disseminate recommendations. Several approaches could be followed to optimize traditional and social media consumption, including but not limited to: Warnings and disclaimers about the dangers of misinformation, advertisement of sources to seek for professional help, technology (*i.e.* application timers that limit prolonged consumption of social media), third party verification or fact checking and media regulations. While completely avoiding traditional and social media is not recommended, optimizing media consumption can attenuate effects on the mental health of older adults during an emergent health crisis.

Acknowledgments

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*Correspondence to

Erta Cenko

Department of Epidemiology,

University of Florida,

Gainesville,

Florida

E-mail: *ertacenko@ufl.edu*