Perpetuating Health Disparities of Minority Groups: The Role of U.S. Newspapers in the COVID-19 Pandemic

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Abstract

During the COVID-19 pandemic, news media are expected to play a critical role in reducing health disparities. However, we know little about whether and how disparities in COVID-19 have been covered in national and local U.S. newspapers. This study examined whether minority health gained news attention and whether partisan bias affected related coverage in the early stages of the pandemic. Results indicate that minority groups have been underrepresented in COVID-19 news articles. Left-leaning newspapers were more likely to discuss minorities in COVID-19 news than least biased media. Left-leaning and right-leaning newspapers did not differ in the number of articles mentioning racial/ethnic minorities. COVID-19 news exceeded the average U.S. reading comprehension level and require some college education to understand but did not differ in readability levels among partisan newspapers. Left-leaning newspapers used significantly more medical terms and affiliated scientific facts to describe COVID-19 than right-leaning newspapers. Implications include avoiding potential failures in informing the public (especially the racial/ethnic minorities) essential scientific facts about disease prevention and increasing public trust in health news coverage.

Keywords COVID-19 · Newspapers · Disparities · Minorities

Introduction

As of this writing, the U.S has surpassed 621,000 COVID-19 deaths and reached 36 million confirmed cases (COVID-19 Dashboard, 2020). Communities of color from economically disadvantaged regions, relative to the rest to other racial groups, have been more heavily impacted by the severe health consequences from COVID-19 (Huang et al., 2020, 2021). Specifically, comparing to White Americans, the infection rate and fatality rate are respectively 1.7 and 2.4 times higher among Native Americans as well as 1.1 and 1.9 times greater among African Americans. Likewise, Hispanics or Latinos are 1.3 times more likely to become infected and 2.3 times more likely to die from COVID-19, when compared to non-Latino Whites (CDC, 2020).

Health disparities refer to the "differences in health outcomes between groups and their causes among groups of people" (CDC, 2016). These differences result more from social determinants of health, such as social, economic, and political factors than from an individual's unhealthy behaviors (Adler & Rehkopf, 2008). Among the major social determinants, communities and neighborhoods influence health outcomes and behaviors which lead to racial and ethnic health disparities. Reducing health disparities has been identified as a major priority in public health policy. However, the progress to address this issue has been slow in the U.S. (Bleich et al., 2012).

Increasing attention has been paid to communication about health disparities in the mass media (Niederdeppe et al., 2013). Early studies show that coverage of racial and ethnic health disparities was relatively scarce, representing 0.1% to 13.6% of all health news (Amzel & Ghosh, 2007; Gollust et al., 2009; Rock, 2005; Taylor-Clark et al., 2007). For instance, racial disparities were only mentioned in 1% of health news stories from 2000 to 2004 (Amzel & Ghosh, 2007). Less than one in seven diabetes related news articles mentioned racial disparities in

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a national sample of newspapers from 2005 to 2006 (Gollust et al., 2009). During the COVID-19 pandemic, news media are expected to play a critical role in reducing health disparities (Chowkwanyun & Reed, 2020). However, few studies have assessed if mass media have effectively discussed racial and ethnic health disparities and if other factors, such as media partisan bias, have affected related coverage.

Prior research assessing news media coverage of issues related to health disparities often examined a small sample of news content within a specific media group (Niederdeppe et al., 2013), with most studies focusing on the coverage in national newspapers such as The New York Times (Gollust et al., 2009; Kim et al., 2010; Taylor-Clark et al., 2007). While national newspapers could provide a larger picture of the status and development of an issue or event in society, local news outlets are often the primary sources for national issues or events of local importance in local communities (Nagler et al., 2016). Specifically, local newspapers are regarded as the voices of community members and play a critical role in influencing regional public opinion and local policy (Paek et al., 2005; Viswanath et al., 2000). Health information delivered by local media is trusted by communities and influential, due to localization and community relevance (Caburnay et al., 2008; Cohen et al., 2008).

Mainstream news media are both the information disseminators and gatekeepers that determine what the audience sees or hear across digital and non-digital platforms (Lin, 2020). As indicated in a recent meta-analysis study, the effects of news media on influencing the perceived importance of issues and attributes in the public agenda remain stable in the digital environment to (Luo et al., 2019). This is evidenced by the fact that that 56% and 46% of the Americans polled in a national study respectively mentioned national and local news outlets as their major COVID-19 news sources, compared to 51%, 36% and 31% who considered public health organizations/officials, elected state/local officials and Trump/the coronavirus task force for the same, in that order (Shearer, 2020).

As COVID-19 has laid bare the severe consequences of health disparities in society, little to no empirical research has addressed how health disparities in relation to COVID-19 have been covered in national and local newspapers. To address this empirical gap, the current study explored and compared the readability and use of medical terminology in COVID-19 news published in print and online partisan newspapers in the early stages of the pandemic.

Literature Review

Health Disparities and Partisan Media

Studies have found that mass media can raise the awareness of health disparities between certain groups (Scheufele et al., 2002), increase the perceived issue importance, promote beliefs about social determinants of health (Niederdeppe et al., 2013) and policy support to reduce health disparities (Gollust et al., 2009), as well as encourage participatory action (Basu & Dutta, 2009). Agenda setting and framing are often adapted to achieve these goals. Agenda-setting theory predicts that the quantity of health disparities discussed in the media can impact awareness and perceived salience of the issue. Framing theory suggests that different strategies used by the media to discuss health disparities can influence beliefs and attitudes regarding the issue (Niederdeppe et al., 2013). These studies tend to focus on the media effects on individual attitudes and behaviors (Viswanath & Emmons, 2006).

Other studies take a structural approach with the assumption that agencies, groups, individuals within the media, and audiences all influence media messages. This approach contends that mass media content often reflects the existing systemaic inequality and may ignore or downplay health disparities (Viswanath & Emmons, 2006). However, the way structural factors influence media content could differ across various media (Niederdeppe et al., 2013). Specifically, partisan lean is one of the major structural factors that could influence media bias, which has been found to impact the awareness of health disparities and the acceptance of social determinants of health (Booske et al., 2011; Gollust & Cappella, 2014; Gollust et al., 2009). Partisan media bias refers to systematically favoring one party over others in news reporting (Groeling, 2013). This type of media bias tends to downplay or ignore negative stories about the media outlet's favored parties, while highlight or exaggerate negative stories about their disliked parties (Puglisi & Snyder, 2011). In addition to political, economic, and social news, partisan media bias also emerges in issues that seemingly should not be polarized, such as public health (Baum, 2011; Larcinese et al., 2011; Merkley, 2019).

According to the structural approach of media effects, media audiences choose, trust, and react to media content, based on their communities and social roles (Viswanath & Emmons, 2006). Media audiences' political attitudes heavily impact partisan media bias (Gentzkow & Shapiro, 2011), aside from media ownership (Balan et al., 2011) and reporters' own political party inclination (Baron, 2006). Based on the media's target audience, some news sources may regard racial and ethnic health disparities as more newsworthy, while other sources may consider such topics lacking audience interest (Cohen et al., 2008; Lumpkins et al., 2010; Stryker et al., 2009). For instance, according to the Pew Research Center, Democrats and Democratic leaners are more likely to regard racial equality as a critical issue than Republicans and Republican leaners (Pew Research Center, 2017).

Since Americans prefer media sources that are consistent with their own partisan perspective (Pew Research Center, 2020), right-leaning media may not perceive racial/ethnic health disparities as important as left-leaning media, and thus may not cover as many related stories. This may lead to a vicious circle where conservative audiences are less likely to be exposed to health disparities news contents, relative to their liberal counterparts. As a result, conservatives were 30% less likely to be aware of racial health disparities (Booske et al., 2011).

In the current study context, left-leaning media may similarly cover more stories related to COVID-19 health disparities than right-leaning media. For instance, a nationally representative survey shows that Democrats and those who are exposed to left-leaning national news are more likely to recognize health disparities issues (Gollust et al., 2020).

To further validate the limited literature on the potential relationship between partisan media and their coverage of health disparities issues, the following hypothesis was proposed.

H1a Left-leaning newspapers are more likely than right-leaning newspapers to publish COVID-19 news stories about minority groups.

H1b Left-leaning newspapers are more likely than right-leaning newspapers to publish COVID-19 news stories about African Americans.

H1c Left-leaning newspapers are more likely than right-leaning newspapers to publish COVID-19 news stories about Hispanics or Latinos.

H1d Left-leaning newspapers are more likely than right-leaning newspapers to publish COVID-19 news stories about Asian.

H1e Left-leaning newspapers are more likely than right-leaning newspapers to publish COVID-19 news stories about Native Americans.

Health Disparities and Health Information Readability

Social groups may differ in their abilities to access, use, and act on information, which is referred to as communication inequality. Communication inequality may result from a lack of understanding of the message or capacity to act on it (Viswanath & Emmons, 2006). In health communication, limited health literacy often results in a limited understanding of health information. Health literacy is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (U.S. Department of Health and Human Services, 2010). Minority communities often have limited health literacy, which may lead to worsened health conditions, limited health knowledge, less use of preventive measures, and higher hospitalization and death rates (Institute of Medicine, 2004). The Covid-19 pandemic has also exposed the health disparities among a large percentage of racial and ethnic minorities who have inadequate access to health services, low health literacy and high rates of chronic diseases (Ronald & Morial, 2020; Zanolli, 2020).

To ensure minority communities and low-literacy readers understand health information, the U.S. National Institutes of Health (NIH) has a set of guidelines for assessing the readability of health education materials. Readability measures how difficult the text is to read and is often calculated by schooling levels (e.g., fifth-grade reading level). Lower readability indicates that the text is more difficult to understand. Lexical and syntactic features both contribute to how readable the text is (Crossley et al., 2017; Tausczik & Pennebaker, 2010). The average reading comprehension level is the seventh grade in the U.S.

The American Medical Association (AMA) and the National Institutes of Health (NIH) recommend that health information targeting patients should not exceed the sixth-grade reading level. Average U.S. adult reading skill is around the eighth-grade level (Eltorai et al., 2014). Based on the target population, health information should be two to five grades lower than their highest grade of education since reading skills tend to decline over time (NIH, 2016). When targeting minority communities and low-literacy readers, the readability of health education materials should not exceed fifth-grade reading levels (D'Alessandro et al., 2001; C. A. Lin et al., 2009; Stossel et al., 2012).

Health information constructed for lower reading levels can assist information processing and understanding (Freidman & Tanner, 2007; French & Larrabee, 1999). However, in reality, health education materials are often produced for a higher reading level. For instance, roughly 80% of cancer resources exceed 10th grade reading level (Thomson & Hoffman-Goetz, 2007) and most pediatric patient education materials are at the 12th grade reading level (D'Alessandro et al., 2001). More than 60% of online human papillomavirus (HPV) related information can only be understood by college students or graduates (Xu et al., 2019). Through the evaluation of 7891 health websites, a meta systematic review concluded that online health information in the U.S. was too difficult for most people to read (Daraz et al., 2018). These findings indicate that these health messages exceed most viewers' reading capacity and may not be helpful in promoting healthy behaviors (Walsh et al., 2008).

According to the CDC's guideline for health literacy, health professionals and the media often have a misapprehension about and hence unattainable expectations of their

target audience's reading comprehension skills and health/medical knowledge (CDC, 2009). As a result, they may create health messages that are difficult to read or contain technical and medical terminology. For instance, instead of "heart," many health messages use the medical term "cardiovascular," which is hard to understand for many people (CDC, 2009). Both the CDC and NIH recommend replacing jargon and medical terms with plain language to ensure health messages and programs are easy to comprehend (Everyday Words for Public Health Communication, 2016; NIH, 2016). For example, instead of using the term "bacteria," message designers should use "germs" or "bugs." "Contagious" should be explained as "germs can spread from one person to another" (CDC, 2016). Studies have shown that when exposed to more vocabulary choices, viewers' comprehension of health messages can improve over time (Sakai, 2013).

Limited studies have examined readability and the use of medical terminology in health news. General reviews of the news show that news articles tend to be difficult to understand and are increasingly less readable, since news articles prefer to include longer words, sentences, and more complicated grammatical structures (Dalecki et al., 2009). However, since mass media, especially newspapers, are a critical information gatekeeper in disseminating the news stories that could help prevent, contain or even eliminate infectious diseases (Tchuenche & Bauch, 2012; Xu et al., 2020), it is important to assess if existing health news coverage is effective in reaching the target audience. In particular, previous empirical studies have validated the effects of newspapers on the public's perception of and vaccination decision-making regarding other infection diseases. For example, past research found that exposure to newspapers was effective in shaping risk perception of the H1N1 virus and vaccination intention (C. A. Lin & Lagoe, 2013). Another research discovered that newspapers discussing flu vaccination shortages successfully promoted earlier vaccination (Yoo et al., 2010).

The extant literature has yet to explore whether health news published by various partisan media differ in terms of readability and the use of medical terms. In the current study context, it is reasonable to speculate that news sources with a different political leaning may perceive the newsworthiness of a topic such as health disparities differently (Cohen et al., 2008; Lumpkins et al., 2010; Stryker et al., 2009). For this reason, it is possible that partisan-leaning newspapers may cover health disparities with varying approaches that could influence the readability of their published stories. To explore these assumptions, we asked the following research questions:

RQ1 Do COVID-19 news articles published by left-leaning, least biased, and right-leaning media reflect different readability levels?

RQ2 Do COVID-19 news articles published by left-leaning, least biased, and right-leaning media contain different amounts of medical terminology?

Methods

Data Collection

Our sample consisted of news articles about COVID-19 published in national and local U.S. print and online newspapers from January 21, 2020 through June 30, 2020. The first recorded coronavirus case in the U.S. was on January 21, 2020 (First Travel-related Case of 2019 Novel Coronavirus Detected in United States, 2020). During this 6-month period, we also saw the first wave of the pandemic, which peaked in April (Akinbami et al., 2020). We first collected all new articles in Lexis-Nexis that contained any of the terms in their headlines, including "COVID", "coronavirus", "corona", or "SARS". The sample included 27,269 articles published in 66 newspapers. We then searched the partisan bias score of each newspaper obtained from the first step in the Media Bias/Fact Check (MBFC) database. Newspapers without partisan bias score were excluded from the final analysis. The final sample included a total of 24,345 articles published in 40 newspapers (Appendix A).

Measures

Partisan Newspapers

We obtained each newspaper's partisan bias score from MBFC, which is an independent outlet that calculates media sources' partisan bias based on criteria such as endorsed political ideology, one-sided versus two-sided covering, source credibility, and biased wording. MBFC categorized all the newspapers in our sample into left-leaning, least biased, and right-leaning biases. MBFC has been repeatedly used and validated in previous studies (Nørregaard et al., 2019; Stefanov et al., 2020).

Racial and Ethnic Descriptors

These included specific racial and ethnic group terms (e.g. Latino) and general group terms (e.g. Minority) (Appendix B). These terms were adapted from previous health disparities studies (Bhopal, 2004; Kim et al., 2010).

Readability

SMOG (Simple Measure of Gobbledygook) was used to assess readability (McLaughlin, 1969). SMOG predicts readability based on "the number of polysyllabic words (words with more than 3 syllables) and the number of sentences" (Zheng & Yu, 2017). It directly generates ordinal grade level of an article and calculates its readability on a continuous scale starting from grade four. Grade 13 to grade 15 is college level. Grade 16 or higher is college graduate level (McLaughlin, 1969). SMOG was the only one readability formula recommended by the NIH in its "Clear Communication" guideline to estimate the reading level of health information (NIH, 2016) and was regarded as the most consistent reading level measure (Wang et al., 2013).

Medical Terminology

was measured using the R package "healthforum." The package contained medical dictionaries from physician and medical documentation software developer as well as medical spell checker software (Hu & Kearney, 2019).

Analysis

The R (version 4.0.2) software package was utilized for all the analyses. We first calculated the number of articles with at least one racial and ethnic descriptor published by each newspaper. Then, Kruskal–Wallis test was used to compare the number of published articles that contained at least one racial and ethnic descriptor across left-leaning, right leaning, and least biased newspapers.

Finally, readability and the amount of medical terms were compared among articles published by left-leaning, least biased, and right-leaning using Kruskal–Wallis test. Benjamini–Hochberg method was used to adjust p-values for multiple comparison in post-hoc Wilcoxon rank sum test.

Results

A total of 12, 650 articles were published in left-leaning newspapers. Least biased newspapers published 4884 articles. Right-leaning newspapers published 6811 articles. Among all 24,345 news articles in our sample, 4206 (17.28%) included at least one racial and ethnic descriptor (Median = 0, Range: 0–106). H1a asked whether left-leaning media were more likely to publish COVID-19 news about general minorities than right-leaning media. Results demonstrated that partisan newspapers significantly differed in the number of articles containing at least one racial and ethnic descriptor. Specifically, left-leaning newspapers published significantly more COVID-19 related articles containing at least one racial and ethnic term than least biased newspapers. Right-leaning newspapers did not differ in the number of articles containing at least one racial and ethnic descriptor from left-leaning or least biased newspapers (Fig. 1). Detailed information can be found in Table 1. Thus, H1a was not supported.

Regarding each specific racial and ethnic group, 1985 (8.15%) news articles included at least one reference of African Americans. Partisan newspapers significantly differed in the number of articles containing at least one term referring to African Americans. Specifically, significantly more left-leaning newspapers published COVID-19 related articles containing at least one description of African Americans than least biased newspapers. Right-leaning newspapers did

Fig. 1 Number of COVID-19 news articles containing at least one racial and ethnic descriptor in partisan newspapers
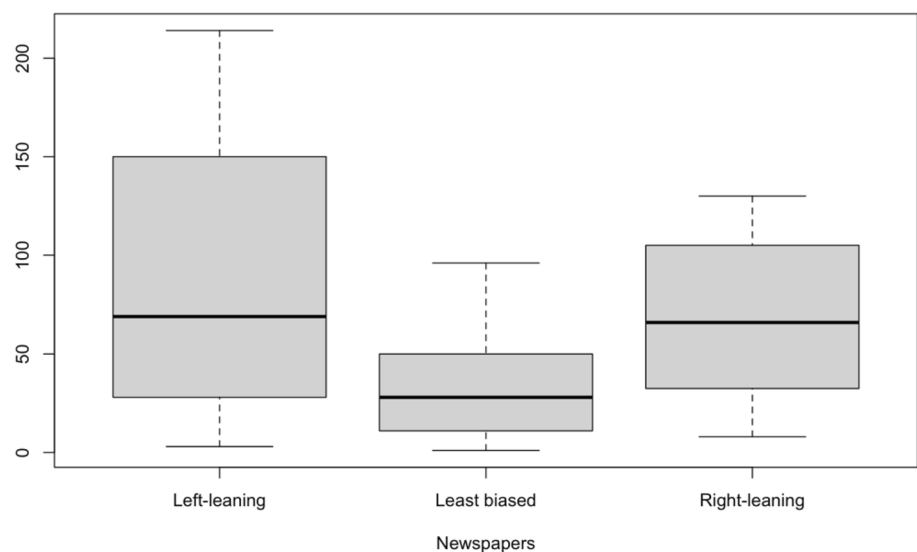
Table 1 Number of COVID-19 minority news articles published by partisan newspapers

Racial/ethnic descriptor	Articles (N=24,345) N(%)	Median of articles containing at least one racial/ethnic descriptor			Kruskal–Wallis rank sum test	Post-hoc Wilcoxon rank sum test		
		Left-leaning	Least biased	Right-leaning		Left vs. right-leaning	Left-leaning vs. least biased	Right vs. least biased
General Minorities	4206 (17.28%)	69	28	66	$\chi2=6.76$, df=2, $p=0.03$	$z=0.30$, adjusted $p=0.77$	$z=2.49$, adjusted $p=0.04$	$z=-1.89$, adjusted $p=0.09$
African American	1985 (8.15%)	39	11	24	$\chi2=6.55$, df=2, $p=0.04$	$z=0.18$, adjusted $p=0.86$	$z=2.42$, adjusted $p=0.05$	$z=-1.97$, adjusted $p=0.07$
Latino/His-panic	441 (1.81%)	8	4	8	$\chi2=4.28$, df=2, $p=0.12$	–	–	–
Asian	706 (2.90%)	6	3	6	$\chi2=3.07$, df=2, $p=0.21$	–	–	–
Native American	712 (2.92%)	13	4	15	$\chi2=5.82$, df=2, $p=0.054$	–	–	–

not differ from left-leaning or least biased newspapers. Thus, H1b was not supported.

A total of 441 (8.15%) news articles included at least one descriptor referring to Hispanics/ Latinos. Partisan newspapers did not significantly differ in the number of articles containing at least one term referring to Hispanics/ Latinos. Thus, H1c was not supported. A total of 706 (2.90%) news articles included at least one mention of Asians. Partisan newspapers did not significantly differ in the number of articles containing at least one reference of Asian. Thus, H1d was not supported. A total of 712 (2.92%) news articles included at least one term referring to Native Americans. Partisan newspapers did not significantly differ in the

number of articles containing at least one description referring to Native Americans. Thus, H1e was not supported.

RQ1 asked if COVID-19 news articles published by partisan newspapers differed in readability levels. The median readability of all COVID-19 related news articles was 14.99 (Range: 7.39–66.49). Kruskal–Wallis test revealed that news articles published in left-leaning (Median=14.9), least biased (Median=16.3), and right-leaning (Median=13.2) newspapers did not significantly differ in readability levels ($\chi^2=5.32$, df=2, $p=0.07$) (Fig. 2).

RQ2 questioned whether COVID-19 news articles published by partisan newspapers differed in the amounts of medical terms. The median number of medical terms in all

Fig. 2 Readability levels of COVID-19 news articles published by partisan newspapers
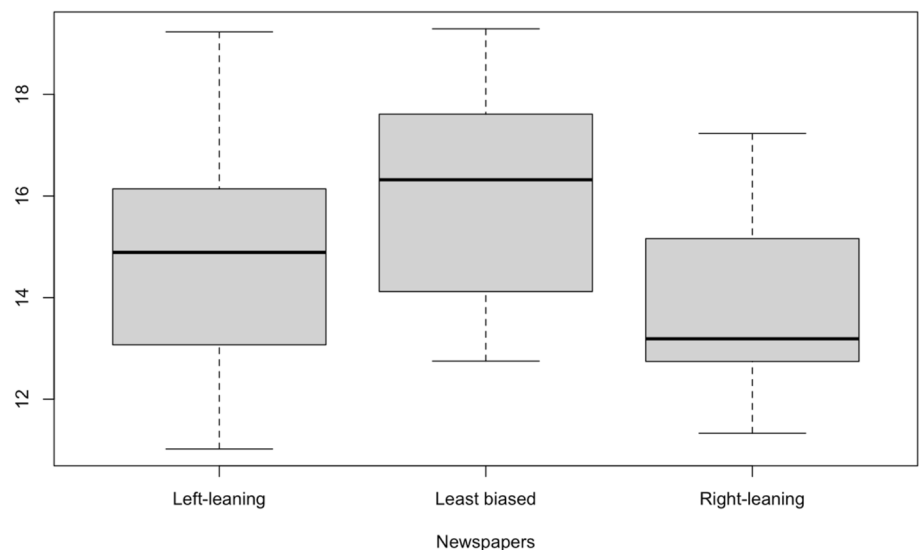
COVID-19 related news articles was 124 (Range: 0 – 4,541). Results indicated that news articles published in partisan newspapers contained a significantly different number of medical terminology ($\chi^2 = 8.12$, df $= 2$, $p = 0.02$). Specifically, articles published in left-leaning newspapers included significantly more medical terms (Median $= 129$) than articles published in right-leaning newspapers (Median $= 98$, $z = 2.71$, adjusted $p = 0.02$). Articles published in least biased newspapers did not contain a significantly different number of medical terms than articles published in left-leaning ($z = 1.88$, adjusted $p = 0.09$) or right-leaning newspapers ($z = 0.90$, adjusted $p = 0.37$) (Fig. 3).

Discussion

This study reveals that up to 17.28% of COVID-19 news articles mentioned racial and ethnic groups. Left-leaning newspapers were more likely to discuss minorities in COVID-19 news than least biased media. However, left-leaning and right-leaning newspapers did not differ in the number of articles mentioning minorities. Partisan newspapers did not differ in the number of articles describing each specific racial and ethnic group. Furthermore, the median readability of all COVID-19 related news articles across left-leaning, right-leaning and least-based newspapers was 14.99. Partisan newspapers did not differ in readability levels. Left-leaning media used significantly more medical terms than right-leaning media.

Compared to prior research findings which indicate that 0.1% to 13.6% of health news discuss racial and ethnic

health issues unrelated and prior to the COVID-19 concern (Amzel & Ghosh, 2007; Gollust et al., 2009; Rock, 2005; Taylor-Clark et al., 2007), the 17.28% of Covid-19 coverage of minorities indicates an improvement in the amount of news space given to racial minority concerns. As individuals classified as Black/African, Hispanic, Asian, and Native Americans represent 13.4%, 18.5%, 5.9% and 1.3% of the U.S. population (U.S. Census Bureau, 2019), the COVID-19 news coverage that mentioned each of these racial/ethnic group stood at 8.15%, 8.15%, 2.9% and 2.92%, respectively. This suggests that the voice of each of these groups in relation to the COVID-19 pandemic might have been underrepresented in these newspapers, except for the Native American group.

Compared the current study findings to past research results that addressed the perceived coverage of minority health issues in the news, it is clear that news attention to minority health issues is similarly lacking. For example, results from a national phone survey showed that 71% of African Americans felt that stories from general news networks (outlets not created for Black communities) catered to White audiences and only 27% believed these networks adequately covered health threats specific to Black communities (Brodie et al., 1999). Prior research also indicated that news coverage about minority health issues tended to emphasize "individual-oriented causal attributions," blaming individual behaviors and lifestyle for health problems (Niederdeppe et al., 2013).

Combining the current findings of disproportionally limited COVID-19 news coverage of racial/ethnic communities and existing community perceptions of underrepresentation

Fig. 3 Number of medical terms contained in COVID-19 news articles published by partisan newspapers
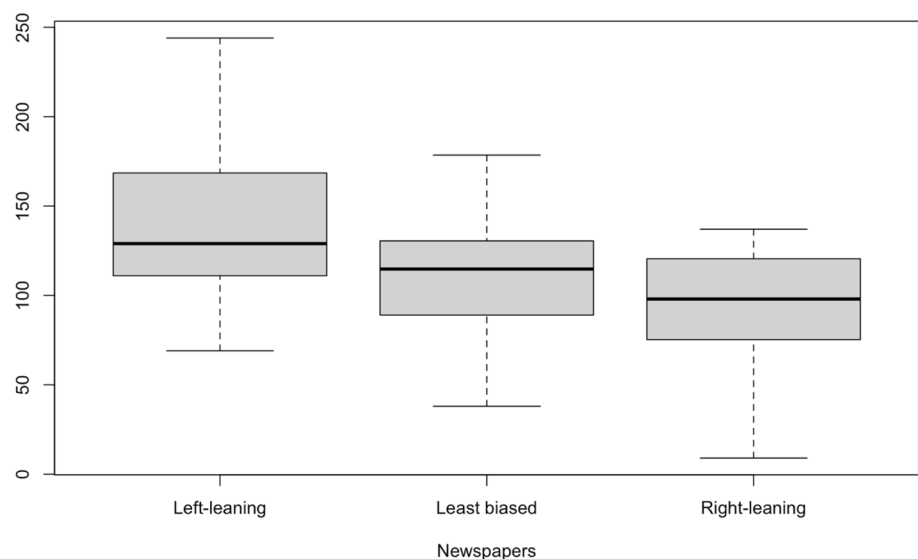
in major news media and the attribution of individual blame, it is possible that news coverage of COVID-19 will not gain a high-level of trust in these communities. A lack of trust in the news coverage then could lead to low efficacy in adopting preventive measures, including vaccine uptake (L. Lin et al., 2014), even though newspapers were found to have an influence on pandemic risk perception and vaccination intention (Lin & Lagoe, 2013). The lack of minority representation in the study sample did not differ between right- vs. left-leaning newspapers. It is possible that when the COVID-19 related stories did mention selected minority groups, the relevant discussion might have been presented to target primarily the majority White audiences who tend to be heavier consumers of mainstream newspapers (Alamo-Pastrana & Hoynes, 2020). Hence, whether the underrepresentation of minorities in health news coverage amounts is due to readership and circulation factors or the "individual-blame" related racial/ethnic bias, there appears to be a systemic under reporting of minority health issues in the news media. Future studies should further investigate this systemic problem to better understand whether newspapers and news media in general, regardless of their political leaning, provide sufficient coverage of minority health issues to avoid undermining the improvement and protection of the health status of minority communities.

Our finding also revealed that least-biased newspapers published fewer articles about racial and ethnic groups than left-leaning newspapers. It is possible that when the least-biased newspapers published news stories about COVID-19, they tended to shy away from mentioning racial and ethnic minorities to avoid appearing partisan. Prior research on this topic argues that such extraneous efforts to remain objective marginalizes journalists (and people) of color, while upholding white experiences as standard, neutral mediums for information sharing (Alamo-Pastrana & Hoynes, 2020). Additional research is needed to explore the individual and structural factors that drive the newsroom and editorial decisions on how report minority health issues which are inherently related to health disparities and have been politicized.

Turning to the results of readability of the COVID-19 news coverage, all COVID-19 news articles in the study sample exceeded the average U.S. reading comprehension level. To understand these COVID-19 stories, it would require the audience to have at least some college education. These findings suggest that national and local newspapers in the U.S. might not have taken into consideration those readers with low reading and health literacy levels, when reporting on health-related topics that involve a certain

level of science and health literacy above and beyond reading comprehension level. As a primary information source for local communities (Caburnay et al., 2008; Cohen et al., 2008; Nagler et al., 2016), local newspapers could play a critical role in developing and disseminating readable health information through their news coverage on a localized presentation of COVID-19 related infection rates, health consequences, preventive measures, vaccination needs, fatality rates and more that address the information needs of both the general, vulnerable and minority populations.

Though left- and right-leaning newspapers did not differ in the reading levels affiliated with their COVID-19 news articles, left-leaning media tended to use more medical terms than right-leaning media. Specifically, COVID-19 news articles published in left-leaning newspapers contained about 30 more medical terms on average than those published in right-leaning counterparts. It is possible that in its desire to provide science-based information to establish the credibility of the COVID-19 stories, the left-leaning newspapers chose to use more medical terms and affiliated scientific facts to describe and analyze the issues at stake than right-leaning newspapers.

Previous studies have demonstrated the importance of using medical terminology in health messages. Information seekers may depend on heuristics cues to make decisions quickly. They may evaluate the quality and credibility of a message based on superficial factors, such as terminology, article length, etc. (Hilligoss & Rieh, 2008; Metzger & Flanagin, 2013; Sundar, 2008). Most viewers skip commonly used words but focus on unfamiliar and difficult terms (Rayner et al., 2011). Health information with more technical terms is regarded as more credible and professional and thus are more engaging and convincing (Kao, 2013; Xu, 2020).

To circumvent the challenge of using necessary but unfamiliar medical terms in presenting health news coverage to their readers, it could be useful for journalists to provide a description to explain those terms and their related medical facts. In particular, this description needs to be written in a simple, concise and straightforward style to enable an individual with a fifth-grade reading level to easily grasp the meaning of the description. Future work can assess the effectiveness of utilizing different combinations of medical terminology and reader-friendly explanations to communicate science-based information, in conjunction with eliciting heuristic responses to such information to facilitate health knowledge gains.

The fact that the left- and right-leaning newspapers did not differ significantly in their mention of racial/ethnic minorities or the readability level in their published COVID-19 stories suggests that, these newspapers had performed their journalistic function – as evaluated with these two criteria – without injecting a statistically discernible level of partisanship. In sum, more research is needed to assess how health-related news is presented to the general public and the racial/ethnic minorities (including the readability level) to reduce the health information disparities within and between each constituency.

Such research will help us gain a better understanding of the multiple social and economic implications associated with the influence of science journalism. These implications could include avoiding potential failures in informing the public (especially the racial/ethnic minorities) essential scientific facts about disease prevention and increasing public trust in health news coverage. By performing both of these two important journalistic functions well to help improve or safeguard public health, the newspaper industry could also help enhance its ability in maintaining reader loyalty and circulation level.

Limitations and Conclusion

Several study limitations should be noted here. First, the focus of this research was to examine whether COVID-19 health concerns associated with racial and ethnic minorities gained news attention in the newspapers and whether such news attention differed among newspapers with different political leaning. As this study only examined print and online newspapers, results may not be generalizable to other media sources such as social media and television news. Furthermore, the Lexis-Nexis database does not include all newspapers published in the U.S. This means that our sample may not be fully reflective of the entire scope of left-leaning, right-leaning, or the least-biased newspapers in the U.S. across different market sizes and geographic regions. Finally, this study only explored COVID-19 news articles published in the early stages of the pandemic and did not fully reflect the entire scope of U.S. newspapers covering health disparities during the pandemic. It is interesting to examine whether left-leaning, right-leaning, or the least-biased newspapers pay more attention to minority health as the pandemic evolves and whether they change their strategies to report health disparities. It is possible that one group of partisan media may increase their coverage of minority health more drastically compared to other partisan media as the pandemic continues and thus may result in a significant difference in the rate at which minority health was discussed in related content. Future studies can also benefit from comparing COVID-19 news articles across different phases of the pandemic.

Appendix A

See Table 2.

Table 2 Newspapers included in this study

Anchorage daily news
Arizona Capitol Times
Bangor Daily News
Daily Herald
Daily News
Daily Record
Dayton Daily News
Deseret Morning News
LNP
Los Angeles Times
New York Observer
Orange County Register
Pittsburgh Post-Gazette
Providence Journal
Richmond Times Dispatch
South Bend Tribune
Spokesman Review
St. Louis Post-Dispatch
Star Tribune
Tampa Bay Times
The Atlanta Journal-Constitution
The Baltimore Sun
The Bismarck Tribune
The Daily News of Los Angeles
The Daily Oklahoman
The Hartford Courant
The Hill
The Lebanon Daily News
The Morning Call
The New York Post
The New York Times
The Pantagraph
The Philadelphia Inquirer
The Salt Lake Tribune
The San Diego Union-Tribune
The Santa Fe New Mexican
The Washington Post
Tribune-Review
Wall Street Journal
Wisconsin State Journal

Appendix B

See Table 3.

Table 3 Racial/ethnic minority terms

Native
Indigenous
Asian
Black
African
Hispanic
Latino
Latinx
Ethnicity
Ethnic
Minority
Ethnocentrism
Racism
Race
Racial

Declarations

Conflict of interest The authors declare that there are no conflicts of interest.

Informed consent No human subject was involved in this study.

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