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Original Research Article

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Communication in the intensive care unit during COVID-19: early experience with the Nightingale Communication Method

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Abstract

Objective: To assess the utility and frequency of use of the Nightingale Communication Method, during the early operational phase of the Nightingale Hospital London (NHL) 4000-bed field hospital's intensive care unit.
Design: Survey-based cross-sectional assessment.
Setting: The intensive care unit at the Nightingale London hospital.
Participants: Staff working in the clinical area and therefore requiring full personal protective equipment (PPE).
Intervention: Survey of all staff members sampled from a single shift at the Nightingale Hospital. This investigated perceived utility and actual use of identification methods (name and role labels on visors and gowns, coloured role identification tapes) and formal hand signals as an adjunctive communication method.
Main Outcome Measure: Self-reported frequency of use and perceived utility of each communication and personnel identification adjunct.
Results: Fifty valid responses were received (72% response rate), covering all clinical professional groups. Prominent name/role identifications and coloured role identification tapes were very frequently used and were perceived as being highly useful. Formal hand signals were infrequently used and not perceived as being beneficial, with respondents citing use of individual hand signals only in specific circumstances.
Conclusion: PPE is highly depersonalizing, and interpersonal identification aids are very useful. Despite being difficult, verbal communication is not completely prohibited, which could explain the low utility of formal hand signals. The methods developed at the Nightingale hospital have enhanced communication in the critical care, field hospital setting. There is potential for wider application to a variety of healthcare settings, in both the current situation and future pandemic scenarios.

Key words: communication, patient safety, intensive care unit

Background

The COVID-19 pandemic has necessitated the widespread redeployment of clinical staff to the intensive care unit, where specialist and complex clinical care must be undertaken whilst wearing full personal protective equipment (PPE). The unfamiliarity of this environment and the communication barriers inherent whilst wearing PPE present potential detrimental effects to the delivery of patient care. Ineffective communication is a common root cause of clinical error and thus is important to address to ensure patient safety [1].

Experience from previous pandemics demonstrates the need for the use of standard operating procedures to ensure the safety of patients and healthcare professionals whilst working in unfamiliar and often high-stress environments [2]. Effective communication is essential in the delivery of high-quality care in such settings, where communication can be most challenging. Healthcare workers have cited the use of PPE as a barrier to effective communication and relationship formation with patients, in both the current and previous infectious disease outbreaks [3–5]. During the Ebola virus disease outbreak, various professional bodies issued guidance for processes to ensure safe use of PPE with a consideration for potential communication issues [6, 7].

Multiple industries beyond those involved in healthcare provision have developed techniques to aid with communication for both high-stress situations and settings where PPE restricts traditional forms of communication. Standardized hand signals are used frequently in both amateur and professional scuba diving and are an essential skill in the field [8, 9]. The 'Shisha Kanko' or 'point and call' communication method developed for use in the Japanese rail system has more recently been introduced to aviation environments [10].

The highly depersonalizing effects of PPE also makes individual identification very difficult (Figure 1). There is an increasing use of personal identification tools not previously widely used in healthcare settings. Examples include the use of personalized name-labelled theatre caps and the impact of these on closed-loop communication and communication errors [11].

The NHL is a 4000-bed capacity, intensive care plus step-down hospital constructed in response to the emerging pandemic to provide surge capacity for London within the ExCel Exhibition Centre in East London, UK. PPE at the Nightingale includes a 'fit-tested' Filtering Face-Piece (FFP3) respirator face mask, full face visor, gown and gloves. In an effort to mitigate expected barriers to effective communication, a standard operating procedure for communication, locally termed the 'Nightingale Communication Method', was developed. This was taught to and used by clinical staff over the 5 weeks that the hospital was operational in the initial pandemic phase

We then describe out investigation of the perception and utility of these communication adjuncts in clinical use and outline lessons that may be drawn from this during future phases of this or other pandemics.

Methods

> 'Speaking to one another wearing PPE is hard. This is worse in the harsh, and to many of us unfamiliar environment of the ICU (Intensive Care Unit). Be kind to each other. Actively listen. At the Nightingale we developed a strategy to try and maximise effective communication to help us all. It doesn't work for everyone, but knowing some basics can help in trying circumstances.'

The Nightingale Communication Method

The Nightingale Communication Method aimed to improve interpersonal communication in difficult environments. It was developed using three core principles based on the experience of the clinical leadership team in the military, aviation and pre-hospital medical provision:

(i) Clear identification (personal introductions on every encounter, identification adjuncts: name labels and coloured stripes),
(ii) Use of hand gestures and signals to reinforce messages and

Figure 1 The depersonalizing effects of PPE. Two staff members are shown in (A) typical non-clinical work clothing, (B) ward/surgical scrubs and (C) full PPE as required at the NHL. Names and roles on visors and gowns are visible, as are role-denoting stripes over the shoulders. Other than these aids, almost no personal identifying features are visible.

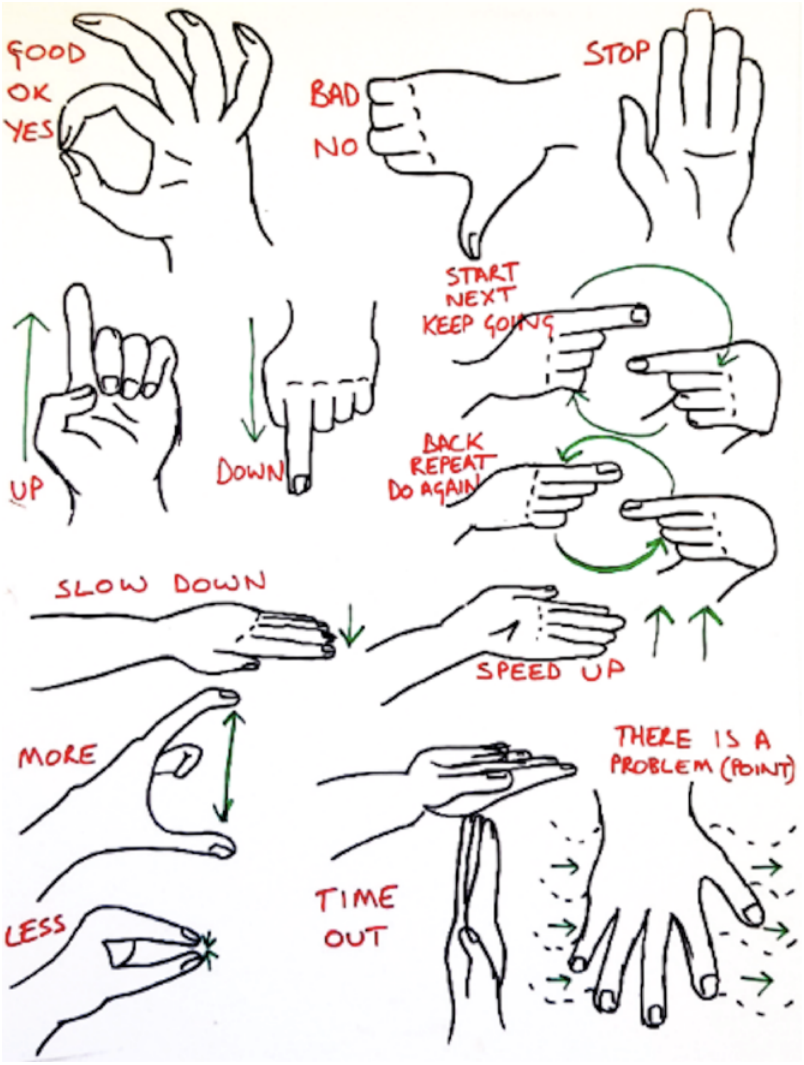

Figure 2 Hand signals taught at the Nightingale induction: This series of hand signals was adapted from diving and other environments where verbal communication is impossible or severely restricted. The 'can't hear' signal was added later following a review. Artwork: Georgia Twigg.

(iii) Communication discipline (including closed-loop communication, with confirmation of messages through read-back and limiting bedside communication to messages regarding that particular patient's care).

The above-mentioned principles were designed to be easy to communicate and remember, to minimize the cognitive burden, particularly on those with no prior critical care experience. These principles were introduced and taught in a dedicated session during staff induction at the hospital.

A series of hand signals were collated and introduced for use at the induction programme (Figure 2). These were developed with reference to British Sign Language, scuba diving, aviation and other non-verbal environments, where the performance of safety critical tasks requires gesture-based methods to ensure clarity of communication.

An 'Introduce yourself at every contact' mantra was encouraged, aiming to mitigate casual misidentification or confusion during verbal communication. Fixed visual aids were used to assist identification. Colour-coded, personalized hats were initially ordered, but supply-chain challenges prevented reliable delivery. As a substitute, coloured-coded stripes of tape were attached to the shoulder of gowns, denoting specific roles (Figure 3). A second tool was formulated on the understanding that conventional staff identification badges would not be visible while in the clinical zone due to the PPE donning and doffing processes. Names and clinical roles of all individuals were written on both visors and gowns in large print. These identification aids were placed during PPE donning, with assistance from 'donning partners'.

The teaching of the Nightingale Communication Method was incorporated into the hospital induction. Induction was between 12 and 24 h depending on staff's prior experience of working in intensive care units. The session was delivered by a dedicated education team made up of a mixture of experienced healthcare professionals including nurses and clinicians and lasted 90 min. The communication tools were then used by attendees during 4 h of simulation sessions. This educational experience was aimed towards developing a communication culture for the Nightingale hospital, introducing a variety of communication tools including graded assertiveness [12], closed loop [13] and 'situation, background, action, response' [14] to

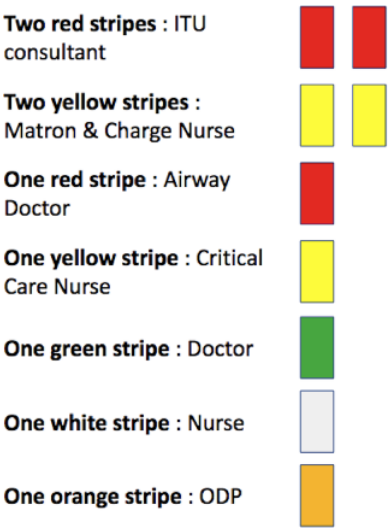

Figure 3 Examples of fast role identification stripes: A strip of electrical tape was run over the left shoulder so to be visible from front and back. Each position was represented by a specific number and colour of stripes. Clinical leader roles including ITU consultant and matron were represented by two stripes that were red and yellow respectively. Clinicians with airway training were indicated with a single red stripe, while those without a single green stripe. Similarly nursing staff with ITU experience were identified with a yellow stripe, and those without a white stripe. Additional colours were continuously updated for wider members of the multidisciplinary team including physiotherapists, CSWs and cleaners.

all levels of staff and volunteers. Delivery methods included demonstration, role-play and simulation-based learning with an emphasis on active participation.

Data collection and analysis

This study aimed to assess three domains of communication: perception of impairment of communication; hand signal frequency of use and perceived efficacy and the use and perceived efficacy of identification aids. A short questionnaire was developed for this purpose (Supplemental File 1). Each domain was evaluated with specific questions, using a standard 5-point Likert scale. In order to obtain a representative cross-section of the Nightingale workforce, all personnel working in the clinical area during a single 12.5-h shift were surveyed. Individuals were approached by one of the investigators and asked to complete the questionnaire whilst in the clinical area (i.e. immediate recall). Investigators (J.S. and J.R.) also witnessed and recorded uses of hand signals in line with those taught in induction. The process was registered with the Barts Health NHS Trust audit team prior to data collection. Data were analysed using R (R version 3.6.2, The R Foundation for Statistical Computing), and Spearman's rank-order correlation was calculated using Hmisc package (4.4.0).

Results

Respondents

Based on the hospital rostering patterns, a total of 69 individuals were available to be surveyed during the chosen data collection period. We did not seek to confirm any absences or 'doubling-up' of job roles during this period. Completed questionnaires were collected from 50 respondents, giving a response rate of 72%. Fourteen percent ($n = 7$) of responders were clinical support workers (CSWs), 24% ($n = 12$) were doctors, 30% ($n = 15$) were allied health professionals (AHPs) and 32% ($n = 16$) were nurses. Non-respondents either declined to participate or were unable to complete their survey within the pre-specified data collection period.

Impairment of communication

Both verbal and non-verbal communication methods and the identification of personnel were impaired by PPE as indicated by mode responses of 3, 3 and 1 for questions 2, 3 and 4 (Figure 4). Frequency of use and perceived usefulness of each communication tool varied and the use of name labels was the most frequently used tool with the highest perceived usefulness (Figure 5).

Hand signal frequency and utility

None of the hand signals detailed in the quick reference guide handbook was observed to have been used at any point during the shift. 'I frequently use hand signals when communicating' (Q5) had a mode response of 1 (mean 2.18) indicating 'strongly disagree' on the Likert scale and 4 (mean 2.76) for usefulness (Q6) indicating 'agree' with the statement. Self-reported frequency of hand signal use per 12-hour shift (Q7) was two per shift (median frequency). Nurses were the most frequent self-reported users of hand signals (median 2, mean 5.7, range 0–24, $n = 17$), followed by AHPs (median 2, mean 3.47, range 0–15, $n = 15$), CSWs (median 2, mean 1.86, range 0–6, $n = 7$) and doctors (median 0, mean 1.18, range 0–3, $n = 11$). The highest frequency user of hand signals was a matron, who had responsibility for a single 42-bed ward.

The most common self-reported hand signals used were 'ok' ($n = 9$), 'stop' ($n = 5$), 'up' ($n = 3$), 'can't hear' ($n = 2$) and 'down' ($n = 1$) (Figure 6a). The most common situations for use were during proning ($n = 6$), turning ($n = 5$), moving ($n = 3$), cardiac arrests ($n = 2$) and positioning ($n = 2$). Other examples include giving instructions ($n = 1$) and adjusting medications ($n = 1$). Hand signal frequency of use was positively correlated with perceived usefulness (Figure 6b), with a positive correlation coefficient of $r = 0.65$ ($P < 0.0001$, (95% CI 0.45–0.79)).

During the data collection period, matrons were observed to use hand signals to communicate along the length of the 'Nightingale' style ward. Healthcare professionals from each surveyed group were seen to use hand signals during pronging patients, cardiac arrests and when making changes to ventilator settings.

Identification tools' frequency and utility

Coloured shoulder stripes had a mode of 5 (mean 3.76) and 3 (mean 3.8) for frequency and usefulness respectively indicating 'strongly agree' and 'neutral' with the statements. Name labels on visors and gowns were the most frequently used and had the highest responses for usefulness with modes of 5 (mean 4.6) and 5 (mean 4.72) respectively, both 'strongly agree'.

Discussion

The highly contagious nature of COVID-19 necessitated strict adherence to PPE guidance while providing clinical care [15]. The safety-critical and highly technical nature of the work performed in the NHL intensive care unit compounded the potential consequences of communication limitations. Further complications arose from the urgent recruitment of a workforce drawn from a variety of healthcare settings.

Our key findings are: (i) all forms of communication are perceived as being negatively impacted by wearing full PPE, (ii) adjuncts aiming at visual interpersonal identification were frequently used and are

	Statement	Average (mode) response, range and frequency (n) of average response
Q1	Role	
Q2	I have found verbal communication easy while wearing PPE	Neutral (3 [1-4], n=24)
Q3	I have found non-verbal communication easy while wearing PPE	Neutral (3 [1-4], n=21)
Q4	I have found it easy to identify people wearing full PPE	Neutral (3 [1-5], n=17)
Q5	I frequently use hand signals when communicating	Strongly Disagree (1 [1-4], n=16)
Q6	I find the hand signals useful when communicating	Agree (3 [1-5], n=9)
Q7	How many times in a shift do you use the hand signals found in the QRG in a shift?	0
Q8	Which situations do you use the hand signals in?	
Q9	I frequently use the coloured shoulder stripes to identify someone	Strongly Agree (5 [1-5], n=15)
Q10	I find the coloured shoulder stripes useful in identifying someone	Neutral (3 [1-5], n=14)
Q11	I frequently use the name labels on the visors/gowns to identify someone	Strongly Agree (5 [3-5], n=33)
Q12	I find the name labels on the visors/gowns useful to identify someone	Strongly Agree (5 (3-5), n=37)

Domains	
Impairment of Communication	
Use of Hand Signals	
Personal Identification	

Figure 4 Survey questions and average (mode) responses.

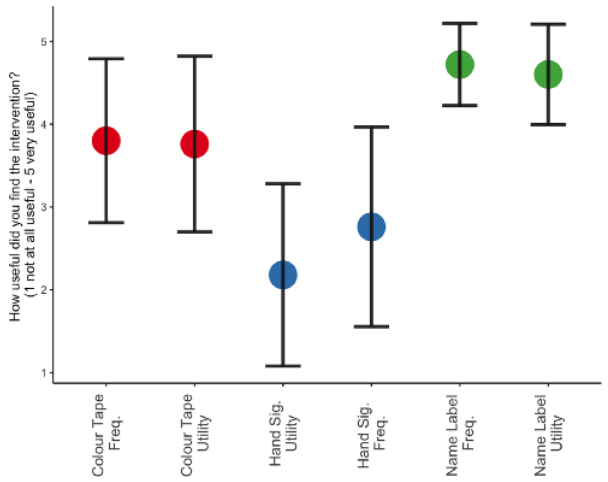

Figure 5 Utility and frequency of use of identification labels, hand signals and role identification stripes.

perceived as being useful and (iii) formal hand signals have limited utility in environments where vocal communication is possible, even if this is constrained.

It is unsurprising that respondents indicated that all forms of communication were negatively impacted by the use of PPE. Previous work demonstrates similar attitudes to PPE use in both pandemic settings and provision of 'usual' acute care [16, 17], while poor communication has been repeatedly shown to be a leading causal factor in adverse events in medicine [18]. These findings justify the planning and subsequent use of less traditional forms of communication at the Nightingale Hospital.

Limited utility of hand signals

There is limited formal evidence exploring the use of hand signals as a communication tool in medicine. The frequency of use of hand signals at the Nightingale Hospital was minimal, though our respondents appeared to show an appreciation for the potential utility of the hand signals. Nursing staff, who had a high frequency of interactions with all members of the multidisciplinary team, appeared to be the most frequent users of hand signals. We were not surprised to find that the highest frequency user of hand signals was one of the ward matrons.

While no formal data collection tool was used to record observed hand signal use, it was apparent during the data collection period that hand signals were being used during safety-critical tasks requiring high levels of focus such as proning patients. It was also noted that hand signals were used to communicate at distances where verbal communication may have been impeded, along the length of the 'Nightingale' style ward. Task-specific use of the hand signal suggests their benefit in promoting clear and closed-loop communication.

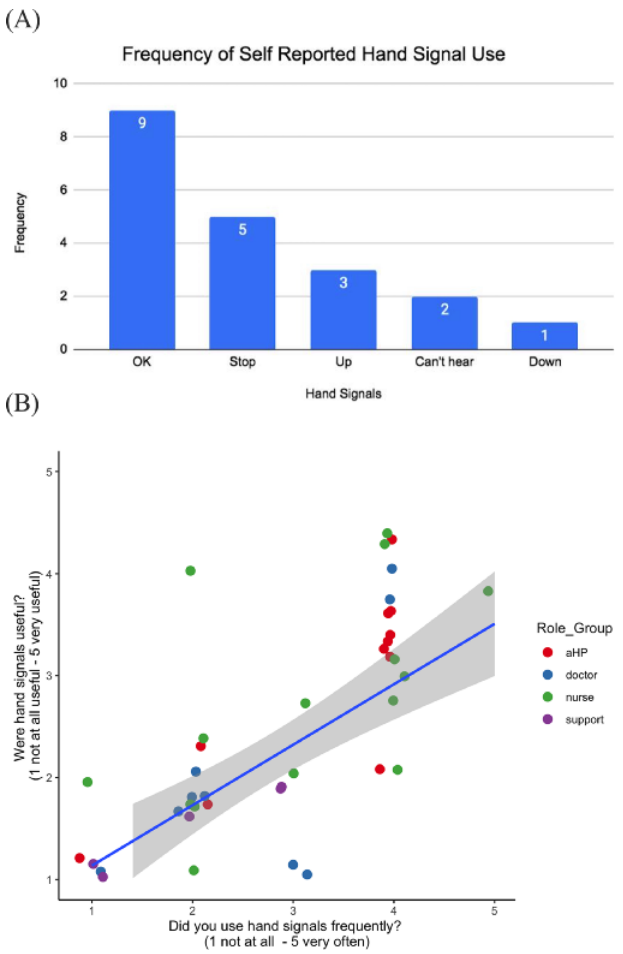

Figure 6 (a) Frequency of self-reported hand signal use by staff members working at the Nightingale Hospital. (b) Individual response correlations for use of hand signals. A significant correlation existed between perceived utility and the frequency of use of formally taught hand signals $r = 0.65$.

Future work would be able to provide further insight through the use of a formal tracking tool allowing an empirical measurement of the situation-specific use of hand signals.

Unlike many of the situations from which hand signals were derived, one-to-one verbal communication was possible in full PPE. Indeed, the working environment at the Nightingale Hospital may simply not have necessitated their use. The associated level of noise pollution was far lower than anticipated: the planned capacity of the Nightingale Hospital London is 4000 beds [19], yet this study was undertaken when only a single 42-bed ward was in use. If such capacities were to be used, background noise would be likely to become highly intrusive and hand-signal communication might be required.

Identification tools

The use of prominent name labels on gowns and visors was shown to be the most effective additional tool for communication by our respondents. Humans are generally good at recognizing faces but very poor at recalling names [20], in addition clinicians remain inconsistent at introducing themselves despite prominent campaigns such as 'Hello my name is…' [21]. In an intensive care setting with many staff displaced from their normal working environment and roles, we had to adapt quickly to problems with supply chains and find alternative ways of identifying the staff member's role, including using coloured electrical tape. The use of names is a key component of closed-loop communication, which has been shown to reduce the time taken to perform tasks during time-sensitive medical scenarios [22].

The benefits to patient safety and workforce satisfaction of the seemingly simple notion of interpersonal communication on a first-name basis should not be overstated. The aforementioned identification tools are a cost-effective adjunct to such communication in the Intensive Care Unit (ITU) setting. The utility of large name labels in the wider healthcare setting where gowns and visors are not commonly used is more complex and warrants further consideration. Healthcare professionals are required to wear identification badges in the clinical setting. Our experience with this involves small badges that are difficult to read at any distance, particularly the currently recommended 2-metre separation [23]. The normalization of the use of more prominent name labels may aid closed-loop communication and foster enhanced patient–professional relationships, in settings both with and without PPE.

An example of a similar approach to communication includes the use of coloured scrubs to denote the job roles of healthcare professionals, particularly within emergency departments [24].

Limitations

By necessity the Nightingale communication approach was rapidly deployed in the clinical setting. The described work explores the method in the evaluation phase of the traditional iterative process for implementing interventions in healthcare [25].

A number of questions were found to have a narrow distribution of responses, suggesting a ceiling effect in some domains. While this is a limitation of the study it provides useful insight for future work. Further re-evaluation, though not possible at present with the Nightingale hospital on standby, is essential for considering wider implementation.

For some staff there was a time delay between induction training and being rostered into clinical practice, this along with a variety in teaching methods may have influenced the uptake or perceived importance of the communication tools. Further research to determine the application of use should consider a qualitative observational study design over a longer time period.

Conclusion

Full healthcare PPE, as worn during the COVID-19 pandemic, significantly impacts interpersonal identification and communication. Adjuncts seeking to enhance personal identification are particularly useful. In environments where verbal communication is restricted but not entirely prevented, formal hand signals may be of limited use only. This preliminary work demonstrates the potential positive impact of holistic communication methodologies to aid clinical work whilst wearing full PPE. There is a wide potential application for this communication approach in both the current situation and in future pandemics.

Supplementary material

Supplementary material is available at *International Journal for Quality in Health Care* online.

Conflicts of Interest

The authors declare no conflicts of interest, financial or otherwise.

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