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Brief Report

Self-reported impact of respirator use on health care worker ability to perform patient care

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In a study of 1,152 health care workers surveyed prior to the COVID-19 pandemic, most disagreed that respiratory protective equipment use interferes with patient care but reported that it would affect respirator use compliance if it did. A patient's fear reaction variably influenced self-reported health care worker compliance with respirator use. Strategies to improve protective equipment design may remove potential barriers to respirator use and allow better health care worker-patient relationships.

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Human factors associated with respirator use have long been a topic of concern, from comfort, communication, heat tolerance and impact on care, including relationships with patients.^{1–7} Healthcare workers (HCWs) have stated that they may avoid patients when personal protective equipment (PPE) use is required and that patients feel uneasy when respirators are required.⁵ Earlier literature showed that while HCW mask use did not impact patient satisfaction, it did reduce perceptions of HCW empathy.⁴ In the setting of widespread mask use for patient care during coronavirus disease 2019 (COVID-19), findings from a previous assessment of HCW opinions on this topic during nonpandemic use were explored.

HCWs enrolled in a medical system's respiratory protection program were queried both during a focus group interview of 11 hospital staff members and a larger medical system-wide electronic survey of 1,152 HCWs regarding their perceptions and beliefs about the impact of respirators on their ability to provide patient care.^{8,9}

METHODS

During a focus group interview in 2015, HCWs were asked to describe how use of respirators impacted their ability to provide

care and whether patients or their family members interact differently with them when they are wearing respirators. The interview was recorded, transcribed, and iteratively reviewed by 4 researchers for key themes, facilitated by use of NVivo 10 software.⁸

In a subsequent electronic survey, HCWs in respiratory protection programs in a medical system with approximately 9,600 respirator users were queried in the fall of 2016. Eligibility to participate included age ≥ 18 years, employment with current employer ≥ 3 months, and having worn a respirator at least once within the previous year. Settings included a large US academic urban hospital and 4 affiliated community hospitals or ambulatory practice. Participants were recruited via email invitations and in-unit visits by the study team and received gift cards limited by the study budget to the first 1,152 respondents. The study was approved by the local Institutional Review Board.

Survey frequencies were calculated for demographic characteristics and 4 questions related to perceived respirator impact on patient care, the latter asked as 5 category Likert-style scales. Two questions addressing impact on compliance were prefaced with the statement: "Consider a situation in which you must enter the room of a patient who is on Airborne Precautions, where there is high suspicion for active tuberculosis. How are important are the following factors in regard to your compliance with wearing your respirator?" For presentation here, responses were combined to make three categories. Both "strongly agree" and "agree" and "strongly disagree" and "disagree" were combined. Chi-square analysis was performed to evaluate participant response across respirator user groups.

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Table 1
Demographic characteristics of health care worker respirator users completing survey

		Total	
Characteristic	n = 1,152	100%	
Gender			
	Female	927	80%
Job category			
	RN	552	48%
	RT	65	6%
	Provider (Attending or Resident Dr., N.P., P.A.)	216	19%
	Patient support/other*	319	28%
Employer/organization			
	Urban academic hospital	830	72%
	Medical system affiliate	322	28%
Percentage of time wearing a respirator			
	0%-1%	597	52%
	1%-10%	382	33%
	>10%-25%	173	15%
Age			
	<30	344	30%
	30-<40	370	32%
	40+	438	38%
Race			
	Black/African American	227	20%
	White	726	63%
	All other	199	17%
Assigned respirator			
	N95	487	42%
	Elastomeric respirator	412	36%
	PAPR	253	22%

Dr, doctor; N95, N95 filtering facepiece respirator; NP, nurse practitioner; PA, physician's assistant; PAPR, powered air purifying respirator; RN, registered nurse; RT, respiratory therapist.

*Patient support includes: Patient care technicians, nurse's aides, speech/occupational/physical therapists, licensed vocational nurses, housekeeping, maintenance/facilities/safety staff, pharmacy staff and administration/management staff.

RESULTS

Focus group participants reported that while patients or families often initially have questions about respirator use, these questions typically subside after an understanding of why the mask is necessary. HCWs recognized that while mask use did not create conflict with patients or family members, it limited the ability to be seen smiling, and they speculated that a transparent mask might be better.

Survey participants were predominantly female nurses from a large academic medical center and users of N95 respirators (Table 1). Most respondents did not find that use of respirators and PPE impacted their ability to perform patient care (62%) or that it was

inconvenient (51%; Table 2). Most reported that if respirator use interfered with their ability to perform care, it would influence their compliance with respirator use. Participant responses were evenly distributed regarding whether patients' fearful reactions toward caregiver respirator use would impact compliance with their use.

Among the minority of respondents who did find that respirators interfered with patient care, responses differed by user groups ($P < .05$ for overall comparison). More PAPR users (27%) than N95 (17%) and elastomeric (16%) users agreed that respirator use interferes with patient care. This pattern was not directly related to low frequency of use, as use 1% of the time or less was similar in PAPR (55%) and N95 users (54%), compared to 44% of elastomeric users.³ While more nurses (22%) and providers (28%) agreed that use of respiratory protection interferes with patient care, only 9% of respiratory therapists and 10% of patient support staff also agreed.

DISCUSSION

This survey, performed prior to the COVID-19 pandemic, suggests that any interference with patient care caused by PPE use would influence HCW compliance with its use. Fortunately, here, most HCWs reported that PPE use did not interfere with patient care and was not inconvenient. This may reflect a willingness of HCWs to use protective equipment that may be cumbersome or uncomfortable, when the tradeoff is protection of their own health. For example, previous research found that elastomeric respirator users, who rated the respirators less favorably with respect to comfort, but higher in perceived level of protection, still preferred to use them in certain higher risk scenarios, such as during pandemic influenza.⁹ Acceptance of less convenient but more protective safeguards may be more pronounced among HCWs while providing care to COVID-19 patients.

This report reflects responses of HCWs during general care provision. It does not address PPE interference with specific tasks or induced by combinations of PPE, such as ensembles including face shields, gowns, and head covers. Thus, there may be limitations in applying these broad findings about respiratory protective equipment to specific care scenarios. Additionally, during crisis times when PPE use may be prolonged, HCW perceptions may differ from when assessed under routine scenarios.

Changes in PPE design to allow visible facial expression, decreased mask size, and better voice transmission might alleviate many existing challenges to the caregiver-patient relationship and to enhance its utility in clinical settings.⁶ Additionally, enhanced HCW training and patient and family education on the necessity for mask use may foster better therapeutic alliance between patients and their HCW clinical providers.

Table 2
Health care worker respirator user responses regarding respirator impact on care

	Disagree or strongly disagree	Neither agree nor disagree	Agree or strongly agree
Using respiratory protection interferes with patient care			
n (%)	710 (62)	221 (19)	221 (19)
It is inconvenient to use recommended PPE when taking care of patients			
n (%)	585 (51)	199 (17)	368 (32)
	Not or slightly important	Neutral	Moderately or extremely important
How important are the following factors in regard to your compliance with wearing your respirator?			
Respirator Interference with my care activities			
n (%)	368 (32)	282 (25)	502 (44)
Fear by patients of my wearing a respirator			
n (%)	420 (37)	351 (31)	381 (33)

PPE, personal protective equipment.

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