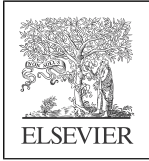




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# Nursing in the spotlight: Talk about nurses and the nursing profession on Twitter during the early COVID-19 pandemic

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## ABSTRACT

**Background:** Nurses comprise the largest portion of healthcare workers and are integral to the COVID-19 response. Twitter has become a popular platform for the public, including nurses, to engage in pandemic-related discourse.

**Purpose:** We sought to analyze the representation of the nursing profession and characterize nurses' experiences during the pandemic from tweets published in April 2020.

**Methods:** We analyzed tweets using natural language processing, Word Adjacency Graph (WAG) Modeling, and thematic analysis. Authors independently reviewed 10% of raw tweets in each WAG-generated topic, qualitatively analyzed tweets, and identified emerging themes.

**Findings:** Six themes emerged: Support and Recognition of Nurses, Military Metaphors, Superhuman/Spiritual Metaphors, Advocacy, Personal Experiences with Nurses, and Social/Political Commentary. Public perception of nurses was positive, but nurses conveyed harsh realities of their work.

**Discussion:** Findings highlight discrepancies in nursing experiences and public perceptions of nursing. Further research should accurately identify and convey the complexities of the nursing profession.

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## Introduction

In March 2020, the World Health Organization declared the COVID-19 outbreak a pandemic. Nearly 2 years later, 59.8 million Americans have been infected with COVID-19, and 836,000 of them have died from it (Johns Hopkins University of Medicine, n.d.). The stress of the pandemic on the United States (US) healthcare system has been extreme. Health care

workers have faced an onslaught of very ill patients, lack of staff, shortages of personal protective equipment (PPE), and the emotional toll of witnessing an enormous amount of death (Argulian, 2020; Centers for Disease Control and Prevention, 2021; Shaukat, Ali, & Razzak, 2020; White, Wetle, Reddy, & Baier, 2021). Political tensions surrounding policies to quell spread of the virus have augmented the COVID-19 crisis for healthcare workers (Logie & Turan, 2020; Taylor & Asmundson, 2021).

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Nurses comprise the largest portion of the healthcare workforce and are integral in the US COVID-19 response; nurses account for the largest percentage of health care worker deaths in the pandemic. Pre-pandemic, inpatient facilities already faced nurse shortages affecting Americans' access to healthcare (American Association of Colleges of Nursing, 2020). This nursing shortage is multifactorial and involves an aging direct care workforce, lack of doctorally prepared nursing faculty, and poor retention of new nurses (American Association of Colleges of Nursing, 2020). Since the onset of COVID-19, nursing staff shortages have been exacerbated due to virus infections, quarantine, and turnover (Gohar, Larivière, & Nowrouzi-Kia, 2020). Nurse-to-patient ratios have been strained due to staff shortages and increased hospitalizations (Maben & Bridges, 2020). The arrival of a pandemic has publicly highlighted the unique role nurses play in healthcare, and abruptly made Americans aware of the necessity of nursing to an operational healthcare system.

Social media platforms, particularly Twitter with 330 million users, have transformed the concept of the public square, and are a central source of information and public dialogue during major events (Hamilton, 2021). Researchers have reliably predicted the timing and location of public protests based on Tweets relating to the 2016 US Presidential election and other major sociopolitical events (Bahrami, Findik, Bozkaya, & Balcisoy, 2018), and Twitter use has soared since March 2020 (Haman, 2020). The intersection of a once-in-a-century pandemic with the ubiquitous nature of social media platform use for public discourse has created a unique opportunity for examination of the public's perception of the nursing profession, as well as the experiences of nurses, during a wide-sweeping, catastrophic event.

Our purpose was to analyze the representation of the nursing profession and to characterize nurses' pandemic experiences as represented in social media discourse in the early period of the COVID-19 pandemic. We achieved this purpose using natural language processing and thematic analysis of tweets from Twitter. Findings provide a unique and extraordinary perspective of both the public's perception of nursing during a pandemic, as well as nurses' experiences practicing during an unprecedented global health event.

## Methods

We used a graph modeling approach for topic modeling and detection. First, we selected a small collection of relevant tweets from the overall Twitter stream in the United States from early in the pandemic. Search keywords included "nursing" as well as "nurse\*," a front-stem wildcard able to match nurse, nurses, and 50 different hashtags that start with that string, for

example, #NursesAreHeroes. We also used #GetMePPE, having anecdotal awareness of its usage by nurses on Twitter. Through the month of April 2020, we utilized the public Twitter API to run a streaming search that used these keywords as well as geo-specific filtering. To include only US tweets, we added a latitude/longitude-specific geo-fence to the search query surrounding all 50 states, then discarded any search results without a US country code, a small quantity of US-adjacent posts. This resulted in 67,433 US-specific posts from that month that matched one of these keywords.

We examined this initial collection of tweets for frequent words and phrases and noticed a significant amount of job-ad-related content. The environment at that time saw increasing demand for hospital-based care. Recognizing this over-represented, nonpertinent single topic early on, which comprised 42% of tweets, allowed us to set it aside when proceeding with the discovery-driven analysis. The remaining 39,418 tweets formed the basis of our collection for topic modeling. We used an adjacent-words-driven graph modeling approach we call WAG modeling (*word adjacency graph*) (Miller, Groves, Knopf, Otte, & Silverman, 2017). This method achieves two important goals: determining the quantity of distinct topics, as well as descriptive definitions of topics.

Using this method, the model was built by iterating through the collection of tweet texts, tokenizing each into words and phrases, and removing punctuation and stopwords. An example of stopword removal turns a phrase like "jack of all trades" into "jack trades." With our dataset, resulting pairs of adjacent words were used to construct the nodes and edges of a graph model, an example of which is shown in Figure 1.

Once in graph model form, this collection of word pairs can be partitioned into distinct communities (suggested by colors in Figure 1) via a graph modularity algorithm for community detection. This process draws boundaries between each section of the graph such that each member of a resulting community is more connected to other members of the same community than members in any others. We used the Louvain algorithm (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008) on this application to discover 38 distinct topics, as defined by the clusters of words that often appear together. Words and word pairs analyzed were used by at least 30 unique users.

With these 38 topics described by lists of words and phrases, we returned to the complete tweet text collection to assign each text to its most appropriate topic; scoring them based on the frequency of words appearing from various topic definitions leads to a straightforward assignment for each.

These 38 subcollections of tweet texts were manually reviewed to judge cohesiveness around a single topic, toward developing a more succinct descriptive phrase that represents that topic, for example, "This



**Table 2 – Combined Relevant Topics**

Original Clusters	Top Word Pairings	Themes
1 and 9	God bless, doctors and nurses, docs and nurses, icu nurses, #doctors, #nurses	Support and recognition of nurses
2	Nurse practitioner, wife nurse, Registered Nurse, friend nurse	Personal experiences with/of nurses
3 and 6	Front lines, health care, healthcare workers, care workers, save lives, risking lives, saving lives, nurses, super heroes, angels	Military metaphors Superhero/Spiritual metaphors
5 and 12	N95 masks, wear mask, n95 mask, face shields, wearing masks, wash hands	Advocacy
7	Protective equipment, protective gear, personal protective, production ppe, defense production	
10 and 11	Federal government, President Trump	Social and political commentary

“Amen to all our health care nurses...God bless and protect them.”

#### *Practical Support*

Tweets in this subtopic area related to providing practical support to nurses during the pandemic. Often accompanied by photos and videos of restaurants and organizations providing meals to nurses, these tweets promoted local organizations who provided meals to healthcare providers. One user tweeted, “Austin [TX] is stepping up to feed the front line in the coronavirus battle...doctors and nurses say the kindness really makes them feel appreciated.”

#### *Celebration and Gratitude*

Tweets in this subtopic area expressed general feelings and wishes of celebration and gratitude for nurses during the pandemic. Tweets indicated both celebration of and thanks to nurses. One tweet read, “We thank all nurses for standing up against COVID-19.”

#### *Military Metaphors*

The second topic area included tweets in which military metaphors were used to describe the public’s perception of nurses’ experiences and work during the pandemic. Tweets consistently used terms such as battle, war, soldier, and front lines. One user posted, “...my daughter just informed me shes tested positive for #COVID19. Shes a nurse on the front line of this war...shes a fighter.” Another tweet read, “Hospitals are the battlefields...and nurses are the soldiers on the front lines.” A nurse tweeted, “As if us nurses arent risking our lives daily going into work and then to deal with this bullshit. Once again [we are] not just health care workers but warriors.”

#### *Superhuman/Spiritual Metaphors*

The third topic area also involved the use of metaphors in tweets, though in this case superhuman and spiritual metaphors to refer to nurses’ work during the pandemic. Tweets in this topic lauded nurses’ efforts by calling them superheroes and angels. For example, one user tweeted, “Here’s to the real #SUPERHEROES...

our nurses!” while another tweeted, “[She] is a nurse... doing angels work.”

#### *Advocacy*

The fourth topic area included tweets from both the public and nurses themselves related to various areas of advocacy for or related to nurses working during the pandemic. Subtopics were *Personal Protective Equipment Advocacy*, *Mental Health Care Advocacy*, *Testing Advocacy*, *Protests and Counter Protests*, and *Financial Advocacy*.

#### *Personal Protective Equipment Advocacy*

Both the public and nurses tweeted advocating for personal protective equipment (PPE) in the context of the PPE shortage. Nurses were part of a large group of healthcare workers who used the hashtag #GetMePPE to report the lack of PPE they were experiencing and advocate for more. One nurse tweeted, “#GetMePPE As long as Im reusing my #N95mask, we dont have enough PPE.” National Nurses United, the largest Registered Nurse union in the country, also tweeted to advocate for PPE, posting “[National Nurses United] is demanding that @POTUS use the Defense Production Act for PPE and #ProtectNurses.”

#### *Mental Health Care Advocacy*

The public and nurses both tweeted the urgent need for mental health services for nurses caring for patients during the pandemic. “I just don’t have any words for all the horrors the nurses are going thru. They all need...extensive counseling,” tweeted one user. Another noted, “We will really need free mental health service as much as free health care. We should...prioritize anyone...in contact with the traumatic experiences of COVID deaths, from nurses to family members.” A nurse tweeted, “Congress should...fund the mental health of [nurses] after the trauma we have seen.”

#### *Testing Advocacy*

Tweets in this subtopic were related to the public’s advocating for nurses to have more access to COVID-19 testing. Many expressed anger that nurses were not currently meeting criteria for testing despite working closely with COVID-19 patients, as well as working

**Table 3 – Theme Descriptions and Supporting Tweets**

Theme	Description	Example Tweets
Support and recognition of nurses spiritual support practical support celebration and gratitude	Tweets supporting and recognizing nurses working during the pandemic through prayer/other spiritual and practical support, as well as those celebrating and thanking nurses for their work during the pandemic.	Praying for all nurses! Another shift of hard working hospital workers fed tonight thanks to you all!!! We keep hearing how much it means from doctors, nurses...and others who are working long shifts to get some hot meals! Yall literally thank a nurse today! You contract Covid-19... you die alone... nurses/medical staff aren't only nurses but they've become stand in family members.
Military metaphors	Tweets comparing nurses' work during the pandemic to war/battle.	ICU nurses...have been instrumental in saving lives Nurses are at war. Shout out to...nurses and everyone working on the frontline in this battle against the covid-19 pandemic. Nurses...demonstrating their bravery and fighting for us all...risking their lives daily These nurses are fighting on the front lines every day saving lives against an invisible enemy & they are my superheroes. Nurse practitioner [caring for COVID patients]...She's a warrior and an angel.
Superhuman/spiritual metaphors	Tweets characterizing nurses working during the pandemic as superhuman (superheroes) or angels.	Im praying that my friends who are nurses will survive this. Its already devastating to see...those on the front lines being affected by the virus because of a lack of PPE. They deserve better. [Nurses]will need strong mental health support to recover. Trump says we are doing great on testing. I have a friend who is a nurse...her partner tested positive for COVID. [She] asked to be tested and was told she doesn't qualify because there arent enough tests and she isn't showing symptoms yet. As if these nurses saving lives dont have enough going on: they stand there and PROUDLY, quietly counter-protest... I love nurses Loan forgiveness for ALL nurses and doctors! What if...nursing home and public sector employees got federally-funded COVID-19-related life and disability insurance for the duration of the pandemic?
Advocacy PPE Mental health care Testing advocacy Protests/counter-protests Financial advocacy	Tweets advocating for nurses in various ways: regarding securing them sufficient PPE, providing mental health care, providing readily available testing, and providing financial compensation for nurses during the early pandemic. In addition, users tweeted support for nurses counter-protesting anti-mask protesters.	I had to talk to a Nurse Practitioner...she said the quarantine is useless, we need to resume business as usual & develop Herd Immunity
Personal experiences with/of nurses Mistrust and misinformation	Tweets from the public and nurses about experiences with or of nurses during the pandemic, specifically related to misinformation from nurses, poor working conditions for nurses, lack of work hours for some nurses, the mental toll of the pandemic	When you're the charge nurse [during COVID] and you try to hide from your staff in the supply room to take a 20-minute nap, they will find you. No tired like nurse tired, especially right now. My dear friend is a nurse. She's had to wear the same N95 mask for 21 days while taking care of COVID patients. My sisters best friend...is a traveling RN, and 40 other nurses were just furloughed, due to area hospital lack of patients. I see my sister going through hell daily as a nurse, I can't imagine what it's like. Nurses [are being] suspended for refusing COVID-19 care without N95 mask and publicly saying it.
Nurses overworked and under protected Nurses losing work hours Mental toll on nurses Whistleblowing	on nurses, and nurse whistleblowers related to PPE and other poor conditions.	Tell your county to open. There is no reason to shelter in place for less people dying th[a]n in nursing homes. Nurses...are busting their asses and risking their lives to save yours. The absolute least you can do to thank them is stay the f– home!
Social and political commentary	Tweets related to the political undertones associated with lockdown, social distancing, and masking policies, as well as users' opinions of how the government should handle the pandemic.	



with non-COVID-19 infected patients to whom nurses could spread the virus. One user tweeted, “My daughter is a nurse, works in a nursing home with positive cases. Facility wide testing should be happening...[she] has not been tested.” One nurse tweeted, “...saying there are enough tests is a lie. We can’t get tested even if we are caring for pos pts.”

#### *Protests and Counter Protests*

Tweets in this subtopic were related to citizens protesting stay-at-home orders, as well as counter protests in which nurses participated. Users tweeted support of nurses who would be affected by those protesting stay-at-home orders. One user tweeted, “These protests are just absurd. It is awful if you have been laid off and want to get back to work but we are talking about human lives here...and nurses who have to take care of you.” A reporter tweeted, “Nurses are outside... protesting. They say nurses are not being given proper PPE. They dont believe patients are being put into isolation in a timely fashion. They also dont think there is adequate testing.” Some spoke negatively about nurses who protested, advocating for nurses not to engage in counter-protests. One user tweeted, “Imagine going to nursing school just to stand in the middle of a street and restrict people from exercising their 1st amendment...instead of doing your job during a global pandemic.”

#### *Financial Advocacy*

Tweets in this sub-topic were characterized by users advocating for financial compensation for nurses working during COVID-19, either via direct payments/bonuses or loan forgiveness. One user tweeted, “...All doctors, nurses, and medical personnel should have their student loan debt wiped clean after this,” while another noted that, “All nurses and doctors fighting this should get bonuses and hazard pay.” Some nurses even tweeted asking other users for assistance buying supplies. They posted their nursing license credentials to prove they had a legitimate need. One nurse tweeted, “Needing financial assistance. Im a nurse in Texas having to...buy my own supplies...will DM credentials and license.”

#### *Personal Experiences With/of Nurses*

This topic area included tweets from both the public regarding their experiences with nurses during the pandemic and nurses’ own experiences working during the pandemic. These experiences encompassed sub-topics of *Mistrust and Misinformation*, *Nurses Being Over-Worked and Under-Protected*, *Nursing Losing Work Hours*, *The Mental Toll on Nurses*, and *Whistleblowing*.

#### *Mistrust and Misinformation*

Tweets in this subtopic related to users’ mistrust of the transmission and seriousness of COVID-19, as well as the effectiveness of mitigation measures in stopping the virus. Nurses were mentioned in these tweets as

examples to prove users’ mistrust about the virus or spread misinformation by being named as sources of “true” COVID-19 information not evident in the media. For example, one user tweeted, “all the nurses at [my wife’s hospital] must be superheroes cause none of them have gotten sick. Good Luck wish you all the best...with all your fear.”

#### *Nurses Being Over-Worked and Under-Protected*

Tweets in this subtopic relayed stories of nurses, from the public and nurses themselves, being exhausted from working long hours during short staffing, high patient acuity, and high rates of death during the pandemic, while some tweets also mentioned that nurses were doing so in an under-protected way, mostly due to lack of PPE. One user tweeted, “Our nurses are wearing trash bags because they don’t have PPE.” One nurse tweeted, “I’m honestly tired af wearing this mask on my 12hr shift at the hospital! #NursingLife” and another shared, “I’m a nurse with all Covid patients. In quarantine cause I tested positive...I have to use my pto time while out.”

#### *Nurses Losing Work Hours*

Contrastingly, tweets in this subtopic described nurses losing work hours or being laid off. Some users discussed how the reduction in elective surgeries had decreased the need for nurses in these areas, while others suggested that hospitals were furloughing nurses due to the curve being sufficiently flattened. One user tweeted, “My friend is a nurse...she just had her hours cut because...all nonessential surgery has been rescheduled.”

#### *The Mental Toll on Nurses*

Both the public and nurses posted tweets bringing awareness to the mental toll on nurses working during the pandemic. Tweets in this subtopic area were marked by concern for nurses. One user tweeted, “My dear nurse friend at a community hospital tells me the nurses were in tears today b/c their patients keep dying.” One nurse tweeted, “physically and mentally drained from another day in covid land ... JUST STAY... HOME ALREADY #NursesCOVID19.” Another nurse shared, “But we are here to help those that are in dire need...but in the process we are also bringing us down mentally physically and emotionally!”

#### *Whistleblowing*

Tweets in this subtopic reported unethical policies of hospitals related to nursing staff; specifically, tweets were related to poor working conditions of nurses and were posted mostly by nurses and other healthcare workers. For example, one user tweeted, “My nurse colleagues are working at local facilities under gag orders & threat of losing jobs for speaking publicly about the unsafe working conditions, lack of PPE, mandatory overtime & no info on their rights.” Nurses also tweeted about whistleblowing, with one sharing, “The fact that #nurses in some of our most vulnerable

communities have been forced to turn to investigative reporters as the only accountability structure for middle mgmt/hospital admins engaged in unlawful harassment is unconscionable.”

### Social/Political Commentary

Tweets in this topic area related to political undertones associated with lockdown, social distancing, masking, and users' opinions of government response. Tweets encouraged officials to prioritize health over freedom through abiding by guidelines. One user tweeted at elected officials, “As an ER nurse, I cannot stress enough the importance of staying home.” Others called for leaders to prioritize opening the country over addressing the pandemic, tweeting, “The curve is flattened...hospitals predicted to be inundated with covid patients are now furloughing nurses... #OPENAMERICANOW.” Some conveyed frustration and criticism related to President Trump's handling of the pandemic; a nurse tweeted, “Trump must realize at some level that history will lay responsibility for 100,000s of American deaths right in his lap, due to minimizing and ineptly managing the first 2 months of responding to the #COVID19 crisis.” Others called on the government to assist those financially affected by stay-at-home orders to increase compliance. One nurse tweeted, “...As a nurse, I also have empathy for people who are living paycheck to paycheck...our Govt needs to provide monetary help.”

### Discussion

Results indicate a dynamic social media discourse around nursing during the early months of the COVID-19 pandemic. Because the last pandemic happened in 1918, it is not possible to compare our results with discussions from a century ago. Accounts of nurses during the 1918 pandemic are limited to newspaper articles and personal accounts in which nurses were called calm, cool, and courageous (Barbara Bates Center for the Study of the History of Nursing, n.d.). A 1918 newspaper article told a detailed account of a visiting nurse in Philadelphia:

In a crib...was a 6-week-old baby...wet and cold. Though the father...running a temperature of 103°, had to get out of bed... to care for his wife and children...the family had no coal, and the three well children were shivering and hungry. The nurse gave care to the sick and bathed and fed the baby. She made a wood fire in the stove and prepared food for the children.

While this account provides a glimpse of the life-saving work nurses did in 1918, the stagnant, one-perspective nature of it does not represent nursing so granularly and comprehensively as Twitter discourse represents the public's perception of nursing and experiences of nurses during COVID-19. Despite our

inability to make a one-to-one comparison of our findings with those from a prior pandemic, current results are illuminating and have important implications.

Overwhelmingly, Twitter users offered support for and recognition of nurses in the early COVID-19 pandemic. While Forbes reports nursing as the US' “most trusted profession” (McCarthy, 2019), nursing has also suffered from invisibility and sexist/subservient stereotypes; nurses are often perceived as hierarchically beneath physicians. The nebulous nature of nursing is well-documented, with scholars like Lyon (2005) pointing to nurses to describe their work, value, and unique contributions more clearly. Twitter users, in more than 39,000 tweets we analyzed, were quite aware of and attentive to nurses. The gratitude for nurses' work during the early pandemic was the most robust theme. The tone of these tweets was, at times, awe-struck, as though users were not aware of what nursing entailed prior to this unprecedented moment. Some tweets involved recognition of work that nurses have been doing since Nightingale's time (Nightingale, 1860), such as putting themselves at risk and being with patients when they die. In this way, the occurrence of a pandemic in a time of ubiquitous social media has created unprecedented visibility for nursing and its contributions.

The Woodhull study (Sigma Theta Tau International, 1997) demonstrated that nursing, despite comprising the largest portion of the health care system, was extremely under-represented in health news media, with only 4% of such news stories using nurses as sources; the follow-up Woodhull study (Mason et al., 2018) revealed that nursing was even less visible 20 years later, with only 2% of health-related news stories sourcing nurses. The Woodhull study authors expressed the urgent need for nursing to become more visible and engaged with the public. Our results indicate that the ongoing pandemic and pervasive social media are providing a platform for that visibility and engagement to occur.

Twitter users' use of military and superhuman/hero metaphors to describe nurses indicates perception of nurses' work during the pandemic as heroic, dangerous, and sacrificial. While this language has been used in reference to nursing in war-time (Schultz, 2004)—Clara Barton wrote reverently of nurses in the Civil War, *Women of the War: Their Heroism and Self-Sacrifice* (Moore, 1866) was published in 1866, and volumes printed about women and the Civil War referred to women's heroism, self-sacrifice, and patriotism (Brockett, Vaughan, & Bellows, 1867)—it is not as prevalent as more feminine metaphors, such as angels, which have long been associated with nursing (Ferns & Chojnacka, 2005) and were also in this dataset (Stokes-Parish, Elliott, Rolls, and Massey (2020). suggest that hero and angel narratives are unintentionally damaging to nursing and fail to portray nurses as highly-educated professionals, while also reinforcing that nursing is innately feminine and disempowered. According to Stokes-Parish and colleagues, “Words



that invoke notions of magic or mysticism or the perception of superior courage or morality disregard the skill, training, and knowledge underpinning skilled nursing practice and the investment of time, effort, and commitment made by nurses” (p. 2). The use of these metaphors by Twitter users in discussing nurses is two-edged: it indicates increased visibility and appreciation of nursing, while also revealing inappropriate characterizations of the profession.

The politically charged nature of some tweets in the dataset is unsurprising. However, the politicization of nursing specifically has not been typical (Halpern, 2020). The 2000s/2010s saw decrying of vaccinations amid claims they were associated with autism, and these beliefs were often politically-based (Bricker & Justice, 2019), but there is no evidence of nursing being so central to this politicized issue. Here, Twitter users pointedly used nurses/nursing to call for mandating and following public health measures (e.g., masking), as well as to support that COVID-19 was overblown. Politicization of the pandemic has intensified since these data were created, and it will be important to compare results in a more recent Twitter dataset to those in the one used here to reveal changes in COVID-19 politicization over time. Such politicization could further strain already overworked and exhausted nurses, and this aspect of their work must be considered and mitigated.

Results demonstrate the dire conditions in which nurses worked in the early pandemic. The mental toll of nurses who cared for COVID-19 patients is also captured in our data. Similar results were reported by Sherman (2000), who conducted in-depth interviews with nurses who cared for AIDS patients. As found in the current data, nurses in the AIDS study suffered anguish, overwhelming sadness, and extreme stress at watching so many people die. Nurses practicing in the COVID-19 pandemic, however, have faced this amount of death more focally and at an accelerated rate: approximately 700,000 people have died from AIDS in the US since 1981, while more than 835,000 have died from COVID-19 in only 22 months. It is urgent that the mental health of nurses who have practiced during the pandemic be addressed and supported.

The COVID-19 pandemic has become a protracted event. Our results reflect social media discourse about and from nurses in the early stages of the pandemic, but do not necessarily depict current nurse-related Twitter discourse. While follow-up analyses are indicated, it is clear that, in just one month of the pandemic’s beginning, nursing was spotlighted on Twitter, and nurses experienced extremely difficult and overwhelming working conditions. The effect of these working conditions on nurses over nearly two years and multiple waves must be analyzed and addressed. As the end of the pandemic remains uncertain, nursing programs must also consider curricula changes to prelicensure programs to prepare new nurses for COVID-19 practice. Health care systems

must work to protect and retain nurses working in the context of COVID-19, while also optimizing patient outcomes. Regular, ongoing research of nurse-related social media discourse, which can be completed rapidly and at a low cost, can continue to provide insight to both the public’s perception of nursing and nurses’ experiences working in the pandemic.

### Limitations

The anonymity of social media prevents capturing demographic data, hindering our ability to examine how user characteristics may relate to themes. Tweets were posted during the early phase of the pandemic and do not represent discourse about nurses in the context of other consequential events that continue to evolve. Our team is conducting a follow-up pandemic-phased analysis of nurse-related tweets to compare findings of this study with those in later stages of the pandemic, as well as those associated with specific pandemic events.

### Implications for Nursing Profession

Two categories of implications can be drawn from our findings: (1) those related to improving nursing practice/protecting nursing during the pandemic; and (2) those related to the unprecedented opportunity for nursing to highlight its unique contributions to society, including accurate articulation of nursing practice.

Research is needed to quantify the trauma nurses have recently experienced, including in-depth qualitative interviews, a follow-up Twitter study analyzing more recent data, and implementation of evidence-based strategies to keep nurses safe and healthy in the context of pandemic working conditions. While we cannot espouse a specific solution to this problem based on our results, our findings, those of others (Arnetz, Goetz, Arnetz, & Arble, 2020; Moore, Hemmer, Taylor, & Malcom, 2021; Prasad et al., 2021), and an exodus of nurses from the bedside highlight the critical nature of the impact of COVID-19 on nurses’ mental health and stability of the profession. As resolution of the pandemic remains uncertain, healthcare systems must address the working conditions of nurses to prevent worse staffing and the vicious cycle of poor working conditions and turnover. Findings alert policymakers of the importance of nursing to the pandemic, as well as the potential frailty of the profession based on nurses’ experiences. It is vitally important that nursing continues to be studied over the course of the pandemic, as experiences and needs change over time. We join others (Catton, 2020) in fervently supporting the protection of nurses in the workplace; this protection cannot be optimally achieved, however, without giving nurses a voice through continued research.

In a 2014 paper on nursing’s public identity, Hoeve, Jansen, and Roodbol (2014) highlight the urgent

need for increased visibility of the profession in terms of its *actual* attributes. While nursing is highly trusted in the US, it is not always valued for the skills, innovation, education, and competencies that underlie its practice (Hoeve et al., 2014). The pandemic has put a bright, sustained spotlight on nursing at a time when information is disseminated via social media at lightning-fast speed. While the 1918 pandemic resulted in attention to nursing and calls for women to become nurses, it was done so by newspaper (Barry, 2005). At present, nursing has an optimal stage to present itself: a captive audience and a ubiquitous, far-reaching, and fast-moving medium. While there is a need to systematically analyze how and to what degree nursing has been discussed on social platforms like Twitter in later phases of the pandemic, nursing is undoubtedly in the public eye (Jacobs, 2021; Rudavsky, 2021). As a profession, nursing should organize and seize this moment to clarify our profession, articulate our importance and unique attributes, disabuse the public of ongoing stereotypes and misconceptions about nursing, and advocate for proper working conditions for nurses.

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## Authors Contributions

Wendy Miller: conception of idea and project, led data analysis, contributed to all sections of the manuscript in all versions. Caeli Malloy: participated in data analysis, contributed to all sections of the manuscript in all versions. Michelle Mravec: participated in data analysis, contributed to all sections of the manuscript in all versions. Margaret Sposato: participated in data analysis, contributed to all sections of the manuscript in all versions. Doyle Groves: completed WAG analysis, contributed to the methods section of the manuscript in all versions.

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