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Social media discussions about long-term care and the COVID-19 pandemic

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ARTICLE INFO

Keywords:

Older adults
Attitudes
Quality of care
Dementia
Twitter

ABSTRACT

With the proliferation of social media networks, online discussions can serve as a microcosm of the greater public opinion about key issues that affect society as a whole. Online discussions have been catalyzed by the COVID-19 pandemic and have magnified challenges experienced by older adults, health care professionals, and caregivers of long-term care (LTC) residents. Our main goal was to examine how online discussions and public perceptions about LTC practices have been impacted by the COVID-19 pandemic. We conducted a content analysis of Twitter posts about LTC to understand the nature of social media discussions regarding LTC practices prior to (March to June 2019) and following the declaration of the COVID-19 pandemic (March to June 2020). We found that a much greater number of Twitter posts about LTC was shared during the COVID-19 period than in the year prior. Multiple themes emerged from the data including highlighting concerns about LTC, providing information about LTC, and interventions and ideas for improving LTC conditions. The proportion of posts linked to several of these themes changed as a function of the pandemic. Unsurprisingly, one major new issue that emerged in 2020 is that users began discussing the shortcomings of infection control during the pandemic. Our findings suggest that increased public concern offers momentum for embarking on necessary changes to improve conditions in LTC.

Introduction

Over 1.3 million older adults live in long-term care (LTC) facilities in the United States (National Center for Health Statistics, 2021) and over 400,000 in Canada (Statistics Canada, 2019a; Statistics Canada, 2019b). Concerns about quality of care and deficiencies in LTC environments have been documented and discussed in the literature (Castle, Wagner, Ferguson, & Handler, 2010; Cooper, Selwood, & Livingston, 2008; Fitzpatrick, 2002; Gallant et al., 2020; Hussein & Manthorpe, 2005; Post et al., 2010). Some of these issues center around the abuse and neglect experienced by older adults (Cooper et al., 2008), as well as the cost of LTC facilities as it relates to quality of care (Carey, Zhao, Snow, & Hartmann, 2018). Inadequate care experienced by LTC residents has also been discussed. For instance, despite the high prevalence of pain among LTC residents, pain tends to be under-assessed and undertreated in this population (Gallant et al., 2020; Horgas & Miller, 2008; Lautenbacher, 2014; Morrison & Siu, 2000; Reynolds, Hanson, DeVellis, Henderson, & Steinhauser, 2008). In addition, LTC staff report high occupational stress which is associated with greater burnout, burden,

and exhaustion (Albers, Van den Block, & Vander Stichele, 2014; Woodhead, Northrop, & Edelstein, 2016). Beyond the scientific literature, quality of LTC has recently been at the forefront of public opinion and policy discussions as reflected in frequent mass media stories (Coletta, 2020; Fields & Hudetz, 2020; McKenna, 2020; Stevenson & Shingler, 2020).

The Coronavirus Disease-2019 (COVID-19) pandemic has had a devastating impact on LTC residents. One of the first documented COVID-19 outbreaks in an LTC facility in King County, Washington involved 167 people (McMichael et al., 2020). By June 2020, LTC residents accounted for 44% of COVID-19 deaths in the United States, and racial/geographic disparities were identified in COVID-19 infection and mortality rates in LTC homes (Gorges & Konetzka, 2021; Li, Cen, Cai, & Temkin-Greener, 2020; Travers et al., 2021). People 80 years and older represented 20.3% of COVID-19 related deaths in China and 52.3% of deaths in Italy in the first few months of the pandemic (Onder, Rezza, & Brusaferro, 2020). In Canada, LTC deaths among staff and residents accounted for two-thirds of all COVID-19 deaths between March 1, 2020, and February 15, 2021 (Canadian Institute for Health

Abbreviations: LTC, Long-Term Care; COVID-19, Coronavirus Disease-2019; SPSS, Statistical Package for the Social Sciences.

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<https://doi.org/10.1016/j.jaging.2022.101076>

Received 16 November 2021; Received in revised form 28 September 2022; Accepted 1 October 2022

Available online 19 October 2022

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Information, 2021). These numbers underscore the detrimental effects of COVID-19 in the older adult population. Lai et al. (2020) cautioned against inaction for the threat of COVID-19 to LTC, citing that residents with multiple comorbidities and limitations in resources for infection control make this population more susceptible to the virus and outbreaks.

A publicized report, that followed the Canadian Armed Forces deployment to several LTC facilities in order to help address resource deficiencies during the pandemic, described numerous problems. These included, but were not limited to, “poor palliative care standards”, a “general culture of fear to use supplies because they cost money”, expired medication, physicians not present, “aggressively repositioning residents,” and “leaving food in a resident’s mouth while they were sleeping” (see Taylor, 2020). These sentiments also permeated prominent media discourse. The media discourse surrounding the pandemic highlighted deficiencies in LTC and amplified attention to challenges and issues experienced by older persons, health care professionals, and caregivers/family members (Coletta, 2020; Fields & Hudetz, 2020; McKenna, 2020; Stevenson & Shingler, 2020). However, there has been no systematic comparison of public discussions about LTC facilities prior to and immediately following the declaration of the COVID-19 pandemic. Therefore, the current study aims to identify the magnitude of discussions and explore views about LTC taking place in social media as a function of the COVID-19 pandemic.

Social media user-generated content can reveal a breadth of information and represents a unique approach to gauging society’s responses and attention towards a wide variety of topics (Chew & Eysenbach, 2010; Ripberger, Jenkins-Smith, Silva, Carlson, & Henderson, 2014). Social media data have been examined to gauge public perception and knowledge about various topics, including public discussions following a significant event (Cavazos-Rehg et al., 2016; Cavazos-Rehg et al., 2016; Krauss, Gruzca, Bierut, & Cavazos-Rehg, 2017). Twitter is a social media platform that has gained tremendous traction with its over 152 million daily active users (Lunden, 2020) and a growing interest among the scientific community in using Twitter as a way of detecting real-time incidents, mobilizing knowledge, and guiding crisis responses (Abel, Hauff, Houben, Stronkman, & Tao, 2012; Sakaki, Okazaki, & Matsuo, 2010; Terpstra, Stronkman, de Vries, & Paradies, 2012). Admittedly, most Twitter users represent a relatively younger adult demographic; however, the platform is increasingly being used by older adults (Bell et al., 2013; Hutto et al., 2015; Sloan, Morgan, Burnap, & Williams, 2015).

Qualitative analyses of Twitter posts have been conducted to understand public discussions about various health-related topics, such as concussion (Sullivan et al., 2012), health-related posts by health care professionals (Lee, DeCamp, Dredze, Chisolm, & Berger, 2014), Hookah use (Krauss et al., 2017), marijuana and alcohol use (Cavazos-Rehg, Krauss, et al., 2016; Krauss et al., 2017), and depression (Cavazos-Rehg, Sowles, et al., 2016). Chew and Eysenbach (2010), for example, conducted a content analysis of Twitter posts about the H1N1 outbreak to gain a comprehensive understanding of public concern and knowledge in order to inform public health measures.

More recently, Jimenez-Sotomayor, Gomez-Moreno, and Soto-Perez-de-Celis (2020) used Twitter data to study public perceptions of older adults during the COVID-19 pandemic and found that approximately 21% of the posts about older adults had ageist connotations. While this study focused on public perception of older adults in general, it did not examine perceptions specific to LTC and how the quality of care in LTC facilities is discussed on social media. Other researchers have investigated public perceptions about people living with dementia based on Twitter posts (e.g., Cheng, Liu, & Woo, 2018; Robillard, Johnson, Hennessey, Beattie, & Illes, 2013). Bacsu et al. (2022), for example, identified Twitter post themes relating to misinformation, the perpetuation of ageist beliefs, as well as challenging the stigma against dementia during the pandemic.

The goal of the current study is to examine how social media

dialogue and public perceptions about LTC practices and residents have been impacted by the COVID-19 pandemic. We used a mixed-methods approach to address the following two research questions:

- 1) What is the nature of discussions and prevalent concerns about LTC facilities following the declaration of the COVID-19 pandemic compared to the prior year?
- 2) Was there an increase in social media discussions about LTC facilities following the declaration of the COVID-19 pandemic?

To address the first question, we employed a conventional qualitative content analysis to explore the discussions about LTC facilities during the periods of interest. To address the second question, we compared the number of posts on Twitter about LTC from March to June in 2019 and 2020. We anticipated a marked increase in the number of LTC-related social media posts following the start of the COVID-19 pandemic as compared to a control period from the previous year. We also compared the overall proportion of tweets within each identified social media theme between the two periods. The findings can help inform LTC policymakers about public sentiment towards current LTC practices and the need to improve such practices and policies.

Materials and methods

Keyhole software

Keyhole (2019) is real-time social media monitoring software that includes a historical data collection feature that allows users to obtain archival Twitter data associated with hashtags or keywords over a specified time frame. The historical data collection feature allows users to input specific keywords, estimate the number of posts with the keywords, and purchase the collected archival data for the given periods. Keyhole has been used in other investigations to collect Twitter data (Castillo, Hadjistavropoulos, & Brachaniec, 2021; Del Vecchio, Mele, Passiante, Vrontis, & Fanuli, 2020; Nolte et al., 2021; O’Connor, 2017).

Data collection

To estimate the number of posts made about LTC in 2019 and 2020, we collected Twitter data from the few days prior to the World Health Organization’s declaration of the COVID-19 pandemic on March 11 (World Health Organization, 2020) to the end of June (i.e., March 1 to June 30, 2020; 122 days) and a comparison period comprising the corresponding 2019 dates (March 1 to June 30, 2019). We used a Boolean search of “long-term care” OR “nursing home” OR “LTC” on Keyhole (2019) to retrospectively estimate the number of total and weekly tweets shared in 2019 and 2020 about LTC facilities and practices. There was an estimated total of 1.17 million Twitter posts (also known as “tweets”) that were made in the 2019 period and approximately 5.27 million tweets during the 2020 period that met our search criteria. Due to the large amounts of posts identified in our search, we randomly selected dates for further sampling of Twitter data.

Our collection and sampling strategy for the qualitative content analysis was as follows: we randomly sampled 20% (24 days) of the 122 days (March 1 to June 30) for our study using a random number generator to select the days (Haahr, 2010). We then collected all “top” tweets up to a total of 100 posts during the dates that we sampled. Top tweets are based on Twitter’s algorithm that sorts the tweets based on engagement, relevancy, and traction (Sehl, 2020; Twitter, 2021). User identifying information (e.g., name, country) was not collected as such information is not always available. However, we chose to evaluate “top tweets” to limit suspected bots in our analysis and focus on pertinent posts gaining traction. For certain dates (especially prior to the pandemic), there were <100 publicly available “top” tweets that met our criteria (i.e., tweets containing “long-term care” OR “nursing home” OR “LTC”). A catalogue of all the tweets identified in the study was then

collated in an Excel spreadsheet. Re-tweet posts (i.e., non-original tweets or containing “RT”) were omitted from the sample and only tweets in the English language were considered. A summary of our data collection strategy is outlined in Fig. 1. We used the same method for the comparison period of March 1, 2019 to June 30, 2019. Out of a total of over 6,000,000 tweets (i.e., estimated using Keyhole) about LTC in 2019 and 2020, our sampling strategy identified 3415 tweets (i.e., 1569 in the before COVID-19 period and 1846 during the COVID-19 period). The goal of our random sampling strategy was to create a representative sample of the leading tweets during the two time periods.

Analysis

Mixed methods content analysis

We used a conventional qualitative content analysis approach (Hsieh & Shannon, 2005) to create a descriptive list of both tweet types shared (e.g., opinion, information) and the topics that were being discussed in relation to LTC on Twitter during the two time periods. This approach allowed us to inductively explore public opinion on these issues as well as to produce a frequency count of tweet types and topics (Vaismoradi, Turunen, & Bondas, 2013). All data were imported into NVivo (Version 12) (QSR International, 2020) software which was used to facilitate the content analysis. Identifying information was removed from tweets

presented in the analysis to maximize the anonymity of users. Additionally, considerations were made about which tweets to include as representative quotes in Tables 1-3 of this manuscript to ensure personal information (e.g., user’s name or names identified in the tweet) that could negatively affect users was not included (Hunter et al., 2018).

To create our initial codebook, two coders engaged in a primary coding stage to open code the data and inductively identify categories (Vaismoradi, Jones, Turunen, & Snelgrove, 2016). Each coder was assigned two randomly selected dates (i.e., approximately 5 % of the data) from each year based on the total collected sample (see Fig. 1 for all the dates examined in the analysis) to independently code and identify categories. During the open coding stage, tweets were coded by meaning units which were defined as any component/sentence in the tweet that contained a unified content (i.e., discussing the same topic). Each tweet was coded in two ways: first, to identify the tweet type; and second, to identify the topics in each tweet. Some tweets contained more than one meaning unit for each coding question and could therefore be assigned to more than one category/theme. For this reason, the total proportion of themes in tables may be >100%.

After the open coding, the coders discussed and came to agreement on the identified categories. They then began grouping the categories into larger descriptive themes (Vaismoradi et al., 2016). For instance, categories such as “lack of resources in LTC” and “staff shortages” were

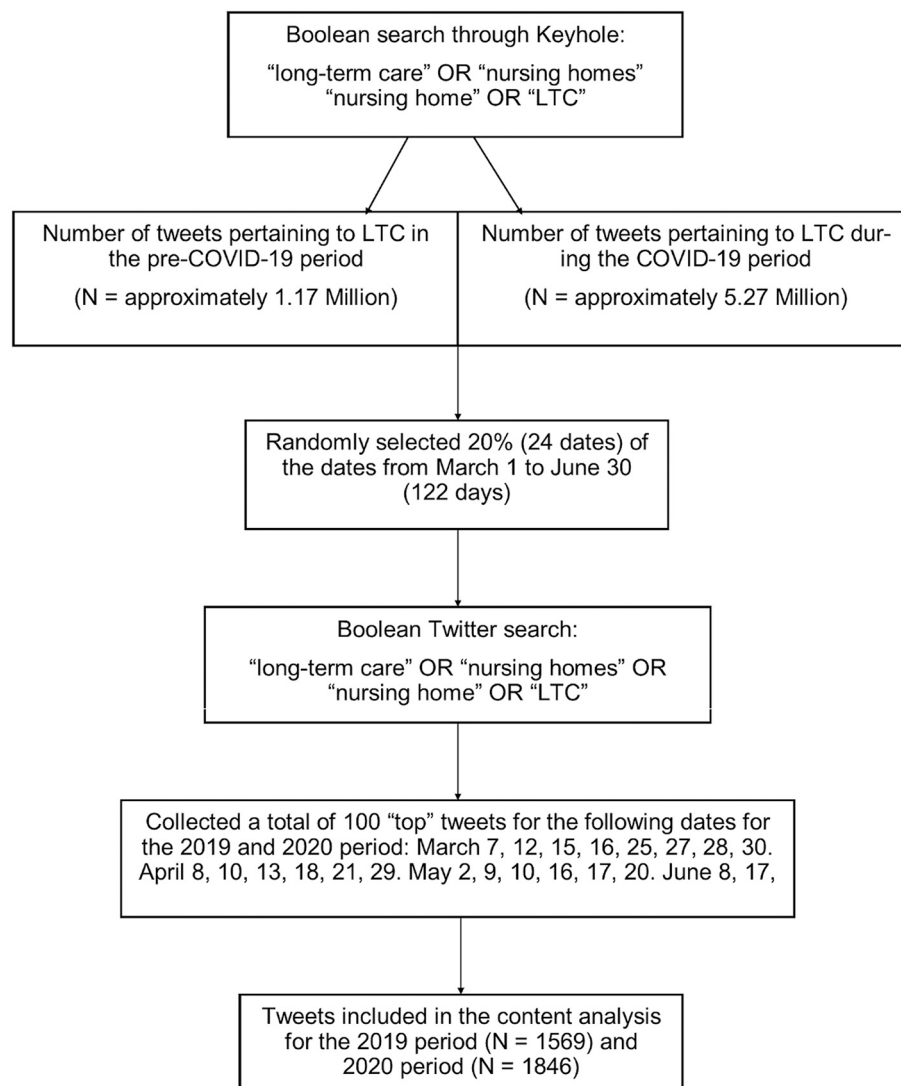


Fig. 1. Data collection strategy.

Table 1
Type of tweets shared about LTC practices.

Type	Before COVID-19 Example	During COVID-19 Example
Information, Resources and News Stories	“Entering long-term care can create difficult choices and challenges for both seniors and their families. https://t.co/NxZ9Cvrl0?amp=1 ”	“40 dead in coronavirus outbreak at long-term care facility in Henrico County, Virginia”
Opinion or Commentary	“As veterans age, the majority of this population will need long-term care and support provided by nursing home services. https://t.co/Od2iSBTtp?amp=1 ” “We say NO WAY & we should in fact reform & expand our health system into a #SinglePayer #MedicareForAll system!” “It’s unfortunate that MA is named one of the worst states for Medicaid reimbursement for nursing homes still using 2007 base year costs?”	“COVID-19 Patients Given Unproven Drug in Texas Nursing Home, Garnering Criticism https://t.co/lStFcSsTm0?amp=1 ” “It is now apparent that the provincial governments of Québec & Ontario have failed seniors, disabled adults & the staff in private & public long-term care & retirement homes during the #covid19Canada pandemic.” “I’m not surprised at how devastating #COVID19 is for people living in long term care.” “Made my first COVID-19 obit calls yesterday. My first cry since this all began. The guy was about my age. Lived in a nursing home” “My 95-year-old dad making a video call for the first time. His new communication method from his nursing home in lockdown.”
Personal Experiences	“A week ago, today I was leaving the nursing home and I just told my nanny I loved her, today we plan her funeral. Weird how some things work like that.” “They’re moving mom to a nursing home today”	There were no tweets identified as clearly related to advertisement or promotion during this period.
Advertisement or Promotion	“A tale of 2 products: Dealing with long-term care and dementia http://on.forbes.com/6018E9xkQ #paid @Impact_Partner” “Yes, long term care scares me even more. I don’t want to be a burden to the kids. #ProtectYourRetirement #Prudential #ad”	

Note. Categories are listed according to frequency.

grouped under a theme that was labelled “systemic issues in LTC”. As another example, categories such as “proposed policy changes” and “treatments” were grouped under a theme which was called “treatment, innovations, and ideas for improving conditions in LTC facilities” Once a list of themes was agreed upon, each coder was assigned two more randomly selected dates of tweets (i.e., approximately 5 % of the data) and they applied the new codebook to ensure saturation of themes had been met. The coders met again to refine the themes. Finally, the codebook was applied to the remaining data. The results section presents the themes identified in the analysis including a description of the categories within each theme.

To help further establish trustworthiness of the coding, inter-coder reliability was calculated using a percent agreement approach established by (Campbell, Quincy, Osserman, & Pedersen, 2013). To accomplish this, a randomly selected 20% of the textual data was independently coded by both coders and, at the time of coding, the coders were blind as to which data would be subjected to the reliability

Table 2
Prevalent themes based on tweets made before and during the COVID-19 pandemic.

Theme	Before COVID-19	During COVID-19
Highlighting systemic issues in LTC	“Staff and residents in long-term care homes deserve better.”	“I hope all Americans understand that we will need to revamp our nursing home and long-term care services once we get beyond COVID-19.”
Mishandling of the COVID-19 pandemic		“The admin’s consistent rollback of rules that protect patients grows more unconscionable by the day.”
Reports of deaths and outbreaks	“All my “grandparent” wanted to do was watch TV. I was pumped to go to the home in the fall but found out my Tv-loving “grand” has died. No more mid-day Tv. #DOBservation	“#COVID19 update for #NM: 103 new cases bring state total to 2072. Total #deaths at 65 with 7 additional today”
Reports of government actions in relation to LTC facilities	“Washington becomes first state to approve publicly funded long-term care http://interc.pt/2iYbRwH ”	“Coronavirus Update: Quebec orders public inquiry into deaths at long-term care facilities http://dlvr.it/RyRhZj ”
Providing or seeking information about LTC facilities	“Have you seen this great long-term care staffing resource? Care for The Aging is growing rapidly, and we are excited that so many states are participating”	“An updated list of long-term care facilities with active COVID-19 outbreaks is now on our website”
Treatment, innovations and ideas for improving conditions in LTC facilities	“Interventions for preventing delirium in older people in institutional long-term care (LTC) https://buff.ly/2IT69gz ”	“There will be an additional \$10 million invested for PPE and testing at nursing homes/ long term care facilities”
Positive LTC experiences and praise for LTC workers and organizations	“It started with 11-year-old Ruby Chitsey’s simple question to nursing home residents: “If you could have any three things, what would they be?” “Now, it’s turned into a national movement.”	“Good news! Only 26 active cases remaining in long-term care facilities.”
Stigmatizing statements about older adults in LTC facilities	“Honestly, we just need to put all these old people running the government into a bunch of nursing homes. They’ve had a good run but it’s time for y’all to go”	“Here is Minnesota. 113 out of 160 deaths were related to long term care facilities. That means we have the entire state shut down for 47 deaths in the general population, which is 5.7 million people. The entire state shut down because less than 0.0001% of our population died”
Topics not related to LTC practices	“Struggling to explain to my residents at the nursing home I work at why they should appreciate my advanced posting skills on Twitter”	“Lowkey want to finish up in the nursing home and study medicine”

Note. LTC = long-term care.

analysis. To calculate percent agreement, the total number of agreements was divided by the total number of independently coded pieces of data (agreements and disagreements). A rate of 83% agreement between the independent coders was established. After the coding was finalized for both periods, chi-square analyses were then undertaken to compare the proportion of the type of tweets and themes identified within the pre-COVID-19 and COVID-19 periods using SPSS (Version 23).

Table 3
Issues raised in relation to LTC facilities and practices broken down from big theme *Highlighting Systemic issues in LTC*.

Theme	Before COVID-19		During COVID-19	
	%	Example	%	Example
General concerns	26	“When someone in the family needs long-term care, the system is complicated, confusing, and broken for families and caregivers.”	55	Here's another gap in the safety net coronavirus is exposing: Our lousy system for long-term care https://t.co/FYUa8GCRsX?amp=1
Resource limitations and funding	27	“More nursing homes will close if nothing is done to stabilize our industry. Please combine the proposed house and senate budget and #SaveOurSeniors. The conference committee has the power!”	14	“Fully fund all long-term care homes and seniors' homes! A society is judged how they treat the most vulnerable, Canada needs to do better. #CanadaFirstConvoy”
Staffing shortages and inadequate compensation	11	“Nursing homes medicate residents because not enough staff, royal commission hears” “Nursing homes short 232 staff https://bddy.me/2ZRwCAk ”	14	“Exactly, here in Ontario they have now realized how important the workers in long term care facilities are, hopefully this will make people and governments take notice and adjust wages etc. for that industry.”
Abuse and neglect	21	“1 in 6 nursing home residents are victims of abuse or neglect every year, most go unreported.”	8	“Government go to disinfect nursing homes & find residents have been left to fend for themselves & many found dead in their beds. Staff found out residents had #COVID-19 & abandoned them without telling anyone I hope they get what they deserve.”
Cost of LTC facilities	16	“For-profit long-term care in this country is a nightmare of cruelty and predatory nonsense and its very existence nearly completely erodes what little can be done through a public option.”	10	“Like nursing homes, aged care facilities and other key welfare providers, they are run for profit. As a business. Given the exorbitant fees and profits connected to these organizations, let them fail if their business model does. Then resume license and return to Government owned”

Note. LTC = long-term care. Percentage reflects the proportion of meaning units with the given theme. Tweets were coded according to meaning units; therefore, a tweet may be coded into more than one theme.

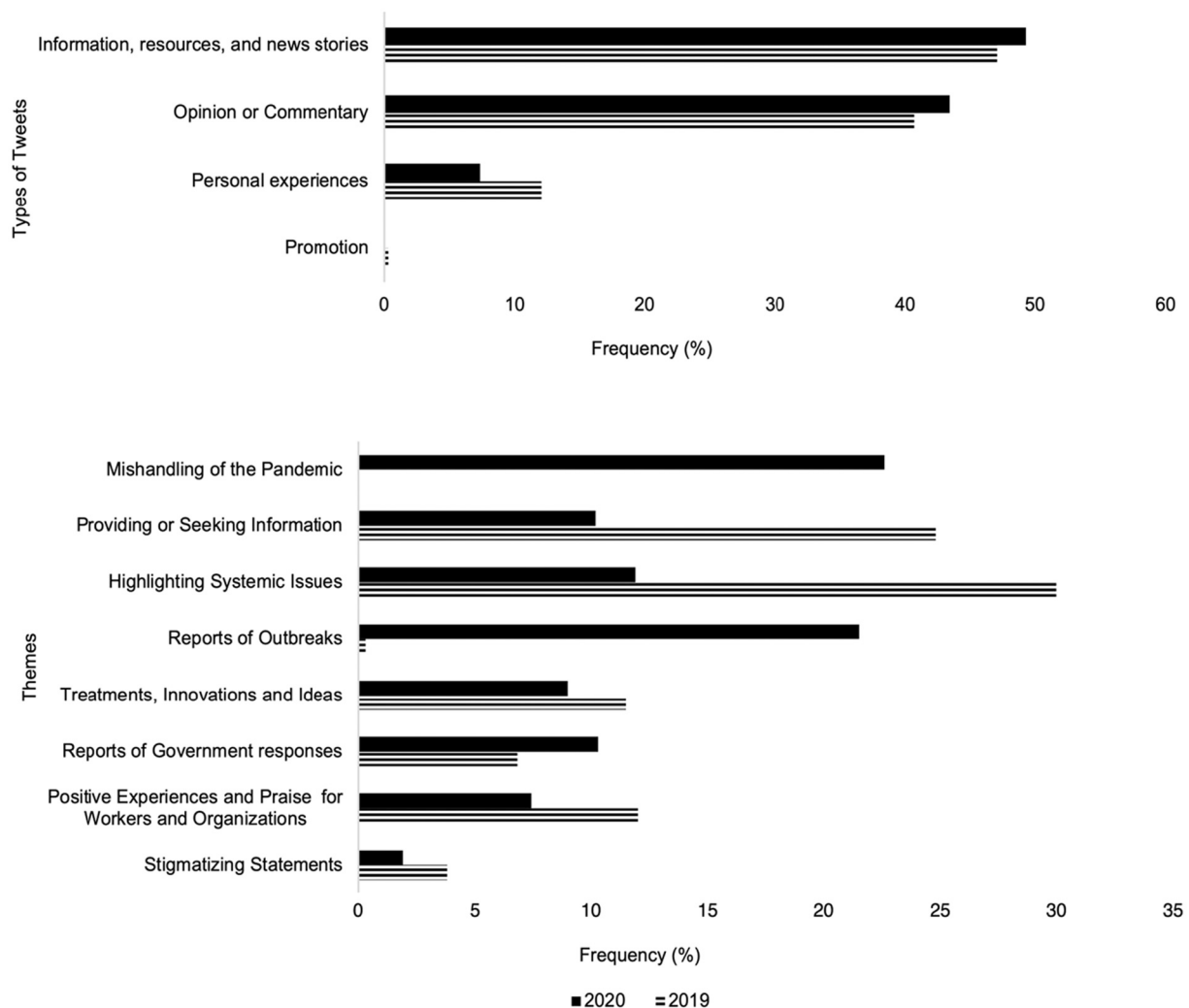


Fig. 2. Proportion of the type of tweets and prevalent themes shared about long-term care practices by year. Percentage reflects the proportion of meaning units with the given theme based on the sample analyzed. Tweets were coded according to meaning units; therefore, a tweet may be coded into more than one theme.

Results

During the pre-COVID period (i.e., March 1 to Jun 30, 2019), there were approximately 1.17 million tweets posted about LTC facilities and a dramatically higher 5.27 million tweets during the COVID-19 period (i.e., March 1 to Jun 30, 2020). A graphical representation of the number of tweets estimated by Keyhole historical data and statistical information has been included as Supplementary Material.

Type of tweets

Four broad categories of types of tweets were identified from the data: 1) information, resources, and news stories; 2) opinion or commentary; 3) personal experiences; and 4) advertisement or promotion (see Table 1 for examples of the categories identified). Chi-square analyses demonstrated that there were significant differences among the proportion of tweet types shared within each year: pre-COVID-19, $\chi^2(3) = 995.42$, $p < 0.01$, and COVID-19, $\chi^2(2) = 645.96$, $p < 0.01$ (Fig. 2 shows these differences). Examining the figure in 2019, the dominant type of tweets shared were information, resources/news stories and opinion or commentary. These two themes had similar frequencies in 2020: information, resources, and news stories and opinion or commentary (see Fig. 2). The information, resources, and news stories tweets contained details about LTC facilities (e.g., reports of issues experienced in LTC, number of COVID-19 cases, events, resources) and news stories about LTC (e.g., COVID-19 related news reports). In addition, any tweet that contained a link (e.g., links to a resource or news stories) was coded in this category. The second most frequent category was opinion or commentary. The meaning units coded in this category expressed an opinion about events related to LTC and affiliated officials, workers, and organizations (see Table 1). The third category involved tweets relaying personal experiences. The meaning units within this category contained direct experiences (e.g., health professional, caregiver, resident, researcher) or relayed experiences of a relative (e.g., family member, or friend in LTC) in LTC. (see Table 1). A small proportion of tweets contained details promoting a product or service relating to LTC. The meaning units within this category all included the hashtags #ad or #promotion (Table 1).

Prevalent themes before and during the COVID-19 pandemic

When analyzing the content of each meaning unit, nine themes were identified in both periods and included: 1) highlighting systemic issues in LTC; 2) reports of deaths and outbreaks; 3) providing or seeking information about LTC facilities; 4) treatment, innovations and ideas for improving conditions in LTC; 5) reports of government actions in relation to LTC; 6) positive LTC experiences and praise for LTC workers and organizations; 7) stigmatizing statements about older adults in LTC; and 8) topics not related to LTC practices. A new theme, related to 9) the mishandling of the pandemic, was identified in 2020 but not in 2019. A summary of the themes, proportion of meaning units by a given theme, and examples of meaning units that fell under each of these categories are outlined in Table 2 and Fig. 2.

Chi-square analyses showed significant differences in the proportions of themes within each year: pre-COVID-19, $\chi^2(8) = 1095.80$, $p < 0.01$ and COVID-19, $\chi^2(9) = 959.29$, $p < 0.01$, periods. Examining the figure in 2019 (see Fig. 2), the most prevalent themes were highlighting systemic issues in LTC and providing or seeking information. These two themes reduced in frequency by approximately two-thirds in 2020 and instead reports of outbreaks and sentiments about the mishandling of the pandemic became more prevalent but not substantially more frequent than other issues.

Highlighting Systemic Issues. During both time periods, highlighting systemic issues about LTC facilities was one of the most frequent themes that Twitter users discussed. In 2019, it was the most frequent theme and in 2020 it was the third most frequent theme. This broad theme

encompasses diverse issues related to LTC practices (see Table 2 and Table 3 for sub-categories and examples of meaning units coded under this theme). The meaning units that were coded in this theme included criticisms of government officials and private LTC facilities and discussed the ramifications of certain policies surrounding budget cuts, facility closures, understaffing, and abuse (see Table 3). Moreover, most of the meaning units coded under this theme were accompanied by calls for action to improve conditions. In both 2019 and 2020, tweets included discussion of systemic issues related to general LTC concerns, resource limitations and funding, staffing shortages and inadequate staff compensation, abuse and neglect, and the cost of LTC. For example, a tweet in 2019 about staff shortages states: "Texas nursing homes struggle with one of the highest annual staff turnover rates in the country making it difficult, if not impossible, to consistently provide the level of care our loved ones deserve." In 2020, however, Twitter users often discussed these issues within the context of the COVID-19 pandemic. For example: "The outbreaks have highlighted problems in the state's nursing home industry: Corporate chains with complex ownership structures, overworked and underpaid employees and a mixed record of complying with infection control requirements." Moreover, discussions highlighted that the pandemic revealed pre-existing issues in LTC facilities. For instance, one Twitter user expressed, "before covid 19 no one cared about long term care facilities or nursing homes — the workers there are overworked, underpaid and it's the patients who suffer! One registered nurse for over 15 patients and few assistants to clean over 30 patients." Evidently, while both periods discussed systemic issues in LTC, discussions in 2020 about prevailing issues in LTC facilities were raised in reference to the COVID-19 pandemic. Additional examples of tweets highlighting systemic issues can be found in Tables 2 and 3.

Mishandling of the Pandemic. During the 2020 period, the most frequent topic that Twitter users discussed was government officials' mishandling of the COVID-19 pandemic in LTC facilities. Users were concerned about government transparency and how information related to COVID-19 in care homes was being reported (e.g., "Coronavirus is spreading in Texas nursing homes. But the state won't share the details"). In addition, users also expressed concerns about policies that did not mitigate transmission of COVID-19 in LTC facilities (e.g., "State has mandated that nursing homes in NY take infected patients. I've read the memo. This is a fatal hazard to healthcare workers & most defenseless population in the state"). Other issues that were discussed varied and included inadequate testing, urging for transparency in reporting cases and outbreaks in LTC, and inadequate supply of proper protective equipment for health care providers and residents in LTC facilities.

Reports of Deaths and Outbreaks. Reports of deaths as well as COVID-19 outbreaks and cases represent the second most prevalent theme in 2020. For example, one tweet states: "40 dead in coronavirus outbreak at long-term care facility in Henrico County, Virginia." Table 2 contains additional examples. The meaning units within this theme highlighted the devastating impact of COVID-19 in LTC facilities. A majority of the tweets focused on news reports of outbreaks in LTC facilities, and a portion were personal reports of family members affected by COVID-19. Only a small proportion of meaning units discussed deaths in LTC homes in 2019. For instance, one tweet reads, "It's the worst feeling working in long term care, walking into work at 6am, and hearing that one of your favorite residents passed away." For more examples of tweets in this category during 2019, see Table 2.

Providing or Seeking Information about LTC. The second most frequent theme identified in the 2019 data was meaning units providing or seeking information about LTC. For instance, information was provided about resources for caregivers and family members and on the quality of care provided by certain LTC facilities. One tweet state, "Have you seen this great long-term care staffing resource? Care for The Aging is growing rapidly, and we are excited that so many states are participating" (2019). A portion of these tweets also shared information relating to current policies regarding LTC facilities. In 2020, the information sought and shared revolved around COVID-19 (e.g., information about testing

protocols in LTC, studies examining the effect of COVID-19 in older adults, and resources to support caregivers of LTC residents). As an example, one 2020 tweet reads, "AARP caregiving expert @AmyGoyer shares questions to ask nursing homes, assisted living, or other long-term care facilities during the #COVID19 outbreak to ensure your loved one will be safe and properly cared for." For more examples of tweets in this theme, see [Table 2](#).

Treatment, Innovations, and Ideas for Improving Conditions in LTC Facilities. Another common topic discussed in both time periods was treatment, innovations, and ideas for improving care and conditions in LTC. Tweets in this theme included information about research studies, introduction of policies or calls for support of legislation, and information about programs or treatments designed to improve conditions in LTC. For instance, according to a 2019 tweet, "Enhancing support for care home residents can result in different outcomes in residential and nursing homes. On our blog, @ThereseTHF discusses the latest findings from the Improvement Analytics Unit." See [Table 2](#) for more examples of meaning units coded in this theme. Similar to other themes, 2020 tweets focused on ideas for mitigating the effects of COVID-19 in nursing homes. A majority of the meaning units in 2020 highlighted the need for increased funding in order for LTC facilities to provide personal protective equipment, as well as medication to treat/manage COVID-19. In addition, many tweets described ideas for removing the restriction on visitation policies. For example, a Twitter user in 2020 shared, "contact is so important for vulnerable people in nursing homes. If your loved one is in assisted living and quarantined, set up FaceTime or similar means of staying in touch, if possible or affordable." For more examples of this theme, see [Table 2](#).

Reports of Government Action Related to LTC Facilities. In both 2019 and 2020, Twitter users discussed reports of government action related to LTC facilities. Most 2019 tweets were about government policies on fines for health violations in LTC and proposed budgets for the LTC sector. For example, "Trump Administration Cuts the Size of Fines for Health Violations In Nursing Homes." For more examples of data coded in this theme, see [Table 2](#). In 2020, Twitter users most frequently discussed government actions in response to COVID-19 (e.g., restrictions in visitation policies; government-issued guidelines to limit transmission and contain outbreaks such as frequency of testing for health care providers and residents). One 2020 tweet stated, "On visiting restrictions in long-term care, Dr. Henry says the province is working on this province wide and health authorities are working with each long-term care home. #bcpoli #covid19bc".

Positive LTC Experiences and Praise for LTC Workers and Organizations. In both 2019 and 2020, Twitter users shared positive experience in LTC facilities and praise for LTC workers. As an example, a 2019 post reads, "I'd just like to point out that there is a lip sync battle in my granny's nursing home this Saturday". Another 2019 tweet states, "Nurses are the Lord's gift to Humanity, on Battlefields, Hospitals, Nursing Homes, Assisted Living Facilities and Veterans Hospitals they Save Lives and give care do what Dr's can't. Compassionately give their heart, soul, time because they Love what they do!" A change in this theme took place in 2020 as these stories were raised in context of the COVID-19 pandemic. For instance, in 2020, discussions included stories of residents in LTC recovering from COVID-19 and of the creative methods family members have used to connect with residents in LTC facilities amid visitation restrictions. One 2020 user wrote, "Family sings #HappyBirthday to 100-year-old outside nursing home amid coronavirus crisis!". During 2020, the tweets became framed within the context of COVID-19 and applauded and highlighted the bravery and important work of health care providers in LTC, "I want to thank our Long-Term Care staff and frontline workers who continue to do an incredible job in these trying and challenging times."

Stigmatizing Statements about Older Adults in LTC. Stigmatizing statements about older adults in LTC facilities were also identified in both the 2019 and 2020 tweets. These posts included jokes about dementia, such as equating politicians' intelligence to dementia and posts that downplayed the lives and livelihoods of older adults. For instance,

one 2019 Twitter user compared a lapse in their thinking to dementia: "Just tried to scroll up on a piece of paper. Come visit me at the nursing home everyone." A novel finding within this theme in 2020 is that some of these tweets deemed older adults in LTC facilities as expendable during the pandemic and expressed opinions about discouraging lockdowns because COVID-19 only impacts older adults in LTC. For instance, one user in 2020 wrote, "Here is Minnesota. 113 out of 160 deaths were related to long term care facilities. That means we have the entire state shut down for 47 deaths in the general population, which is 5.7 million people. The entire state shut down because less than .0001% of our population died." While both time periods included statements that stigmatized or highlighted the stigmatization of older adults, within 2020 these statements often referenced COVID-19.

Topics Not Related to LTC Practices. Lastly, a proportion of tweets were coded as "topics not related to LTC practices" if they contained information unrelated to the LTC facilities or practices or if no clear meaning could be extracted from the text. An example of a 2019 tweet coded in this theme indicated "Lowkey want to finish up in the nursing home and study medicine." An example of a meaning unit from a 2020 tweet coded in this theme was, "I found out my ex cheated on me right before I went in for my 6 am shift at a nursing home." For more examples of tweets coded under this theme, see [Table 2](#).

Discussion

Social media posts on key public issues can provide insight to the current discussions taking place in society (Chew & Eysenbach, 2010; Ripberger et al., 2014). Our main goal was to examine how social media discussions and public perceptions about LTC have been impacted by the COVID-19 pandemic. Following the start of the pandemic, news stories began reporting on how COVID-19 was revealing longstanding deficiencies in LTC (Coletta, 2020; Fields & Hudetz, 2020; McKenna, 2020; Stevenson & Shingler, 2020). Moreover, a review by Tsao et al. (2021) showed that during the COVID-19 pandemic, social media was critical in disseminating information, surveying public attitudes, identifying COVID-19 cases, and analyzing government actions in response to the pandemic. Documenting changes in online social discussions is important because they can act as an indicator of public sentiment and can help direct researchers and policymakers to areas of public concern and preoccupation.

We identified a dramatic increase in the number of Twitter posts about LTC from 2019 to 2020 following the declaration of the pandemic (i.e., approximately 5 million in 2020 and 1.1 million in 2019). The increase was evident in the data derived from our social media monitoring software (Keyhole, 2019). In addition, a comparison between the two periods indicated that the number of tweets about LTC facilities made per week was significantly and substantially higher during the COVID-19 period. This finding aligns with the study by Chew and Eysenbach (2010) which suggests that major events increase discussions and public attention to issues on Twitter.

During both periods, users shared tweets that discussed the following themes within LTC: systemic issues, treatments and innovations, government actions related to issues in LTC, positive stories and praise for LTC workers, stigmatizing statements about older adults in LTC, and providing and seeking information about LTC. Although the themes identified in the content analysis were similar in the two periods, there were significant differences in the proportions of themes shared within the two periods. During both periods, Twitter users predominantly shared information and resources about LTC but also shared opinions and personal stories. With regards to the prevalent themes identified within each period, the most frequent themes in 2019 were highlighting systemic issues and providing or seeking information. These two themes reduced in frequency during the COVID-19 pandemic. That is, a major but unsurprising change that occurred in 2020 is that users began discussing the shortcomings in the mishandling of the COVID-19 pandemic. In addition, reports of COVID-19 outbreaks and deaths in LTC took

center stage. This finding, taken together with the dramatic increase in the number of Twitter posts discussing these issues, suggest that the COVID-19 pandemic increased public concern about these issues.

Although systemic issues (e.g., general concerns, resource limitations and funding, staffing shortages, cost) in LTC were being discussed on Twitter prior to the COVID-19 pandemic, we found that the proportion of meaning units within this theme was lower in 2020 in comparison to 2019. In 2020, systemic issues were still a prevalent theme; however, users became more concerned with the way the government was handling the pandemic and with the number of LTC deaths occurring. Discussions of the LTC sector also became framed within the context of COVID-19 and the way that COVID-19 exacerbated or revealed issues of concern. For instance, users were concerned about the ramifications of staffing shortages and inadequate pay including the negative consequences (for infection control) of LTC workers working at multiple homes. Moreover, emphasis was placed on how the COVID-19 pandemic created increased urgency to address resource limitations, the high cost of LTC, and funding issues that were highlighted in the pre-COVID-19 period.

The discussion of LTC in relation to COVID-19 on Twitter is consistent with the frequent media stories covering the adverse effects of COVID-19 in LTC (Coletta, 2020; Fields & Hudetz, 2020; McKenna, 2020; Stevenson & Shingler, 2020). Yet, our data also suggest that there was already discussion of resource and funding constraints on Twitter prior to the COVID-19 pandemic. This suggests that discussions of these issues were already taking place but that the COVID-19 pandemic brought a sense of urgency and expanded discussions of concern about these issues. This is consistent with the substantial increase in the number of tweets made about LTC in 2020 in comparison to 2019 (i.e., approximately 5 million in 2020 and 1.1 million in the 2019 period under study).

The pandemic also influenced the context in which other previously discussed issues were raised. A proportion of tweets made in the 2020 period included stigmatizing statements about older adults in LTC facilities. For instance, pejorative comments about nursing home residents during the COVID-19 pandemic centered on devaluing the lives of older adults in comparison to younger age groups. Our findings parallel previous research on the prevalence of negative sentiments about aging (i.e., highlighting problems of old age and negative physical and functional implications of aging) on social media platforms (Makita, Mas-Bleda, Stuart, & Thelwall, 2021). In particular, our findings are consistent with previous research highlighting social media posts containing ageist and stigmatizing content about older adults during COVID-19 (Bacsu et al., 2022; Barrett, Michael, & Padavic, 2021; Jimenez-Sotomayor et al., 2020). Furthermore, the discourse on social media platforms during the COVID-19 pandemic contained posts perpetuating intergenerational divisions (Soto-Perez-de-Celis, 2020). Skipper and Rose (2021) examined the tweets associated with the hashtag #BoomerRemover, which became prominent at the start of the pandemic. The authors identified posts using the hashtag which perpetuated ageist beliefs that COVID-19 was taking away older adults who had generated social problems for subsequent generations. In addition, Twitter users in 2019 shared and provided information regarding LTC cost, conditions, and options, whereas 2020 users focused on seeking and providing information about how COVID-19 has affected LTC facilities (e.g., a list of LTC facilities where outbreaks had occurred, guidelines for visitation policies in LTC). Furthermore, there was a shift in the type of issues that were being raised. For instance, reports about outbreaks became a prominent topic shared in 2020; infection control was not a topic discussed in 2019. Evidently, the pandemic magnified the effects of outbreaks and the importance of infection control in current social media discussions.

In sum, the findings from our study revealed that the COVID-19 pandemic stimulated significant online discussions about LTC practices and facilities. Moreover, the parallels between media stories and online discussions are consistent with research highlighting associations

between media and public opinion. For instance, a framework by Baum and Potter (2008) illustrates multidirectional relationships between public opinion, media, and policy, in which public opinion is precipitated and stimulated by major events which can impact news stories and policy development. These findings can offer insights to policymakers when seeking to create policy in line with public opinion. The great deal of attention directed at highlighting systemic issues about LTC facilities could influence policymakers on the need for changes. Moreover, many sentiments under this theme accompanied calls for action to improve conditions and included discussions of issues related to resource limitations and funding, staffing shortages, inadequate staff compensation, and abuse and neglect, as well as the cost of LTC. The identified areas of concern could guide policymakers in developing policies that adequately address the needs of the public, such as policies directed at increasing investments in LTC facilities, resource allocation, and improved public health measures.

Limitations and directions for future research

Misinformation is prevalent on social media platforms, particularly during the COVID-19 pandemic (Gupta et al., 2020; Tasnim, Hossain, & Mazumder, 2020). For instance, Kouzy et al. (2020) found that approximately 25% of tweets about COVID-19 contained misinformation. The accuracy of each tweet and links associated with the posts were not assessed in our content analysis which could have impacted the results and quality of the data analyzed. As such, future qualitative analyses of social media posts might take in to account the veracity of reports and information when analyzing tweets about LTC facilities and COVID-19. Nevertheless, given that our focus was on understanding public perceptions, including potential misinformation allowed us to assess overall public perceptions and opinions as public opinion can be based on misinformation.

Moreover, our investigation focused on the three months following the first documented COVID-19 case in North America and the corresponding months in 2019. Given the large number of social media data and our aim to gain a representative sample, our data collection strategy and analysis focused on retrospectively collecting the “top tweets” identified by Twitter on a randomly selected day. Kim, Jang, Kim, and Wan (2018) suggest that a simple random sampling strategy is more conducive to the production of a representative sample than a constructed weekly sampling strategy suggesting our approach produced a representative sample of the two time periods. Our sample size was in line with previous research examining sample sizes of 1000 to 5000 tweets (Cavazos-Rehg, Patricia et al., 2014; Chew & Eysenbach, 2010; Krauss et al., 2017; Papacharissi, 2012). However, our method might still have excluded tweets that would be pertinent to our analysis. In addition, it is possible that “top tweets” may be skewed towards accounts with larger numbers of followers and fail to adequately capture the sentiments of users with fewer followers. Future research should examine the type of users prevalent in discussions about LTC and the COVID-19 pandemic as this information was not collected for this study. It is important to note, however, that we did identify a high proportion of opinion/commentary and personal experiences posts in the current investigation. As such, future research could examine even larger data sets or collect tweets in real-time (e.g., the day of) and examine non-“top tweets” posts.

Previous research has shown that Twitter users tend to be younger adults (Sloan et al., 2013) which may limit the generalizability of our results to older age groups. Nonetheless, older adults are increasingly turning to social media to connect and gain and share information (Bell et al., 2013; Hutto et al., 2015). With the rapid influx of social media posts and the dynamic nature of online discussions, further research is needed to evaluate the discourse later in the pandemic. For instance, future investigations could compare how perceptions of LTC practices change in the subsequent waves of the pandemic. In addition, future research may examine longer periods of time or accentuate the way

discussions about LTC change over the course of the COVID-19 pandemic. Finally, future investigations could examine the way online discourse about LTC practices in other prominent social media sites (e.g., Facebook) is impacted by the pandemic.

Conclusion

In the era of the Internet, discussions on social media platforms at any given time represent a snapshot of the greater public discussion about an issue or topic. For instance, previous research suggests Twitter discussions may be a more accurate indicator of public opinion than polls (Yaqub, Chun, Atluri, & Vaidya, 2017). Therefore, online discussions could aid policymakers in gauging public sentiment in relation to policy decisions. The Twitter platform presents new opportunities for understanding the experiences of older populations as older adults are increasingly turning to this platform to share their lived experiences (Talbot, O'Dwyer, Clare, Heaton, & Anderson, 2020). Social media platforms may also be sources of information for researchers aiming to gain insight into social or healthcare issues from the viewpoint of the public or from individuals who may be underrepresented in research when traditional recruitment strategies are employed. In sum, we found that the COVID-19 pandemic was at the forefront of discourse about LTC facilities and practices. The pandemic highlighted the way in which systemic issues in the LTC sector contributed to the adverse effects of COVID-19 on LTC residents. Our results confirmed a dramatic increase in public interest and discussion on the challenges faced in LTC environments. This increased discussion and public awareness create opportunities for policy change. Policies focused on improved care standards and increased accountability in LTC as well as increased resource allocation are obvious areas for attention. Public opinion often drives political platforms and findings like ours encourage new ways of informing such platforms.

Statement of funding

This work was supported through funding from the Saskatchewan Health Research Foundation and the Saskatchewan Centre for Patient Oriented Research.

Declaration of Competing Interest

All the authors have no conflict of interest to declare.

Data availability

Data will be made available on request.

Acknowledgement

This work was supported through grants from the Saskatchewan Health Research Foundation (#5085) and the Saskatchewan Centre for Patient-Oriented Research (#347325).

Appendix A. Supplementary data

Supplementary content to this article can be found online at <https://doi.org/10.1016/j.jaging.2022.101076>.

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