
Short Communication

Availability of Personal Protective Equipment in NHS Hospitals During COVID-19: A National Survey

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Abstract

Objectives: The continuous supply of personal protective equipment (PPE) in the National Health Service (NHS) is paramount to reduce transmission of COVID-19 to patients, public, and staff.

Methods: A 16-question survey was created to assess the availability and personal thoughts of healthcare professionals regarding PPE supply in England. The survey was distributed via social media (Facebook© and Twitter©) to UK COVID-19 healthcare professional groups, with responses collected over 3 weeks in March 2020 during the beginning of the pandemic.

Results: A total of 121 responses from physicians in 35 different hospitals were collected (105 inpatient wards, 16 from intensive care units). In inpatient wards, eye and face protection were unavailable to 19% (20/105). Fluid-resistant surgical masks were available to 97% (102/105) whereas filtering facepiece class 3 (FFP3) respirator for 53% (56/105) of respondents. Gloves were accessible for all respondents (100%). Body protection was available primarily as a plastic apron 84% (88/105). All of respondents working in intensive care had access to full-body PPE, except FFP3 respirators (available in 88%, 14/16). PPE is 'Always' available for 30% (36/121) of all respondents. There was a statistically significant difference between London and non-London respondents that 'Always' had PPE available (44 versus 19%, $P = 0.003$).

Conclusions: Our survey demonstrated an overall lack of PPE volume supply in the UK hospitals during March 2020, demonstrating a lack of preparedness for a pandemic. PPE was more readily available in London which was the epicentre of the outbreak. Eye and full body protection are in most lack of supply.

Keywords: COVID-19; NHS; PPE

Introduction

COVID-19 poses a great health risk to healthcare workers. Spreading primarily via respiratory droplets and aerosols, COVID-19 is transmissible via both symptomatic and asymptomatic individuals, and so it is increasingly difficult to classify patients as non-infectious with adequate certainty (Kolifarhood *et al.*, 2020). As such, the continuous supply and use of appropriate personal protective equipment (PPE) are paramount in all patients coming to secondary care, in order to sustain a safe level of staffing, to reduce transmission of COVID-19 to patients, public, and staff, and to reduce preventable admissions to hospital.

The UK government has acknowledged this issue and published a COVID-19 PPE plan outlining the specific recommended PPE for the various in-hospital and community settings (Public Health England, 2020). Within hospitals, these guidelines varied between two broad clinical contexts: higher-risk acute care areas and inpatient ward areas. Higher-risk acute care areas were defined to include intensive care units (ICUs), high dependency unit, emergency department (ED) resuscitation areas, wards with non-invasive ventilation, operating theatres, and endoscopy units. The UK government recommended the use of eye/face protection, filtering facepiece class 3 (FFP3) respirator, disposable fluid-repellent coverall, and disposable gloves for aerosol-generating procedures and higher-risk acute care areas, and that healthcare workers must be fit-tested prior to using the FFP3 respirator. For inpatient ward areas, eye/face protection, fluid-resistant (type IIR) surgical mask (FRSM), disposable plastic apron, and disposable gloves were recommended.

The Department of Health and Social Care (DHSC) procurement team reports that nationally there is currently adequate national supply of PPE in line with PHE recommended usage (Department of Health and Social Care, 2020; Stevens and Pritchard, 2020). However, local distribution issues are being reported, and the British Medical Association (BMA) has reported that their members have been raising concerns regarding inadequate COVID-19 PPE supply (Stevens and Pritchard, 2020). In response to these claims, the aim of this survey is to provide a preliminary investigation into the concerns of inadequate PPE in hospitals in England during the first weeks of the COVID-19 pandemic.

Methods

Survey instrument

A 16-question survey instrument was specifically designed and created by the authors to assess the knowledge, availability, and personal thoughts of healthcare

professionals, surrounding PPE. Questions were split into four discrete sections: respondent speciality and their grade of training, PPE training and knowledge, PPE availability, personal thoughts regarding PPE provision and personal safety. General demographics (age, race, and gender) were not collected. Respondents were required to state which items of PPE were actually available in their respective Hospital, and then how available these are, ranging from 'Always' to 'Never'. Respondents were also asked to state how long it would take to gather all PPE prior to reviewing a patient, as a gauge of accessibility to PPE. A 10-point Likert scale was utilized to capture perceptions of how protected respondents felt against potential infection (0 = not at all protected; 10 = very well protected).

Survey participants and protocol

We consulted local and national bodies and it was confirmed that no ethical approval was required for carrying out this survey. No identifiable data were collected from participants, and participation was informed and voluntary. The survey was distributed via social media (Facebook® and Twitter®) to all UK COVID-19 healthcare professional groups. Social media was the mode of dissemination of the survey because it allowed to reach a national audience in a short time frame at the beginning of the outbreak. During that time, various healthcare worker support groups were created on Facebook® to disseminate information amongst National Health Service (NHS) staff. These were identified by using the search terms 'COVID UK' and 'COVID-19 UK'. All groups identified were joined, and the survey was distributed via these channels. Further, it was posted on Twitter® which then subsequently 're-tweeted' by other healthcare staff, reaching a wider audience.

The survey was distributed for 3 weeks, starting 2 days after the official UK lockdown (23rd of March). The time period was chosen to capture a snapshot of PPE availability and perceptions at the beginning (first weeks) of the COVID-19 pandemic, as a measure of hospital preparedness to deal with a national pandemic. Participants were eligible if they were a healthcare worker employed by the NHS, in the in-hospital setting. Participants working in the community were excluded.

Descriptive analysis was performed using Microsoft Excel 2007®. Subgroup analysis was performed with MedCalc for Windows, version 15.0 (MedCalc Software, Ostend, Belgium), which included testing for normality and performing Chi-squared and 'N - 1' Chi-squared tests to compare for statistically significant differences (set at P -value <0.05).

Results

Respondent demographics

During the 3-week data collection period, a total of 121 replies were collected from 35 hospitals across England. Respondents comprised 77 (64%) foundation doctors and senior house officers (equivalent to intern), 34 (28%) registrars (equivalent to resident), and 10 (8%) consultants (equivalent to attending physician). Of the total responses, 55 were from London NHS Hospitals (46%) and 66 were from Hospitals outside London (54%).

The majority of responses came from four main work areas, with 39 currently working on medical wards (32%), 37 on surgical wards (30.6%), 26 in ED (22%), and 16 in ICU (13%). Two other hospital specialities were represented, radiology and paediatrics, by three responses (0.2%).

During their working hours, 92% (112/121) of workers come into contact with patients who are potentially COVID-19 positive but pending laboratory confirmation and 60% (73/121) having direct daily contact with confirmed COVID-19 positive patients.

PPE availability

In an analysis of the 105 respondents working in inpatient wards, eye and face protection were unavailable to 19% (20/105) of respondents. FRSM was available to 69% (72/105) of respondents. Although the UK government does not state FFP3 respirators are necessary in inpatient ward settings, FFP3 were still available to 53% (56/105) of respondents. Overall, 97% (102/105) of respondents working in inpatient wards had access to either FRSM or FFP3 respirator. Gloves were in supply in all respondents (100%, 105/105). Lastly, body protection was available largely in the form of a plastic apron 84% (88/105), with a smaller percentage of respondents having access to a full body plastic or surgical gown (34 and 12%, respectively). Full data for PPE supply and availability are summarized in [Table 1](#).

The 16 respondents from 8 different hospitals that work in a higher-risk acute care area (i.e. ICU and ED resuscitation areas) are described separately because of the specific FFP3 respirator requirement in their clinical setting, and the prioritization of PPE to these wards. In the 16 responses, 100% of respondents had full eye protection and 100% had gloves and full body protection (full body plastic or surgical gown) available. 88% (14/16) had FFP3 respirators available with the other two respondents (12%) using a surgical mask with or without a visor instead.

In total, 19% (3/16) respondents from ICU were not fit-tested despite the availability and need for FFP3

Table 1. Summary of PPE availability in inpatient wards.^a

Type of PPE (tick all that apply)	Number of respondents with the PPE available in their site (n = 121)	Percentage of all respondents (n = 121)
Eye and face protection		
General safety glasses	41	39%
Chemical splash goggles	11	11%
Face shields alone	40	38%
Surgical masks with visor	45	43%
None	20	19%
Masks and/or respirator		
Surgical masks	72	69%
FFP3	56	53%
None	3	3%
Gloves		
Ward gloves	121	100%
Chemical resistant gloves	0	0%
None	0	0%
Body		
Scrubs	74	71%
Plastic apron	88	84%
Full body plastic gown	36	34%
Surgical gown	13	12%
None	0	0%

AGPs, aerosol-generating procedures; HDU, high dependency unit.

^aExcluding high-risk clinical areas (ICU, HDU, areas where AGPs are performed, and ED resuscitation areas).

respirator in their clinical setting. Interestingly, of the 56 respondents working in inpatient wards who had access to FFP3, only 50% (28/56) were fit-tested.

PPE is 'Always' available for 30% (36/121). When comparing the availability of PPE in London (n = 55) versus non-London (n = 66), there was a statistically significant difference between London and non-London respondents that 'Always' had PPE available (44 versus 19%, P = 0.003). PPE was always available in 63% (10/16) of ICU respondents and 30% (31/105) of inpatient wards ([Table 2](#)).

From all respondents, 24% (29/121) had bought PPE independently to go to work due to lack of supply. There was no statistically significant difference between London and non-London respondents (23 versus 25%, P = 0.853).

Table 2. PPE availability.

	Number of respondents with the PPE available in their site	Percentage of all respondents
Are the aforementioned PPEs available as needed?		
Always	36/121	30%
Usually	49/121	41%
Occasionally	23/121	19%
Almost never	10/121	8%
Never	3/121	3%
Are the aforementioned PPEs 'Always' available as needed?		
London	24/55	44%
Non-London	13/66	19%
High-risk areas		
ICU (ITU)	10/16	63%
Inpatient wards		
Total ^a	31/105	30%
Medical	14/39	36%
Surgical	12/37	33%
ED (not resuscitation areas)	3/26	12%

^aIncluding three respondents in paediatric and radiology whom do not fit in the below categories.

The Likert-scale responses were used to assess the results of the questionnaire (0 = not at all protected; 10 = very well protected). Healthcare workers felt modestly protected for themselves and their families from COVID-19 (mean 4.2 out of 10). From all respondents, 53% (64/121) have considered not coming into work because of lack of PPE supply in their local hospital. When comparing the London and non-London respondents, there were no statistical differences in how protected respondents felt (4.6 versus 5 out of 10, $P = 0.075$).

Discussion

Public Health England has issued guidance on the recommended PPE, which should be always available for healthcare workers in secondary care (Public Health England, 2020). During March 2020, in inpatient wards, eye and face protection were unavailable to 19% (20/105). FRSMs were available to 97% (102/105) whereas FFP3 respirator in 53% (56/105) of respondents. Gloves were accessible in all respondents (100%). Body protection was available primarily as a plastic apron 84% (88/105). All of respondents working in intensive care had access to full-body PPE, except FFP3 respirators (available in 88%, 14/16).

These findings are important, as 92% (112/121) of respondents stating they have direct contact with patients who are potentially COVID-19 positive. Eye protection is mandatory for all staff that work in inpatient wards in the NHS, and our results demonstrate that one in five members of staff do not have access to this. The eyes provide a mucous surface and are directly involved in the transmission of the COVID-19, by both causing a local infection (viral conjunctivitis) and spreading to the respiratory tracts via the lacrimal ducts (Li *et al.*, 2020; Qing *et al.*, 2020). Increasing the supply of this should be one of the governments priorities.

Lastly, our results demonstrated that PPE was always available in 30% (36/121) of our cohort, with London being preferentially more supplied than non-London areas of England (44 versus 19%, $P = 0.003$). This potentially demonstrates that the overall PPE supply in England was not adequate at the beginning of COVID-19 in March 2020, which demonstrates a lack of preparedness for such an event. A preferential distribution of PPE supplies to London is noted, which has been the centre of the pandemic. Despite this, London and non-London staff members felt equally unprotected by COVID-19. This demonstrates the emotional toll this pandemic has taken on healthcare workers, despite PPE.

Although this is one of the first surveys on this topic, it also has limitations. Given that the survey was spread via social media, it was not possible to calculate the actual response rate and the level of non-respondent bias. Also, the survey collected responses from doctors only and thus has missed the point of view of other healthcare staff. Lastly, higher numbers of respondents from ICU and community (general practitioner psychiatry) would also allow for a more thorough review of PPE supply in England.

Authors' contribution

All authors contributed equally to the conception of the protocol and study design, reviewed this report, and approved the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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