International Journal of Infection Control
www.ijic.info ISSN 1996-9783

ORIGINAL ARTICLE

"The cookie monster muffler": Perceptions and behaviours of hospital healthcare workers around the use of masks and respirators in the hospital setting

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doi: 10.3396/IJIC.v11i1.006.15

Abstract

To ensure facemasks and respirators protect healthcare workers (HCWs) during respiratory virus outbreaks or a pandemic, individual, environmental, organizational and cultural issues associated with their use must be addressed. In order to get a rich understanding of the barriers and facilitators associated with non-emergency facemask/respirator use, we undertook in-depth interviews with staff from a major tertiary referral hospital in Sydney, Australia.

A qualitative study involving semi-structured interviews was undertaken at a tertiary hospital in Sydney Australia. HCWs from wards in which risk from respiratory infections is considered to be high (i.e. intensive care, emergency and infectious disease wards), were invited to participate.

A broad spectrum of attitudes was expressed regarding the use of facemasks and respirators, with many participants expressing uncertainty surrounding their use and level of effectiveness. Participants who stated that they had previous experience with using these products agreed that the latter provided more protection and should be the product recommended for use in a respiratory infection setting. A lack of training, uncertainty

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regarding hospital or health department guidelines and the discomfort and difficulty associated with facemask/respirator use, were highlighted to be the core issues resulting in poor implementation of facemasks and respirators in the setting.

While HCWs should take personal responsibility for donning facial protection when needed, the legal responsibility for employee use, adherence and occupational health and safety falls to the employer. An institutional commitment to a culture of safety systems, policies and practices is required to ensure a higher rate of adherence.

Key words: Respiratory tract infections and prevention and control; Health personnel; Disease outbreaks; Respiratory protective devices; Masks.

Introduction

consistent facemask and/or respirator use amongst healthcare workers (HCWs) is considered a cornerstone of hospital containment plans during outbreaks of unknown respiratory diseases or influenza pandemics. The problem is that compliance with using personal protective equipment (PPE) has been documented to be suboptimal.[1-6] Studies have identified that individual, environmental, organizational and cultural factors can all influence staff compliance.[2,7-10] These factors include: (a) the type and quantity of product available;[11] (b) the work activities being undertaken and the workload;[12] (c) perceived interference with providing patient care;[13,14] (d) doubts about the effectiveness of the product to prevent disease transmission; (e) time constraints; and (f) the culture,[5] profession,[15,16] gender and age of the HCW.[8] Lastly, compliance with using masks/respirators has also been shown to vary with the HCWs, perceived levels of self-risk,[8] with higher perceived self-risk rates associated with providing care for adults, patients with tattoos, patient who look unkempt, patients from developing countries, and patients with known infectious diseases such as HIV/AIDS, hepatitis, or influenza H1N1 etc.[17,18] Organisational and environmental factors have been suggested to be more important than individual factors in regards to affecting the level of compliance with the use of PPE, and specifically facial protection.[19]

The implications of not complying with infection control practices were documented during both the 2003 SARS outbreak and the influenza pandemic (H1N1) of 2009. In 2003, Canada, China (Mainland and Hong Kong), Taiwan and Vietnam all documented SARS cases amongst their HCWs.[20] Systematic breaches in infection control guidelines likely contributed to the transmission of SARS in this population.[21] There were accounts of suboptimal compliance with protocols for the donning and removal of PPE, PPE reuse, fatigue and poor knowledge of basic procedures for infection control.[20-22] HCWs reported that it was difficult to keep from contaminating themselves or their environment.[21] Six years later, pandemic influenza (H1N1) infections amongst HCWs were again associated with suboptimal PPE compliance.[23]

To ensure facemasks and respirators protect HCWs during respiratory virus outbreaks or a pandemic, individual, environmental, organizational and cultural issues associated with their use must be addressed. Most studies to date have relied on surveys to examine factors associated with using respiratory protection. In order to get a rich understanding of the barriers and facilitators associated with non-emergency facemask/respirator use, we undertook in-depth interviews with staff from a major tertiary referral hospital in Sydney, Australia.

Method

Study design

Eighteen semi-structured interviews were undertaken with hospital staff from a major public hospital in Sydney, Australia between May and July 2012. The study was approved by the Human Research Ethics Committee (HREC) of the South Eastern Sydney Local Health District-Northern Sector (SESLHD-NS).

Participants

HCWs from wards, in which risk of respiratory

infections is considered to be high (i.e. intensive care, emergency, aged care and infectious diseases), were invited to participate. An invitation letter, along with the participant information and consent form was sent to staff members. Participants did not receive any compensation for their involvement and snowballing techniques were used for further recruitment. Each staff member was contacted twice before they were considered a non-respondent. Participants were recruited into the study when full written consent had been received.

Data collection

An interview guide was developed by HS and reviewed by the researchers to identify key areas of interest for the study. This included a series of questions related to: the perceived role/importance of respiratory protection; attitudes towards the use of facemasks versus respirators; current work practices; issues impacting on the use of facemasks/respirators; knowledge of hospital or health authority guidelines and education and training. The list served only as a general direction for the researcher during each interview. In addition, paraphrasing and additional questions were added to seek clarification. This was to ensure that the study included most of the opinions and was flexible to changes depending on the actual scenario. Questions were asked in an open-ended manner to allow room for expansion. For example, interviews often began with a broad question like "what are your thoughts about the use of facemasks and respirators?" to allow participants to freely discuss their opinions. Prompts were only given when the interviewer deemed that it is necessary to encourage the conversation back to topic or to address a certain issue. During the interviews, member checking was conducted to ensure that the themes identified during the early phase of analysis were appropriate. The interviews typically lasted approximately 30 minutes and were audio-recorded then professionally transcribed verbatim.

Data analysis

The interviews were analysed thematically. Two investigators (JL and HS) developed a list of themes after one quarter of the transcripts had been analysed. An agreed framework was then applied to another subsample of transcripts and modified further. Using this final framework, all of the transcripts were analysed and coded. Text was organised within the identified themes of the developed framework without the use of any software. No formal testing of the reliability of the coding was undertaken, although discussions with colleagues about the analysis and the meanings and patterns derived from it were extensively undertaken.

Results

Perceived effectiveness

There was a broad spectrum of viewpoints toward the use of facemasks and respirators. When asked whether they believed that using the products were effective, responses ranged from highly positive ("*90% effective*") to very negative ("*I don't think it does anything*"). One participant even stated that the use of masks/respirators was just for "*show*". Hand hygiene and patient isolation were cited as the most effective methods in preventing the spread of respiratory infections. Hand hygiene was described as being superior, as the practice is "*the easiest to do and the easiest to comply with… not just by the staff but by visitors and patients as well*."

"Masks, hand washing, gloves, gowns, you know. It's a show. I don't believe it's of any value." (Ward Director)

"I would wear them but I would be aware of the fact that they're not offering 100% protection". (Doctor)

Experience influences preferences

Most of the participants who stated that they have had previous experience with using facemasks or respirators agreed that respirators provide more protection and should be the product used in a respiratory infection setting. One HCW noted that "*there's a lot of gaps around the surgical mask*" and that the "*lack of tight seal prevents adequate protection*". Some even went on to say "*surgical (face) masks are useless*." However, a few participants considered facemasks were useful for "*droplet infection*" and "*seasonal influenza*". When referring to the role of facemasks, one participant stated: *"I think it's designed for you to not breathe germs onto the patient while you're operating. I don't think it's designed to go the other way." (Resident Medical Officer)*

Triggers for mask/respirator use

Reported cues for using masks/respirators varied greatly amongst the participants. Some stated that it was just '*instinctive*', whereas others linked the use to their perceived personal risk of acquiring an infection. A range of triggers for product use was nominated and were categorised as being disease-based, patient-based or procedure-based (or a mixture of all three). The following diseases were highlighted as triggers for use: norovirus, influenza, TB, meningitis, varicella, pneumonia and measles. An example of a patient-based trigger was reported as "*when the patient is immune-compromised*" or "*coughing*". Others nominated that they wore a facemask or respirator or certain procedures (e.g. "*procedures involving body fluid splashes*" including "*inserting central lines*", "*chest drains*", "*stitching*", "*nasal cavity examination for epistaxis or nasal bleeds*" or a "*nasopharyngeal swab for influenza*.") or when entering certain areas of the hospital (e.g. "*upon entering negative pressure rooms*"). Another common theme that arose was that use was sparked by a sense of risk. One interviewee described a case involving infective meningococcal septicaemia where the doctors and nurses "*all immediately backed off, put their gowns on and did everything properly.*" Personal safety was highlighted as being the driver for use ("*They don't want to take germs home*"), rather than patient safety.

"Depending on the infection; if it's influenza, I think they'd wear the proper duck mask. If it's just a wound dressing then it's just a surgical mask". (Head of Ward)

It was noted that the practices of and/or directions given by senior staff members influenced mask usage in a ward. Respondents described a great deal of inconsistency among staff compliance and attributed this to a lack of a clear hospital policy. Additionally, even those who were willing to wear a facemask or respirator faced a confusing routine of identifying when to use one or which product was appropriate.

"I think there are slight behaviour changes when senior staff members are on the floor or they see the respiratory infectious diseases nurse come around." (*Nurse Educator)*

Adverse effects and barriers to patient care

Participants described various adverse effects associated with wearing masks and respirators. These included "*breathing difficulties*", "*heat discomfort*," and "*claustrophobia*". Heat build-up seemed to be a particular problem, with participants noting that is made it difficult to wear a respirator for extended periods.

"Our department's kept at 23, 24 degrees and if you were in a full PPE sort of situation, yeah, you can be sweating buckets." (*Nurse Educator)*

Interviewees also commented that the use of facemasks/respirator were "*generally another barrier*" placed between the staff member and their patients. Several mentioned that "*it breaks down communication with a patient*" because it makes it more difficult to listen and talk. One respondent even went on to describe the respirator as a "*cookie monster muffler*." Not being able to see the staff members face was also nominated as a psychological barrier. Furthermore, there was great unease about inducing anxiety in patients and many acknowledged that this was a factor that deterred them from using respiratory protection. Some worried that patients would "*feel like a lepers*" when staff members wore respiratory protection and that it sent a terrible message.

"It's like "I'm distancing myself from you; I'm not part of your problem; in fact I'm trying to, you know, get away from you as much as possible." (Doctor)

These issues were exemplified in the paediatric context, as children were perceived to be less tolerant of mask-wearing HCWs. One respondent recalled how their colleagues were willing to expose themselves to infection risk rather than potentially scare their child patients.

"None of us were using PPE seeing these kids who were coughing in our faces and, you know, everywhere around the unit. And one of the reasons is you don't want to be scaring kids." (Registrar)

Mask design issues

Respondents reported difficulties in achieving a proper fit-check with a respirator and commented on the

lengthy time consumed in the process. This difficulty in creating a tight seal and the consequent "*time labour*" of "*30 to 60 seconds*" was identified as an obstacle to respirator use especially in "*the mindset of everything's an emergency*." One participant identified those with a "*small, flat face*" or an Asian face without the "*bridge on their nose*" would have difficulty achieving a proper fit with the current respirator that was one-size-fits-all.

"They never fit very well and you need to be fitted for them. I have been fitted…but they stopped buying that model within this hospital". (Doctor)

Lack of training and low awareness regarding the policies and guidelines

Most of the participants reported that they had received little to no formal training on the use of masks and respirators. Many expressed uncertainty about whether they were wearing the facemask or respirator properly or whether it was actually doing anything. Almost all participants could not recall the hospitals policy or guideline regarding facemask and respirator use. However, many believed that they were available via the hospitals intranet.

"I don't think people even put them on properly, fit them properly, or take them off properly, once it's been used." (Registrar)

Discussion

Using qualitative methods, this study explored the opinions of hospital staff towards the use of facemasks/respirators. A broad range of attitudes was expressed regarding the use of these products, with many expressing uncertainty surrounding their use and effectiveness. Participants highlighted a range of cues that influenced their adherence with respiratory protection use, which were broadly classified as being disease, patient or procedure-based. A lack of training, uncertainty regarding hospital or health department guidelines and the discomfort and difficulty of mask/respirator use, were highlighted to be the core issues resulting in poor implementation of masks and respirators in the setting.

Participants in our study revealed a great sense of uncertainty regarding the use of facemasks/respirators as an infection control measure. This is not the first time a study has document this level of uncertainty around PPE use. A previous Australian study described the lived experiences of the nursing and medical staff caring for patients in the intensive care unit during the 2009 influenza H1N1/A pandemic.[24] Their participants believed there was a perceived lack of firm recommendations and guidelines regarding specifically what PPE were required during the pandemic. This created an element of confusion amongst the staff caring for these patients. Some staff reported that the ambiguity regarding PPE requirements even made them feel "unprotected" and "undervalued".[24] Healthcare organizations dedicate a lot of time and effort into reminding staff members about the value of hand hygiene through regular training sessions, audits and promotional materials. Given the potential value also associated with facemask/respirator use in protecting staff members/patients, time and effort should be placed on educating and reminding staff members about appropriate PPE use. It is important that staff feel competent regarding the use of masks and respirators as a lack of knowledge will impact on compliance as highlighted by Nichol *et al.* who showed that nurses who were knowledgeable in the recommended use of PPE were 2.9 times more likely to demonstrate competent use of an N95 respirator.[4]

Our participants coupled facemask/respirator use with putting "barriers up" between themselves and their patients and associated their use with having a negative impact on their relationships with patients and ability to provide care. They perceived that children were less tolerant of facemask/respirator-wearing HCWs and that some staff members were willing to expose themselves to infection rather than potentially scaring children by wearing a facemask. This is not the first time that it has been theorised that staff members elect not to use PPE due to their trepidations around how their patients will feel. Previous studies have found that staff members believe that by donning PPE, patients may be embarrassed in front of other patients and family, uncomfortable, offended, and/or anxious.[25-27] The perception that the use of PPE may lead to decreased quality in the therapeutic relationship between patients and HCWs has been shown to be a significant factor influencing compliance.[6,28,29]

If staff members are forfeiting respiratory protection

due to embarrassment or perceived concerns with communicating with patients, it is vital that approaches be put into place to reduce these perceived staff member anxieties. Hospitals could consider developing a communication strategy that includes: (1) information resources (i.e. flyers and posters) for patients and/or parents of patients about why and when staff members use PPE and (2) communication cues (verbal and non-verbal) for staff members so that they can communicate with patients about why they are using facemasks/respirators. In order to improve compliance, staff members in paediatric wards should be given the option of wearing facemasks/respirators that are patterned or which have animated characters on the outer facing as this may provide a sense of familiarity and comfort to the child. Or as an alternative, face-shields could be provided to staff members as parents/children have a preference to staff using them as opposed to facemasks.[30]

Amongst the staff members interviewed, it emerged that the use of masks/respirators was not prioritised in the setting, ongoing support or training was not being provided and that senior staff members had negative attitudes towards the use of masks/respirators. The importance of organisation support was highlighted in a paper by Nichol *et al.* who found that nurses who felt they had organizational support for health and safety were significantly more likely to report compliance with the recommended use of facial protection.[4] Similarly, Lymer *et al.* found nurses were more willing and likely to use PPE in general when the in-charge nurse was committed, knowledgeable, approachable, capable and able to organise people in improving the safety culture.[31] Other researchers have found similar results, where staff were motivated to use PPE when senior staff members were willing to change their practice and were good role models in the use of PPE.[25,26] Shifting towards a positive culture around the use of masks/respirators needs to come from the top down. Hospital and department managers must make occupational health and safety a high priority which includes taking all reasonable steps to minimize hazards, communicating to employees about health and safety matters and encouraging employees' involvement, and actively working to protect employees.[32] Reminding managers about the rationale for mask/respirator use and the evidence supporting the practice is an important first step. It has also been suggested that at the hospital level, workers must be involved with sorting out issues related to the use of masks and respirators and managers should enforce adherence with workplace policy.[4]

Qualitative research methods can provide information about perceptions and practices that otherwise can be difficult to obtain.[33] The use of in-depth interviews to elicit a greater depth in the information is therefore the key strength of this study. However, they cannot answer questions of magnitude or prevalence of risk factors, nor do they readily allow generalization of findings to other settings. Specific details regarding the participants' role in the hospital were also not collected.

Conclusions

while HCWs should take personal responsibility for donning facial protection when needed, the legal responsibility for occupational health and safety, employee use and adherence falls to the employer. An institutional commitment to a culture of safety and the implementation of policies and practices is required to ensure a higher rate of adherence. Health managers should be aware of the perceptions of HCWs toward PPE, as this is important to consider for maintaining staff confidence and work attendance during an outbreak or pandemic. It is also important that users as well as infection control and occupational health experts be consulted before required workplace practices are established and PPE such as masks/respirators are selected.

Acknowledgements

The authors of this study would like to thank all the participants who gave their time to take part in the interviews. During 2012, Dr Holly Seale held an NHMRC Australian based Public Health Training Fellowship (1012631).

Conflict of interests

Holly Seale and Raina MacIntyre have received funding from influenza vaccine manufacturers GSK, Sanofi Pasteur and bioCSL for investigator-driven research. The remaining authors declare that they have no competing interests. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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