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Ayokunle Olagoke

Olakanmi Olagoke

Ashley M. Hughes

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Exposure to coronavirus news on mainstream media: The role of risk perceptions and depression

Ayokunle A. Olagoke¹, Olakanmi O. Olagoke² and Ashley M. Hughes^{3,4}

¹Division of Community Health Sciences, School of Public Health, University of Illinois at Chicago, Illinois, USA

²Department of Internal Medicine, John H. Stroger, Jr. Hospital of Cook County, Chicago, Illinois, USA

³Department of Biomedical and Health Information Sciences, College of Applied Health Sciences, University of Illinois at Chicago, Illinois, USA

⁴Center of Innovations in Chronic and Complex Healthcare, Edward Hines JR VA Medical Center, Illinois, USA

Objective. The mainstream media tend to rely on news content that will increase risk perceptions of pandemic outbreaks to stimulate public response and persuade people to comply with preventive behaviours. The objective of this study was to examine associations between exposure to coronavirus disease (COVID-19) news, risk perceptions, and depressive symptoms.

Methods. Cross-sectional data were collected from 501 participants who were ≥ 18 years. Exposure to COVID-19 news was assessed as our exposure variable. We screened for depression (outcome variable) with the Patient Health Questionnaire and examined the roles of risk perceptions. Multiple linear regressions and mediation analysis with 1000 bootstrap resamples were conducted.

Results. Participants were 55.29% female, 67.86% White with mean age 32.44 ± 11.94 years. After controlling for sociodemographic and socio-economic factors, news exposure was positively associated with depressive symptoms $b = .11$; 95% confidence interval (95%CI) = 0.02–0.20. Mediation analysis showed that perceived vulnerability to COVID-19 mediated 34.4% of this relationship ($b = .04$; 95%CI = 0.01–0.06).

Conclusion. Perceived vulnerability to COVID-19 can serve as a pathway through which exposure to COVID-19 news on mainstream media may be associated with depressive symptoms. Based on our findings, we offered recommendations for media–health partnership, practice, and research.

Statement of contribution

What is already known on this subject?

- Mainstream media use the elements of elevated risk perception to steer public response during pandemic outbreaks.
- Frequent exposure to risk-framed news is positively associated with risk perception.
- Risk perception is positively associated with psychosocial distress.

What does this study add?

- Frequent exposure to coronavirus disease (COVID-19) news on mainstream media is positively associated with depressive symptoms.
- Perceived vulnerability to COVID-19 mediates the relationship between exposure to COVID-19 news and depressive symptoms.
- Perceived self-efficacy to practice protective behaviour is positively associated with news exposure and negatively associated with depressive symptoms.

Since the onset of the first reported coronavirus disease (COVID-19) patient on 1 December 2019 (Huang *et al.*, 2020), the disease has rapidly spread worldwide to over 100 countries with more than 937,000 cases, 47,256 deaths (World Health Organization, 2020). As of 3 April 2020, the United States has recorded 239,279 cases and 5,443 deaths, making it the leading nation in the world for the number of cases (CDC, 2020). These alarming estimations have triggered emergency preparedness efforts and public awareness through the swift dissemination of risk-framed information in the mainstream media (Cowper, 2020; Dyer, 2020; Laupacis, 2020; Oxford Analytica, 2020). Understandably, it is important to glean up-to-date information regularly to stay in compliance with local and state authorities, as well as to mind the well-being of family and loved ones in different parts of the world. The purpose of this current study was to assess the psychosocial outcomes of exposure to COVID-19 news on the mainstream media.

American mainstream media is known to shape public perceptions through its widely available news conglomerates (e.g., digital, electronic, and print media) (Atton, 2002; Nair, Janenova, & Serikbayeva, 2020), giving it a significant influence on the psychological outcomes of rapidly shared information during pandemics (Leo & Lacasse, 2008; Meadows & Foxwell, 2011). However, managing the COVID-19 pandemic requires a balanced and prompt approach which informs the public on what they can do, without causing a mental health burden (Cowper, 2020; Keles, McCrae, & Grealish, 2020; Seabrook, Kern, & Rickard, 2016). In an attempt to stimulate public response, threat perception, and persuade people to comply with

the preventive policies and regulations, the mainstream media rely on producing news contents that will increase the perceived self-efficacy to protect, vulnerability to the disease, and severity of the pandemic outbreaks (Bish & Michie, 2010; Park, Boatwright, & Avery, 2019; Pieri, 2019). For instance, in a recent video coverage, CNN interviewed recovering COVID-19 patients who described their perceived vulnerability, severity, and experiences with the disease (CNN, 2020). However, frequent exposure to risk-framed news may negatively impact the viewers' mental health (Keles *et al.*, 2020; Seabrook *et al.*, 2016). Therefore, it is important to investigate the mental health consequence of exposure to pandemic news on mainstream media. The objective of this study was to examine the association between exposure to COVID-19-related news on mainstream media, risk perceptions, and depressive symptoms.

Methods

To satisfy this objective, we deployed a survey tool with validated screening techniques for rapid assessment of the mental health implications of the ongoing pandemic. The study was approved by the Institution Review Board of the University of Illinois at Chicago. All participants signed the online informed consent form before proceeding with the survey.

Study sample

Participants were recruited via Prolific, an online crowdsourcing platform for researchers (Peer, Brandimarte, Samat, & Acquisti, 2017). Recent studies have established the diversity of the participant pool and the high quality of the data collected from Prolific. For example, compared to other crowdsourcing platforms, participants from Prolific scored higher on attention-checks, engaged in lesser dishonest behaviour, and were able to reproduce existing results (Palan & Schitter, 2018; Peer *et al.*, 2017). Eligibility criteria for participants were (1) residence in the United States and (2) being 18 years or older. Cross-sectional data were collected from 502 participants on 25 March 2020, through the Qualtrics online survey.

Media exposure

Exposure to COVID-19 news on mainstream media was measured by asking participants four questions starting with the stem statement *How frequently do you get information on coronavirus from any of the following sources?* (1) Cable news channels (e.g., Fox News, CNN), (2) Local news channels, (3) New York Times, and (4) Washington post. Response options ranged from 1 = Never to 5 = Daily. Responses were summed and divided by 4 to provide a composite score ranging from 1 to 5 for each participant.

The most recent information source for COVID-19 was assessed by adapting one question from the National Cancer Institute Health Information National Trends Survey (HINTS) (Nelson *et al.*, 2004). Participants were asked *The most recent time you looked for information about COVID-19, where did you go first?* Response options included television, friends, and government websites.

Depression screening

Patient Health Questionnaire (PHQ-2) (Gelaye *et al.*, 2016), *an established screening tool* (intraclass correlation of .92), was used to screen for depressive symptoms. The PHQ probed well-being over the past 2 weeks (recommended time of self-quarantine): *Over the past 2 weeks, how often have you been bothered by any of the following problems?* (1) *Little interest or pleasure in doing things* and (2) *Feeling down, depressed, or hopeless*. Response options were (1) nearly every day, (2) more than half the day, (3) several days, and (4) not at all. Responses were reversely coded and averaged to range from 1 to 4 with low numbers indicating low depressive symptoms.

Risk perceptions

Perceived vulnerability to COVID-19 was assessed by adapting Gainforth's perceived vulnerability scale ($\alpha = .95$) (Gainforth, Cao, & Latimer-Cheung, 2012). Three items with 5-point response options (1 = *Strongly disagree* and 5 = *Strongly agree*) were used to assess the participants' anxiety, fear, and worry about being infected with COVID-19. Items started with the statement *Thinking about the*

possibility of being infected with coronavirus makes me feel: (a) Anxious, (b) Fearful, and (c) Worried.

Perceived severity of COVID-19 was measured using a single item that asked respondents *Coronavirus is a serious infection for me to contract*. Response options ranged from 1 = Strongly disagree to 5 = Strongly agree.

Perceived self-efficacy to practice protective behaviour was assessed using a 4-item measure (Ajzen, 2002) ($\alpha = .83$) about participant's perceived confidence and perceived control in protecting themselves against COVID-19 infection. An example of an item was *It is possible for me to protect myself against coronavirus infection*. Response options ranged from 1 = Strongly disagree to 5 = Strongly agree.

Covariates

As COVID-19 perceptions of risk and media consumption are likely to be influenced by key demographics (e.g., age, underlying conditions), we collected key demographic variables for statistical control (Liu, Huang, & Brown, 1998; Primack, Swanier, Georgiopoulos, Land, & Fine, 2009). More specifically, participants reported on the following important demographic characteristics: sociodemographic characteristics, for example, age (continuous variable), sex (female, male) race (White, African American, Asian, Hispanic, American Indian, Middle East and North Africa [MENA] and others), and marital status. For marital status, categories included married, divorced, separated, widowed, or single. Socio-economic status (SES) characteristics included household income (<\$20,000, \$20,000–<\$35,000, \$35,000–<\$50,000, \$50,000–<\$75,000, and \$75,000 or more), employment status, and education (less than high school, high school graduate, some college, college graduate, or more). Race was self-reported by participants based on the provided categories. It was considered to be an important confounder because both media exposure (Johnson, Adams, Hall, & Ashburn, 1997) and depressive symptoms (Morris *et al.*, 2011) vary by race/ethnicity.

Data analysis

Participants' characteristics were analyzed using descriptive statistics such as frequencies, proportions, means, and standard deviations. The one-way analysis of variance (ANOVA) was performed to investigate the mean differences in depressive symptoms by participants' characteristics. Pearson correlations were calculated to test bivariate associations between continuous variables. To further investigate the relationship between exposure to COVID-19 news on mainstream media and depressive symptoms, multivariable analysis was calculated to test the relationship between the exposure and depressive symptoms. Model 1 tested the unadjusted relationships. In Model 2, we adjusted for sociodemographic factors, and in Model 3, we included the SES variables. Finally, mediation analysis was conducted to test the possible mediating role of perceptions in the relationship between news exposure and depressive symptoms. Alternative pathways were also tested to address the concern of causal ordering (i.e., the mediating role of news exposure in the relationship between perceptions and depressive symptoms). Regression models were fitted in four steps according to the procedures outlined by Sobel (1982) to assess whether the association between the independent variable and depressive symptoms was mediated by risk perceptions. Statistical tests were two-sided, and a $p < .05$ was considered statistically significant. Effect sizes and their confidence intervals (bootstrapping methods were used to estimate 95% confidence intervals for the indirect effects) were reported to interpret findings (Cumming, 2014). Statistical analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

After the exclusion of one participant who failed the attention check (Table 1), the remaining participants ($N = 501$) reported a mean age of 32.44 ± 11.94 years, being females (55.29%), White (67.86%), single/never married (68.46%), college graduate or more (53.71%), and employed (54.89%).

Participants reported exposure to COVID-19 news on mainstream media as 2.73 ± 0.91 , depressive symptoms (1.92 ± 0.93), perceived severity (3.73 ± 1.19),

perceived vulnerability (3.67 ± 1.07) and, self-efficacy (4.01 ± 0.67). Mean occurrences of depressive symptoms by participants' characteristics (Table 1) showed that participants who were single/never married (2.05 ± 0.93), with less than high school/high school diploma (2.20 ± 1.06), household income \$15,000–\$34,999 (2.2 ± 0.97), students (2.10 ± 0.95), and perceived risk of losing their jobs (2.20 ± 0.80) reported higher depressive symptoms. Pearson's correlation analysis showed that the occurrence of depressive symptoms was negatively associated with age ($r = -.22, p < .001$), self-efficacy to protect self ($r = -.13, p < .01$), and positively associated with perceived vulnerability ($r = .23, p < .001$).

Model 1 showed a non-significant positive association between exposure to COVID-19 news and depressive symptoms ($b = .06$; 95% confidence interval [CI] = -0.03 to 0.14). This relationship remained non-significant in Model 2 ($b = .07$; 95%CI = -0.01 to 0.16). However, after including SES in Model 3, there was a significantly positive association between the news exposure and the depressive symptoms ($b = .11$; 95%CI = 0.02–0.20). We also found a significantly positive relationships between news exposure and perceived severity ($b = .08$; 95%CI = 0.01–0.15); perceived vulnerability ($b = .21$; 95% CI = 0.13–0.28); and a negatively significant relationship with perceived self-efficacy to practice protective behaviour ($b = -.16$; 95%CI = -0.27 to -0.04). Standardized mediation tests showed perceived vulnerability as mediating 34.4% (bias-corrected 95% CI = 7.79–149.35) of the relationship between exposure to COVID-19 news on mainstream media and depressive symptoms (Figure 1) with an indirect effect of $b = .04$; 95%CI = 0.01–0.06. We recorded non-significant indirect effects through perceived severity ($b = .00$; 95%CI = -0.01 to 0.02) and perceived self-efficacy ($b = .01$; 95%CI = -0.03 to 0.00). In the analysis of the alternative pathway where news exposure mediated the relationship between perceived vulnerability and depressive symptoms, we found a non-significant indirect effect ($b = .01$; 95%CI = -0.00 to 0.02), a partial mediation of 2.18% (bias-corrected 95%CI = -0.63 to 7.65) of the total effect.

Table 1. Mean (SD) of occurrences of depressive symptoms by participants' characteristics (N = 501)^a

Variables	Depressive symptoms		
	No. (%) of participants	Means (SD)	p-Value
Sex			
Female	277 (55.29)	1.96 (0.92)	.29
Male	224 (44.71)	1.87 (0.94)	
Race ^b			
White	340 (67.86)	1.93 (0.94)	.98
African American	30 (5.99)	1.92 (1.05)	
Asian	72 (14.37)	1.85 (0.86)	
Hispanic	41 (8.18)	1.94 (0.87)	
American Indian/MENA/others	18 (3.59)	1.94 (0.97)	
Marital status ^b			
Single/Never married	343 (68.46)	2.05 (0.93)	<.001
Married	128 (25.55)	1.61 (0.83)	
Widowed/Divorced/Separated	30 (5.99)	1.98 (1.03)	
Highest education ^b			
Less than high school/high school	70 (14.03)	2.20 (1.06)	<.001
Some college	161 (32.26)	2.05 (0.97)	
College or more	268 (53.71)	1.77 (0.83)	
Household income ^b			
<\$15,000	50 (10.02)	2.10 (0.81)	.005
\$15,000–\$34,999	80 (16.03)	2.2 (0.97)	
\$35,000–\$49,999	82 (16.43)	1.99 (0.99)	
\$50,000–\$74,999	109 (21.84)	1.80 (0.90)	
Over \$75,000	178 (35.67)	1.79 (0.90)	
Employment status			
Employed	275 (54.89)	1.80 (0.87)	.01
Student	102 (20.36)	2.10 (0.95)	
Unemployed/retired/disabled/others	110 (22.59)	1.98 (0.98)	
Most recent information source ^b			
Government website	131 (29.05)	1.90 (0.91)	.59
Medical websites	105 (23.28)	1.88 (0.87)	
Social media	78 (17.29)	2.08 (0.95)	
Scientific publication	53 (11.75)	2.02 (1.03)	
Television	50 (11.09)	1.82 (1.01)	
Relatives/employer/doctor's office/print	34 (7.54)	1.90 (0.85)	
Perceived risk of unemployment			
Yes	190 (38)	2.20 (0.80)	<.001
No	310 (62)	1.91 (0.87)	

Note. MENA = Middle East and North Africa.

^a*n* may vary due to missing responses. ^bResults from this group should be interpreted with caution due to the small *n*.

Discussion

In this analysis, the relationship between exposure to COVID-19 news on mainstream media and depressive symptoms was partially mediated by perceived vulnerability to COVID-19. Our findings suggest that perceived vulnerability to COVID-

19 can serve as a pathway through which exposure to COVID-19 news on mainstream media may be associated with depressive symptoms. The non-significance of the alternative pathway model further addresses concerns of causal ordering, which supports our premise. The spread of COVID-19 news on mainstream media has been dominated by the proliferation of negatively framed information (Cowper, 2020; Dyer, 2020) such as uncertainties concerning the virus–host interaction, the evolution of the pandemic (Wang, Wang, Chen, & Qin, 2020), increased magnitude of the disease (e.g., the number of cases and fatalities both nationally and globally) (CDC, 2020), momentous government policies (Lazzerini & Putoto, 2020), and increasing health care demand (Ferguson, Laydon, & Nedjati-Gilani, 2020) which has psychological implications.

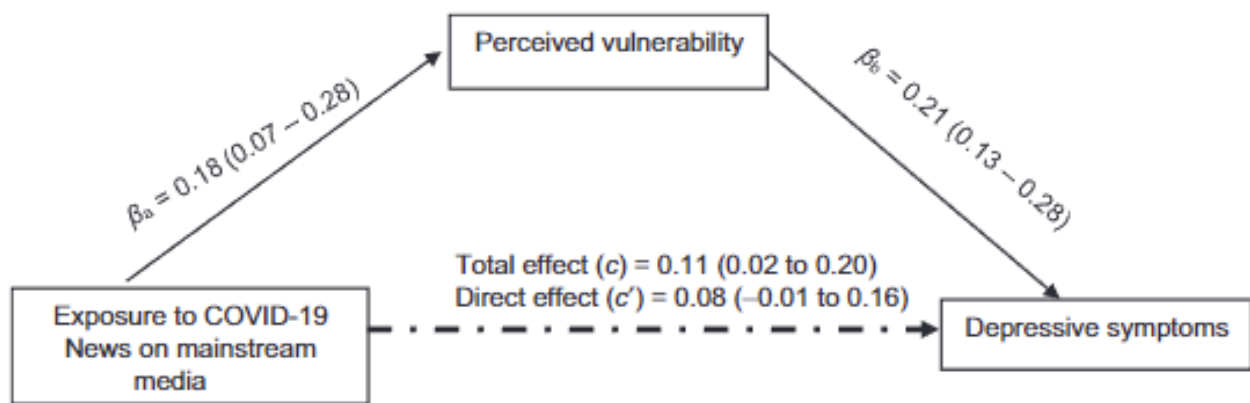


Figure 1. Mediation analysis: Perceived vulnerability mediates 34.4% of the total effect of exposure to COVID-19 news on mainstream media on depressive symptoms with 1,000 bootstrap resamples $b = .04$, $SE = .01$. Bias-corrected 95%CI = 0.01–0.06.

We, therefore, offer the following recommendations: First, in addition to disseminating information on vulnerability to COVID-19, public health workers should work with mainstream media to provide teletherapy and mental health resource contents to their viewers. Second, considering the mediating role of perceived vulnerability, and its negative correlation with perceived self-efficacy to practice preventive measures, mainstream media should consider offering balanced information that will increase the viewer’s confidence to practice protective measures in addition to the information on vulnerability. Third, primary care

providers should screen for depressive symptoms while following up with their patients either in person or via telemedicine.

Limitations

Our study is not without its limitations: first, our sample consists largely of young, educated adults and is therefore not representative; hence, our results may not be generalizable across the United States and should be interpreted with caution. Second, the use of a cross-sectional study design makes it challenging to establish causality and warrants a careful interpretation of our result. Third, our measure of exposure to mainstream media was developed by the researchers and not validated. Nevertheless, the correlation with other items is consistent with previous studies on media exposure (Keles *et al.*, 2020; Seabrook *et al.*, 2016). Future studies should therefore consider testing these relationships longitudinally and with more valid measures to improve our understanding of these associations.

Conclusion

In this study of 501 participants, perceived vulnerability mediated the relationship between exposure to COVID-19 news on the mainstream media and depressive symptoms. In addition to providing information about the vulnerability to COVID-19, mainstream media outlets should offer contents that will reduce their viewers' mental health burden at this critical time.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Ayokunle Olagoke (Conceptualization; Data curation; Formal analysis; Methodology; Writing – original draft) Olakanmi Ojo Olagoke (Writing – original draft;

Writing – review & editing) Ashley Hughes (Methodology; Supervision; Writing – review & editing).

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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