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Letter to the Editor

Personal protective equipment portraits in the era of COVID-19[☆]

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Dear Editor

Use of personal protective equipment (PPE) aims to prevent SARS CoV-2 transmission in the healthcare setting. However, PPE limits human connection and non-verbal communication by masking individuals' facial gestures and body language. Contact isolation potentially presents considerable psychological consequences for patients and healthcare providers (HCPs) [1]. During the 2015 Ebola outbreak, HCPs utilized PPE portraits to humanize care and bridge communication gaps [2]. With increasing PPE portrait use during the coronavirus disease 2019 (COVID-19) pandemic, we sought to summarize and critically evaluate the available evidence of PPE portraits on clinical care.

The systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A comprehensive literature search of Medline, Embase, ISI Web of Science, and PsycInfo was performed from the recorded start of databases until January 2022 using terms related to personal protective equipment and portraits (or picture, image, or photo) or patient-provider relationship/connection and COVID. Cross-referencing of selected articles was also conducted. After removal of duplicates, two reviewers (CHB and MM) independently evaluated the eligibility of citations based on title and abstract. The full texts of the remaining citations were then reviewed for assessment of final study selection. A third reviewer (AB) resolved conflicts. Study inclusion criteria were fully published articles in English or French that addressed the use of PPE portraits in a clinical setting from either the patient or HCP perspective, using qualitative or quantitative methods. We excluded review articles and non-human studies. Data extraction was completed by one author (CHB) and verified by a second (MJS). Predefined variables such as study characteristics (country, year of publication), study design, population characteristics, sample size, and outcomes were extracted. Methodological study quality was assessed using the Newcastle-Ottawa quality assessment scale for non-randomized studies and the Critical Appraisal Skills Programme for qualitative studies. Certainty of evidence

was assessed using the GRADE approach. Because of the nature and amount of available data, only descriptive analyses could be carried out. Outcomes are reported as proportions and 95% confidence intervals for categorical variables and as means and standard deviations for continuous variables, with statistical comparisons collected as reported from the appropriate study publication, where applicable.

The literature search revealed three relevant studies (PRISMA diagram, Appendix 1). Detailed study descriptions and quality assessments are shown in Table 1 and Appendices 2 and 3. The first study provided qualitative insights from frontline HCPs who reported increased comfort with patient interactions while wearing PPE portraits and noted significant adoption [3]. The second study was a survey of 173 HCPs in a palliative care setting (78% female); 64% were exposed to PPE portraits, although only 9.8% had used them [4]. Attitudes toward PPE portraits were positive among all HCPs and more positive among those exposed to PPE portraits. Most HCPs exposed to PPE portraits reported these improved their mood and helped them feel connected to the person wearing the portrait (Table 1). Moreover, most had received positive feedback from staff, patients, and families, and described enhanced meaningful connections and an increased sense of well-being. A few HCPs were concerned with infection control and cleaning/decontamination, costs and logistics, and vulnerability by those wearing PPE portraits. The third was a pre-post intervention study investigating the effects of physicians wearing PPE portraits by administering a survey to 31 patients and 20 physicians [5]. Significant improvements were reported in time spent with doctors, between-doctor communication, colleague identification, and doctor perceptions of patient happiness. No significant differences were noted in patient satisfaction, interpersonal interaction, communication, or in doctors feeling the need to remove their masks to communicate (Table 1). The overall certainty of evidence across all studies was very low owing principally to limitations in study design and small sample size (Appendix 4).

Use of PPE portraits continues to increase during the COVID-19 pandemic despite a paucity of data examining its impact on patients

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Table 1
Summary of studies addressing use of PPE portraits

Study Year Country	Study design Study quality assessment	Study population Study Sample	Measurement of outcome	Results / Quotes
Brown-Johnson et al. 2020 [3] USA	Initial qualitative insights – pilot study CASP Score – dichotomous and qualitative assessment of the criteria presented in Appendix	HCPs working at a drive-thru COVID-19 testing, Stanford Express Care, USA n = not specified - HCPs	Qualitative data on implementation barriers and facilitators of PPE portraits No standard qualitative methods were described	- Front-line providers reported more comfort with patient interactions while wearing PPE Portraits - Signs of significant adoption by HCPs - “It makes it feel less like a disaster zone [for the patient].” Reported exposure to PPE portraits (n = 111): - Agreed that PPE portraits were a good idea (89%) - Improved provider mood (79%) - Enhanced perception of team connection (72%) - Wanting PPE portraits implemented in their department (59%) and system-wide (59%) - Had talked to colleagues about PPE portraits (47%) Used PPE portraits and agreed or strongly agreed (n = 17): - Receiving positive feedback from staff (65%) and patients and families (69%) - PPE portraits augmented interactions with staff (71%) - Enhanced meaningful connection with patients and families (65%) - Increased provider sense of well-being (69%) Open-ended comments regarding PPE portraits addressed (n = 41): - Needs for connection (37%) - Infection control and cleaning/decontamination (15%) - Costs and logistics (12%) - Provider vulnerability in wearing PPE portraits (7%)
Reidy et al. 2020 ⁴ USA	Cross-sectional survey Newcastle-Ottawa quality assessment scale = 1 star out of 8 Rating details provided in Appendix	HCPs at UMass Memorial Medical Center in an inpatient palliative care service, USA n = 173 - Physicians (n = 33) - Advanced practice providers (n = 81) - Trainees/residents/ fellows (n = 19) - Case managers/ social workers (n = 25) - Nurses (n = 11) - Administrative assistants (n = 3) - Women amongst all responders (n = 135)	Survey assessing: - Exposure to PPE portraits - Attitudes toward PPE portraits (impacts on mood and inter-staff connection) - Potential program expansion - Perceptions of interactions with other staff and patients/families - Impact on personal well-being Survey items used a five-point Likert scale (strongly agree to strongly disagree), with an open-ended comments option	Pre- vs. Post-intervention means (SD) in participant response scores (p value): Patients: - General satisfaction = 3.80 (0.87) vs 4.00 (0.61) (p=0.32) - Interpersonal interaction = 3.91 (0.74) vs 3.96 (0.54) (p=0.77) - Communication = 3.66 (0.94) vs 3.85 (0.41) (p=0.31) - Time spent with doctor = 3.20 (0.89) vs 3.70 (0.53) (p=0.02) Physicians: - I feel the communication between doctors has improved = 2.90 (0.64) vs 3.60 (0.88) (p<0.01) - I feel it was easy to identify my colleagues = 2.50 (0.99) vs 3.90 (0.85) (p<0.01) - I need to remove my mask to communicate = 3.90 (0.72) vs 4.00 (0.79) (p=0.68) - My patients are happy with doctors in PPE = 2.10 (0.85) vs 2.80 (1.11) (p=0.03)
George et al. 2021 ⁵ India	Pre-post intervention study Newcastle-Ottawa quality assessment scale = 7 stars out of 9 Rating details provided in Appendix	HCPs and patients at a tertiary COVID-19 specialty hospital, Christian Medical College Vellore, India n = 51 - Patients (n = 31) - Physicians (n = 20)	Modified validated Patient Satisfaction Questionnaire 18 administered prior to and four days following the intervention	Pre- vs. Post-intervention means (SD) in participant response scores (p value): Patients: - General satisfaction = 3.80 (0.87) vs 4.00 (0.61) (p=0.32) - Interpersonal interaction = 3.91 (0.74) vs 3.96 (0.54) (p=0.77) - Communication = 3.66 (0.94) vs 3.85 (0.41) (p=0.31) - Time spent with doctor = 3.20 (0.89) vs 3.70 (0.53) (p=0.02) Physicians: - I feel the communication between doctors has improved = 2.90 (0.64) vs 3.60 (0.88) (p<0.01) - I feel it was easy to identify my colleagues = 2.50 (0.99) vs 3.90 (0.85) (p<0.01) - I need to remove my mask to communicate = 3.90 (0.72) vs 4.00 (0.79) (p=0.68) - My patients are happy with doctors in PPE = 2.10 (0.85) vs 2.80 (1.11) (p=0.03)

PPE = Personal protective equipment; HCPs = Health care providers; SD = standard deviation; NS = Not significant; CASP = Critical Appraisal Skills Programme checklist

and HCPs [2]. Overall, less than 250 participants were enrolled, including only 31 patients. The three studies included in this review are heterogeneous in design, of low to moderate quality, and are all at serious risk of bias. All studies address HCPs experiences or their perceptions of patient experiences. Study findings among HCPs show promise that PPE portraits are helpful in building connections with colleagues. However, the only study to directly measure patient perceptions showed that the use of PPE portraits resulted in a significant increase in time spent with doctors, but no significant improvements in

general satisfaction, interpersonal interaction and communication [5].

The rationale underlying the use of PPE portraits is that facial expression recognition is impaired by wearing a mask. Facial masks conceal the lower part of the face, including the mouth and nose, which provide essential information for the interpretation of expression. Indeed, both the upper and lower face are important for conveying and decoding emotional facial expressions. A randomized controlled study performed before the COVID-19 pandemic was conducted in primary care to explore the effects of doctors wearing facemasks on patient

perception of doctors' empathy, patient enablement and patient satisfaction [6]. A significant negative effect was found in the patient's perception of the doctor's empathy, potentially thwarting the necessary development of trust, communication, and a therapeutic alliance [7]. Alternatively, use of PPE portraits showing smiling headshots may help the facial mimicry where the brain recreates and mirrors the emotional experience of the other person and affects how people empathise with others and interact socially. However, the dynamic and heterogeneous nature of the messages communicated by HCPs to patients and their families may run the risk of confusion when incongruent with the static nature of the portrait. An example would be a patient receiving troubling news from an HCP while looking at their smiling face on the portrait. Further qualitative research is needed to shed light on these areas.

This systematic review is the first to summarize and critically evaluate the available evidence about use of PPE portraits on clinical care. We included both qualitative and quantitative evidence using state of the art adapted methodology. Surprisingly only one study questioned patients regarding their experiences with PPE portraits using a validated outcome measurement tool that was modified. Overall conclusions are limited by the very low certainty of the evidence, the heterogeneity of outcomes assessed, and the small number of studies and participants. Ideally, in future original research, the choice of outcomes will be informed by an understanding of the psychological and biological rationale underpinning the impact of PPE on patients. Additional qualitative research should employ a phenomenological approach to inform a selection of clinically pertinent outcomes. Quantitative research must then employ validated measurement tools when surveying patients and HCPs. As dissemination and adaptations are often driven by clinician and institutional preferences and protocols, issues of decontamination, feasibility, sustainability, and cost-effectiveness will also require characterization [3]. Volunteer organizations have begun supporting the creation and distribution of PPE portraits. [[8,9]] While possible limitations exist, PPE portraits present a potentially impactful low-risk solution to the challenge of delivering compassionate patient care under contact isolation precautions. Contact isolation remains a necessity both during the COVID-19 pandemic, emergence of future infections, and new clinical scenarios of high PPE use.

Contributors

Study concept and design; Christopher Hansen-Barkun, Omar Kherad, Adamo A Donovan, Anupa J Prashad, Maida J Sewitch. Acquisition of data; Christopher Hansen-Barkun, Omar Kherad, Adamo A Donovan, Anupa J Prashad, Maida J Sewitch. Analysis and interpretation of data; Christopher Hansen-Barkun, Omar Kherad, Adamo A Donovan, Anupa J Prashad, Maida J Sewitch. Drafting of the manuscript; Christopher Hansen-Barkun, Omar Kherad, Maida J Sewitch. Critical revision of the manuscript for important intellectual content; Christopher Hansen-Barkun, Omar Kherad, Adamo A Donovan, Anupa J Prashad, Maida J Sewitch. Statistical analysis; Christopher Hansen-Barkun, Maida J Sewitch.

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Supplementary materials

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