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Out and about: Factors associated with nurses' use of COVID-19 personal protective behaviors when not at work

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Abstract

Aim: To characterize nurses' engagement in Centers for Disease Control and Prevention promoted personal protective behaviors (PPBs) outside the work setting during the COVID-19 pandemic and factors that inform engagement in these behaviors.

Background: Nurses' health is of vital importance to the functioning of the healthcare system. Little is known as to what informs nurses' use of PPBs outside the work setting.

Design: Cross-sectional survey study.

Settings: A large healthcare system in the southeastern region of the United States.

Participants: Nine hundred fifty eight registered nurses.

Methods: Participants surveyed during the week of September 14th. Survey contained questions regarding factors that may be linked to nurses' compliance with PPBs.

Results: The most frequently reported behavior practiced outside work was "cover mouth with cough or sneeze." Concern for COVID-19 infection and confidence in masks to control the spread of COVID-19 were positively related to both frequency and number of protective behaviors engaged in ($p < .01$), while fatigue was inversely related to engagement with PPBs ($p = .01$). There was some evidence that viewing self as role model may predict behavior.

Conclusions: Personal factors drive engagement with protective behaviors outside the work setting. Implications for nursing management and education are explored.

KEYWORDS
administration, professional issues, COVID-19, Fatigue assessment acale, education

1 | INTRODUCTION

The SARS-CoV-2 (COVID-19) virus has disrupted life as we know it both at work and at home. Although the Centers for Disease Control and Prevention (CDC)[1] along with state and local governments in the United States and the World Health Organization[2] emphasized the importance of personal protective behaviors (PPBs) to help control the spread of COVID-19, much of the United States saw increases in infections throughout the fall and winter of 2020.[3] The infection rate in the 25–49 age groups increased dramatically throughout the United States during summer and fall of 2020, while the infection rate in persons over the age of 65 remained relatively stable.[3] In the United States, 25–49 age group was also less likely to report wearing face coverings, practicing social distancing and avoiding congregating with groups of <10 compared to persons ≥65 years of age.[4] Fifty-two percent of practicing nurses in the United States are under the age of

50[5] and thus belong to the demographic with the highest rate for community spread of COVID-19 in 2020. However, little is known about their own behaviors as it relates to engagement in PPBs outside their work setting and whether their behavior is influenced by their professional identity.

2 | BACKGROUND

In the early days of the pandemic, the CDC began publishing guidelines to help individuals, employers, and communities protect themselves from the spread of COVID-19.[1] In the summer and fall of 2020, the CDC on their main COVID-19 prevention homepage, promoted the following behaviors: frequent hand hygiene, masking in public places, social distancing of 6 feet or greater, avoiding groups of more than 10 people, daily sanitizing of home surfaces, isolating from others in household when feeling sick, and wearing face mask in house when others are sick. These protective behaviors were widely disseminated across healthcare and community settings in an effort to curb the spread of COVID-19 both in healthcare settings and in communities.

As a vital member of the healthcare team, nurses' health and safety is paramount to the functioning of the healthcare system. Protection of the healthcare worker and patient is the cornerstone of infection control in the inpatient setting. Research regarding compliance with infection control measures in inpatient settings has generally focused on compliance with personal protective equipment (PPE) such as facemasks, gloves, shields.[6-8] Fatigue,[6] personal fear of infection, exposure to virus, years' experience,[8] discomfort and work location have been associated with PPE compliance in the hospital setting.[6-8] Less attention has been paid to the factors that inform nurses' use of PPBs outside the work setting. Reynolds et al.[9] reported only 24% of healthcare workers complied with all quarantine orders after severe acute respiratory syndrome (SARS) exposure and only 29% expressed concern for infecting others. During the H1N1 pandemic, one study found that 54.9% of healthcare workers expressed worry over infecting family and friends while only 6.6% restricted their social contacts.[10] Higher levels of worry over becoming infected were associated with limiting social contacts.[10] These findings suggest that healthcare workers may find it difficult to comply with infection control practices outside the work setting.

Health promotion and ability to protect the health of populations during public health emergencies are key elements of professional nursing education.[11] In addition, the American Nurses Association (ANA),[12] International Council of Nursing[13] and the National Health System of England[14] have endorsed views supporting nurses as role models for healthy living. In 2017, the ANA[12] launched the Healthy Nurse, Healthy Nation Campaign™, with the goal of impacting the nation's health by encouraging nurses to engage in healthy lifestyle behaviors to positively impact both the personal health of nurses and the health of the communities in which they serve. Although nursing promotes health promotion and disease prevention as a key role of the professional nurse,[11,13] there is little in the literature to support

that nurses have integrated this concept into their professional identity outside the work setting.[14-16]

Nursing, as the largest healthcare profession, is vital to the efficient functioning of the healthcare system in the United States and globally, especially in times of crisis. However, little is known as to nurses' personal engagement with PPBs outside work, which may reduce the spread of infection or decrease their risk of acquiring infection within their community. The COVID-19 crisis in the provides a unique opportunity to explore nurses' engagement in infection prevention practices when not at work, and personal and professional factors that may inform this engagement. Understanding these factors is necessary in ensuring the health of our nursing workforce, healthcare system, and our communities while we deal with COVID-19 and future health crises. Thus, the purpose of this study is to understand nurses' engagement in PPBs outside the healthcare setting and factors that may influence their use during the COVID-19 pandemic.

3 | OBJECTIVES

Specific Aim 1: To characterize nurses' use of CDC promoted COVID-19 PPBs outside the work setting.

Specific Aim 2: To understand factors that inform nurses' use of CDC promoted COVID-19 PPBs outside the work setting including fatigue, vulnerability to infection, and view of self as role model.

4 | METHODS

4.1 | Design and setting

We conducted a cross-sectional online survey in a large academic healthcare system in the southeastern United States. The healthcare system includes four community hospitals serving both rural and metropolitan areas across five counties, including a large metropolitan academic teaching hospital.

4.2 | Sample and recruitment

All registered nurses, including advanced practice registered nurses, employed full or part-time were invited to participate in the study. Survey links were emailed to all eligible participants the week of September 14, 2020. The links remained active for a period of 2 weeks, participants could only respond once to the survey, and their responses could not be linked to their email address. Reminders were sent three times over the course of 2 weeks. Participants were given the opportunity to participate in a random drawing to win one of three $50 gift certificates after completing the survey. If respondents chose to participate in the random drawing, they were directed to a separate site to enter the drawing; this ensured that their contact information could not be linked to their responses on the survey.

Study data were collected and managed using REDCap (Research Electronic Data Capture).[17] We calculated that we needed 355 responses based on a confidence level of 0.95 and a margin of error of +/−5%.

The survey was composed of questions with a variety of response formats (including Likert format, free text, and multiple choice). The nursing research committee of the organization developed the personal behavior questions and focused on CDC recommended preventive behaviors and behaviors that had been described in the media and posted on social network sites by healthcare workers. The committee piloted the survey before distribution. Fatigue, vulnerability to disease, and select demographic and work history variables were measured based on previous research related to PPE compliance.

4.3 | Measures

Respondents were queried regarding the following variables: the makeup of their household (children, adults) exposure to patients with COVID-19, if they or someone they lived with was at risk for higher morbidity or mortality related to COVID-19 based on the CDC risk groups, their exposure to patients with COVID-19, and personal history of COVID-19 infection. Demographic data collected included age, race, education level, years' experience as a RN, and current work environment.

To assess vulnerability to disease, the 7-item Perceived Infectability (PI) subscale of the Perceived Vulnerability to Disease Scale (PVD) was used.[18] This subscale measures individual's belief in their own susceptibility to disease. Responses were based on a 7-point Likert scale (strongly disagree to strongly agree), mapped to values of 1 through 7 and summed to calculate a total score. Three items were reversed coded so that higher values represented stronger agreement with respect to vulnerability. The scale has been used in a variety of research settings and has shown discriminate and predictive validity and reliability across various populations.[18] In the current study, the reliability of the PI subscale was 0.84.

Fatigue was measured using the Fatigue Assessment Scale © FAS (Fatigue Assessment Scale): ild care foundation (http://www.ildcare.nl/).[19] The FAS is a 10-item general fatigue questionnaire composed of two subscales: mental fatigue (5 items) and physical fatigue (5 items). Each FAS question is assessed on a 5-item Likert-scale with responses from 1 ("never") to 5 ("always"), with 2 items reverse coded so that higher scores correspond to greater frequency of fatigue (range of scores 10–50). This scale has been used to measure fatigue in nurses[20] and other healthcare workers.[21] The FAS has good convergent and divergent validity.[22] The FAS was treated as a unidimensional scale[22] for this study. Internal consistency in our sample was 0.87.

There is not an available or extensively validated instrument to measure nurses' perception of themselves as role models. Other studies have asked participants to rate their agreement with statements related to their self-perception as a role model.[15] For this study, participants were asked to rate their perception of oneself as role model using a 100 mm visual analogue scale provided in the REDCap platform and weighted with higher score reflecting greater identification of self as role model. Two separate questions were used to determine the degree to which a respondent perceived themselves as a role model for their patients and community. Scores could range from 0 to 100.

4.3.1 | Personal protective behaviors

Participants rated the frequency in which they engaged in the CDC most recommended PPBs (frequent hand hygiene, mask in public places, and social distancing of 6 feet or greater, avoiding groups of more than 10 people, daily sanitizing of home surfaces, isolate from others in household when felling sick, and wearing face mask in house when others are sick)[1] outside the hospital setting using a 5-point Likert response format (1-never, 2-rarely, 3-sometimes, 4-usually, 5-always). Participants were also given the option of "not applicable" if they did not have the opportunity to practice the behavior in the previous two weeks.

The Institutional Review Board (IRB) approved the study (IRB00068198) with a waiver for written informed consent. Email invitations to participants contained informed consent.

4.4 | Data analysis

Statistical analysis was performed in R (version 4.02). Our primary outcome(s) of interest were PPBs responses and our primary predictors included: age, education, work place in the hospital, provision of direct patient care (yes/no), years of experience, concern of acquiring COVID, perceived self-risk, FAS score, PI score, confidence in social distancing, confidence in masks, confidence in hand hygiene, whether or not participants had had COVID, and whether or not nurses saw themselves as a role model for their patients or for their community. Confidence measures (for social distancing, in masks, and hand hygiene were all continuous responses from 0 to 100, with 0 representing no confidence and 100 representing absolute confidence). Descriptive statistics for our primary predictors of interest were computed using means and SD for continuous variables, and frequency (percentage) for categorical variables.

4.4.1 | Missing data

Missing data was scarce, with 7% or less among each predictor variable of interest and <2% across PPBs outcome responses. Missing data was assumed to be missing at random. We used multiple imputation by chained equations (across 10 imputed data sets) to impute missing data for each PPB question and predictor variables of interest.[23] Statistical analysis was performed on the imputed data sets using pooled estimates.

4.4.2 | Analysis

There were in total 8 CDC promoted PPBs. Our primary analysis investigated two outcome measures of interest for behaviors: (A) The average "frequency" with which nurses practice PPBs across their set of applicable PPBs, and (B) the proportion of PPBs practiced "often" or "always" out of all PPBs applicable. For (A), we calculated the mean response for each participant out of the number of "applicable" questions to them. We then fit a linear regression model for the CDC protective behaviors, modeling mean frequency response by the set of our defined predictors of interest. For (B), we dichotomized each PPB response to "always or often" versus "never, rarely, or sometimes" and for each respondent we summed the number of PPBs with which they responded "always" or "sometimes." We modeled the proportion of applicable PPBs practiced via logistic regression using a quasi-likelihood framework to account for overdispersion.[24] For all models, we determined statistical significance at a 0.05 a level.

5 | RESULTS

A total of 4621 nurses (RN and advanced practice RNs) were sent links to the survey and 958 responded (response rate 20.7%). The mean age of respondents was 45 (SD = 12.6) and average experience as an RN was 17.5 years (SD = 12.5). Most respondents self-identified as White (83.6%) and 76.4% had a bachelor's degree or higher, 85.9% provided direct patient care and 55% reported providing direct care to a COVID-19 patient. Only 2.8% and 2.5% of respondents had either tested positive for COVID-19 or lived with someone who had, respectively, at the time of the study. Only 13.6% of nurses reported being very concerned about contracting COVID-19. Of the 8 CDC promoted PPBs, covering mouth to cough and wearing facemask (86.6% and 78.2% reporting "always", respectively) were the two most frequently practiced behaviors (see Figure 1). See Tables 1 and 2 for complete demographic and factor descriptives.

5.1 | Mean frequency of PPBs practice

Regression results are found in Table 2. Assessing the mean practice frequency of PPBs, we found that increasing confidence in masks ($p < 0.001$), increasing concern about COVID ($p < 0.001$), and increasing age ($p < 0.021$) were significantly related to higher mean practice frequency, explaining 45% of the variability adjusted for all predictors. We found that participants involved in direct patient care had significantly lower mean PPB practice frequency ($p < 0.04$) and participants with higher fatigue (FAS) scores had significantly lower mean PPB practice frequency ($p = 0.01$).

5.2 | Proportion of PPBs practiced

We found that increased confidence in masks ($p < 0.001$) and increasing concern about COVID ($p < 0.001$) were significantly related to higher proportions of PPBs practiced (See Table 3). We additionally found that decreasing fatigue score ($p = 0.004$) was significantly related to higher proportion of practiced behaviors.

6 | DISCUSSION

This study sought to describe and understand factors that inform nurses' engagement with CDC PPBs in their communities. Overall, nurses appear to engage frequently with PPBs; however, there were some behaviors (e.g., wearing a mask around household members who are sick) that were seldom practiced which may have placed nurses at risk for spreading or acquiring infection. Our results underscore five drivers in nurses' engagement in PPBs in the community setting in both mean practice frequency and number of behaviors employed: (1) concern of contracting COVID-19, (2) confidence in the ability of the facemasks to control the spread of the virus, (3) working in an ICU, (4) fatigue, and (5) direct care. Three factors:
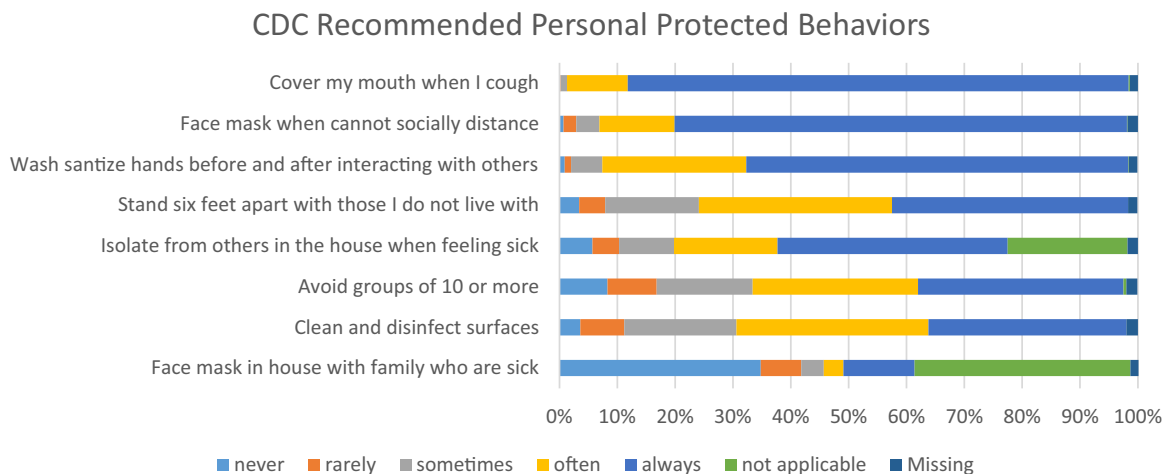
FIGURE 1 Personal protective behaviors most frequently practiced in descending order. CDC promoted behaviors on their website in September 2020

TABLE 1 Demographic characteristics and other predictors

	N (%)	Mean (SD)	Median (Min, Max)	Missing (%)
Age	44.6 (12.6)	44.6 (12.6)	45.0 (21.0, 74.0)	10 (1.0%)
Race				3 (0.3%)
American Indian or Alaska native	5 (0.5%)			
Asian	36 (3.8%)			
Black/African American	67 (7.0%)			
Don't know/not sure	2 (0.2%)			
Native Hawaiian or other Pacific Islander	1 (0.1%)			
Other	19 (2.0%)			
Prefer not to answer	24 (2.5%)			
White	803 (83.6%)			
Education				2 (0.2%)
Some college or technical school	4 (0.4%)			
Associate's degree	220 (22.9%)			
Bachelor's degree	453 (47.2%)			
Some graduate school	59 (6.1%)			
Graduate degree	222 (23.1%)			
Missing	2 (0.2%)			
Years clinical experience		17.5 (12.5)	15.0 (0, 52.0)	17 (1.8%)
Direct patient care				2 (0.2%)
No	133 (13.9%)			
Yes	825 (85.9%)			
Work area				0 (0%)
Adult Med-Surg	182 (19%)			
Adult ICU	91 (9.5%)			
Adult ED	66 (6.9%)			
Ambulatory Clinic	168 (17.5%)			
Designated COVID Unit	17 (1.8%)			
Pediatrics inpatient	84 (8.8%)			
Pediatrics outpatient	22 (2.3%)			
Other	330 (34.4%)			
Family/self at high risk for complications from COVID-19				6 (0.6%)
No	576 (60%)			
Yes	378 (39.4%)			
Concern for COVID-19				5 (0.5%)
No Concern	122 (12.7%)			
A little	237 (24.7%)			
Somewhat	260 (27.1%)			
Moderate	209 (21.8%)			
Very	127 (13.2%)			

TABLE 1 (Continued)

	N (%)	Mean (SD)	Median (Min, Max)	Missing (%)
Fatigue		20.6 (7.37)	19 (10,49)	57 (5.9%)
Perceived Infectability		22.1 (8.10)	21 (7.0,49)	40 (4.2%)
Confidence In Distancing		63.4 (28.6)	70 (0,100)	65 (6.8%)
Confidence In Masking		70.2 (29.7)	78 (0,100)	52 (5.4%)
Confidence in Hand Washing		83.5 (19.4)	91 (0,100)	54 (5.6%)
Live with someone who has tested positive				8 (0.8%)
No	922 (96%)			
Yes	30 (3.1%)			
Has tested positive for COVID-19				5 (0.5%)
No	917 (95.5%)			
Yes	38 (4%)			
Role model for patients		82.1 (21.1)	90 (0.0, 100)	51 (5.3%)
Role model for community		79.0 (22.7)	86.0 (.0, 100)	55 (5.7%)

age, viewing self as role model for their community, and working on a COVID unit were either statistically significant or close to significance in one of the models (frequency or proportion of behaviors employed). Our findings have several implications for healthcare organizations as well as provoke some discussion as to professional identity and health promotion.

A substantial portion of our sample reported never wearing a mask when interacting with others in their home who are sick. Although the CDC consistently recommended wearing a mask around others in one's household who are sick, this behavior was practiced infrequently in our sample. According to a Belgium study,[25] healthcare workers (N = 3056) living with someone who was sick or suspected of having COVID-19 had 3 times the odds of having COVID-19 antibodies compared to those not living with someone who was sick. Exposure during work, however, did not show any significant increase in COVID-19 infection. Thus, not wearing a mask in the home if someone is sick may place the nurse at significant risk. Not wearing a mask at home with others who are sick may be associated with fatigue or tap into the feeling that contracting the infection may be inevitable, in light of exposure before symptoms.

Our study partially supports the Protection Motivation Theory.[26] Rogers[26] proposed that persons engage in protective behaviors based on the perceived probability of occurrence of threat, perceived severity of threat, the efficacy of the recommended prevented behaviors, and perceived self-efficacy. In our study, concern of contracting COVID-19 (probability of threat) and confidence in masks controlling COVID-19 infection (efficacy of recommended prevented behaviors), and working in an ICU (severity of threat) were significant predictors for both mean frequency of engagement and proportion of behaviors engaged in for CDC PPBs. Bashirian et al.[27] also found perceived threat and susceptibility to COVID-19 were predictors for

COVID-19 preventive behaviors. However, their study only looked at in-hospital engagement and only 24% (N = 231) of their sample were nurses. Surprisingly, we did not find any support for perceived vulnerability to disease (specifically PI) as playing a role in nurses' engagement with PPBs even though others have found perceived vulnerability to disease to be associated with COVID-19 preventive behaviors.[28] DeConnick et al.[29] in a survey of adults in Belgium (N = 1000) found that perceived vulnerability to disease (PI) was linked to stronger beliefs in the role of public health measures in protecting the population against COVID-19. Stangier et al.[28] found that PI was associated with increase in practicing preventive behaviors in a sample of German citizens. It is unclear why we did not find an association in our study; however, our mean average (2.94, total score divided by 7 items) was considerably lower than either the Stangier et al. (3.27) or DeConnick et al. (3.87) studies. Both of these studies sampled lay persons and not healthcare workers, thus this scale may not be as sensitive in discerning vulnerability to novel disease/viruses in healthcare workers.

Fatigue and providing direct patient care was negatively associated with engagement in CDC recommended PPBs. Fatigue has been described as "an experience of tiredness, dislike of present activity, and unwillingness to continue."[30] Fatigue has been implicated as a factor in nurses' ability to comply effectively with infection control practices in the work setting.[6] Unlike other studies, we sought to measure fatigue using a validated fatigue scale. In our sample, 37.3% of nurses reported fatigue, with 5.5% reporting severe fatigue. Although not statistically significant, 6.3% of RNs in direct care roles experienced severe fatigue compared to only 2.8% of RNs in research, administration, or education roles and 3.2% of nurse practitioners. The Word Health Organization cites pandemic fatigue as the "demotivation to follow recommended protective

TABLE 2 Linear regression model for mean frequency of practice of CDC personal protective behaviors with select descriptive statistics

Variable	Effect estimate	95% CI lower	95% CI upper	p value	Model R^2
(Intercept)	2.287				0.45
Age	0.006	0.00	0.01	0.021	
Work area					
Emergency Depart.	Referent				
Adult ICU	0.191	0.02	0.36	0.030	
Direct Patient Care No					
No	REF				
Yes	−0.114	−0.22	−0.01	0.036	
Concern for COVID					
No concern	Referent				
A little	0.322	0.19	0.45	0.000	
Somewhat	0.517	0.38	0.65	0.000	
Moderate	0.588	0.45	0.73	0.000	
Very	0.754	0.59	0.92	0.000	
Fatigue	−0.007	−0.01	0.00	0.010	
	−0.007	−0.01	0.00	0.010	
Confidence in masking	0.006	0.00	0.01	<0.001	
Self as role model for community	0.004	0.00	0.01	0.060	

Note: Fitted model adjusted for all covariates presented in Table 1; only variables with *p* < .10 presented.

TABLE 3 Logistic regression estimated odds ratios for proportion of CDC personal protective behaviors engaged in

	Odds ratio	Odds ratio 95% CI lower	Odds ratio 95% CI upper	p value
Age	1.010	1.000	1.021	0.053
Work in COVID unit (relative to ED)	1.768	0.965	3.240	0.064
Work in adult ICU (relative to ED)	1.498	1.069	2.098	0.019
Direct patient care	0.731	0.573	0.933	0.012
Concern for COVID				
Not at all	Referent			
A little	1.524	1.215	1.911	<0.001
Somewhat	2.111	1.661	2.685	<0.001
Moderate	2.851	2.181	3.728	<0.001
Very concerned	4.213	2.944	6.028	<0.001
Fatigue	0.985	0.974	0.995	0.004
Confidence in distancing	1.003	1.000	1.007	0.087
Confidence in masks	1.008	1.004	1.012	<0.001

Note: Fitted model adjusted for all covariates presented in Table 1; only variables with *p* < .10 presented.

behaviors…"[31](p.4) and postulates that pandemic fatigue plays a role in lack of engagement in promoted infection control and prevention practices during the COVID-19 pandemic.[31] We measured general fatigue and not specifically pandemic fatigue; however, fatigue at some level appears to diminish engagement in PPBs. Direct care nurses typically work 12-h shifts and during the pandemic, many of our nurses worked overtime in response to organizational demands. The inverse association between direct care and PPBs, may also be related to the fact that most of the participants worked in areas not directly impacted by COVID-19 and may not have participated in daily COVID-19 briefings that were a part of the daily cadence for both leadership, clinical educators, and those providing care to COVID-19 patients.

Interestingly, adult ICU nurses were more likely to engage in CDC protective behaviors outside the work setting, even though a high-level of fatigue would be expected in this group. This finding may relate to their perceived severity of disease, since the majority of deaths in the hospital setting were in the ICU. In a study[32] of 158,445 healthcare workers employed in the National Health System of Scotland, Shah et al. reported that patient-facing ICU workers (*n* = 1348) were less likely to be admitted to the hospital due to COVID-19 infection than other patient facing healthcare workers. Although the researchers caution interpretation of this results due to the low number of ICU workers, Shields et al.[33] in a cross-sectional study of 545 asymptomatic healthcare works found the lowest seroprevalence of SARS-CoV-2 antibodies in those working in ICU compared to housekeeping, acute medicine, and general medicine. The researchers suggested that these workers may comply with and have more enhanced PPE requirements at work to a greater extent than other direct patient caregivers. Our findings support that they may also be more likely to engage in PPBs outside the work setting and thus limit additional exposure to themselves and others.

Our study revealed that viewing oneself as a role model for their community, may be related to the use of PPBs outside the work setting although not significant (*p* = .06). Our sample reported wearing a mask "always" (78.2%) and "often" (13%), outside work when around people with whom they do not live. Interestingly, this rate of compliance with mask wearing was almost identical to the rates reported in a poll of US citizens during the same time as our survey.[34] As a profession, nursing in the United States and internationally has

promoted the idea that nurses should be role models for healthy behaviors.[12,13] However, the concept of being a role model is not well-defined[14] and may be met with some resistance.[16] For the 19th year in a row, nurses have been voted the most honest and ethical profession in the United States.[35] Implied in this statistic, is trust that nurses will protect those in their care from harm and by extension their communities. Many nurses may not see themselves as "role-models" to their larger communities or have consciously considered that practicing COVID-19 protective behaviors outside the work setting as a professional responsibility. A qualitative study conducted by Darch et al.[36] of nursing students, nursing faculty and practicing nurses in the UK (n = 39) found that although the majority of nurses felt that it was reasonable for nurses to be role models for healthy behaviors, some nurses did not feel that this should be a professional expectation. Provision 5 of the ANA Nursing Code of Ethics states "The nurse owes the same duties to self as to others, including the responsibility to promote health and safety..."[37(p.73)] While the ICN Code of Ethics states "The nurse maintains a standard of personal health such that the ability to provide care is not compromised.[38(p.3)] and "The nurse at all times maintains standards of personal conduct which reflect well on the profession and enhance its image and public confidence."[38(p.3)] The implication in these provisions is that nurses not only have a responsibility to care for themselves but to also "practice what they preach."[37(p.79)]

7 | LIMITATIONS

Care should be taken in generalizing our results across all nursing populations. Our healthcare system employs nurses in both rural and metropolitan areas, though we did not specifically ask nurses to identify where they lived. Our study relied on self-report, which may inflate engagement with PPBs. We also did not look at gender in this analysis. There is some evidence that engagement with PPBs, may vary by gender, with females being more likely to wear facial protection than males in one observational study.[39] Our study was conducted during a period when cases were rising (however, at a slower rate than the latter part of 2020) and before the availability of the vaccine. Thus, our results may not reflect accurately current knowledge and practice of nurses. The study does however, demonstrate that nurses like others, are motivated based on their personal appraisal of susceptibility. We also had a low response rate, despite reminders and incentive. This may reflect fatigue of our nurses, as there were ongoing staff shortages at the time of the study with a reliance on contract nurses.

8 | CONCLUSION AND IMPLICATIONS

As we live through COVID-19 and other inevitable health crises, we will continue to face challenges in keeping our nurses and communities safe. Since nurses are a critical resource in an effective healthcare system, understanding factors that influence nurses'

behavior and choices to protect themselves and others is imperative. Recognizing that fatigue may diminish engagement in PPBs, it is important that leaders determine what measures may help mitigate fatigue in their workers. Approaching this through a harm-reduction mindset may be more helpful.[31] In harm reduction, the expectation is not to stop all harmful behaviors, but provide guidance on how to make potentially harmful behaviors less risky. The CDC[40] has published recommendations for workers and employers on how to manage workplace fatigue, including the provision of spaces where staff can safely doff their masks while on breaks, limitation of shifts longer than 12 h, access to support services, and development of fatigue management plans.

The Protection Motivation Theory may also be useful in understanding individual engagement with PPBs and developing targeted methods to increase engagement. Although we did not look at vaccine intentions, our study may have implications for leadership in addressing those with vaccine hesitancy by providing accurate and fact based messages concerning exposure risks outside work (probability of threat) and the mounting evidence as it relates to vaccine efficacy and safety (efficacy of recommended prevented behaviors). Dissemination by trusted leaders of the latest research on social media sites and through other platforms may be helpful as other studies have found that many nurses obtain their information through social media platforms.[41]

Additional research is needed in how educators and leaders may help nurses connect with their own professional obligations as outlined in both the ANA and ICN Code of Ethics. Nursing curricula may not adequately prepare nurses for self-care and health promotion[42,43] nor help nurses reflect on how they are related to our professional Code of Ethics. Attempts to incorporate health promotion and self-care in nursing curricula have focused on exercise, diet, and programs designed to enhance mental health and resilience.[42-44] Expanding the notion of self-care to incorporate a deeper understanding of evidence based disease prevention strategies within the context of community/population health may also be of benefit with guided self-reflection of one's own health preventive behaviors. Embedding didactic, reflective and experiential elements of self-care and health promotion across a curriculum has shown benefit.[42] However, methods that help students examine professional standards as they relate to self-care and health promotion need to be explored further. As we move forward, it behooves nurse educators and leaders to explore ways they can help students and nurses uphold their professional expectations and support them in fulfillment of this obligation, recognizing that a healthy workforce is key to healthy work environment.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

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

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