

Session: P-19. COVID-19 Infection Prevention

Background. At the frontline of fighting against the coronavirus disease 2019 (COVID-19) pandemic, emergency room (ER) nurses are faced with various challenges throughout the provision of emergency care for incoming patients without knowing their COVID-19 status. However, little is known about their work burden, exhaustion, and psychological distress in the pandemic. Therefore, to provide basic data for effective counterstrategies against future emerging infectious diseases in the ER, this study aims to understand ER nurses' COVID-19 work experiences in depth at one tertiary hospital over 1 year.

Table 1. Summary of Qualitative Responses Regarding Emergency Room Nurses' COVID-19 Pandemic Experience

Sub-theme	Concept	Representative comment
1. Psychological burden of handling COVID-19 patients directly	1.1. ER nurses dealing with uncertainty in patients	"We don't know for sure whether they are COVID-19 patients or not, we just have to rely on luck."
	1.2. Overcrowded ER environment with patients	"We had to buy yoga mats for patients' procedures due to lack of enough beds. It doesn't make sense to control infection in this outrageous environment."
	1.3. Neglected ER patients due to shortage of resources	"Patients are being delayed for emergent operations or medical procedures just because they haven't got their COVID-19 test results. If the pandemic were not here, they wouldn't have been delayed and would receive appropriate treatments on time."
	1.4. Repeated ER shutdowns related to accidental exposures of COVID-19 patients	"I was dumbfounded to see ER shutting down because it didn't seem possible to me. That actually made me feel in my bones that COVID-19 really is a big thing"
2. Unprecedented change of ER's response to the pandemic	2.1. Improvement of ER's infectious disease response system	"Limiting ER's patient number and pre-triaging ER patients is the merit compared to past with full accommodations without having enough beds."
	2.2. Wearing personal protective equipment (PPE) all the time, feeling as if they are body parts	"PPE was bothersome in the early days of pandemic. However, it has become natural. It feels like we have a protective barrier between me and the patient. ... Many actually say that even when pandemic is over, they'll still wear PPE, including me."
	2.3. Raising ER nurses' awareness about infection control	"COVID-19 made me realize that I've been overlooking the importance of ER's infection control."
3. Revealing hospital's lack of support for ER	3.1. Inefficient task changes causing fatigue in nurses	"So many processes related to COVID-19 have been taken into action, but none has been reduced. Patients and their caregivers' complaints seem to have increased twice as much. ... It's just too much for me."
	3.2. Bureaucratic Management and insufficient Consideration of ER nurses on site	"We have to wear all those gowns and gloves which make our hands slow and take more time to do our jobs than usual, but managers don't seem to consider any of this. They just do the math and say, since the number of ER patients has gone down, the number of nurses should also be reduced. It's just abysmal."
	3.3. Unsatisfactory compensation and treatment in ER work	"It seems like all the focus is going to COVID-19 patients' wards. We are really working at the frontline, with relatively poor PPE, and without knowing whether our patients are diagnosed with COVID-19 or not. But nobody is paying any attention to ER."
4. Withdrawal from social life as ER nurses	4.1. Meeting colleagues only for work	"COVID-19 has made workplace culture more individualistic. I haven't even seen this year's new nurses' bare faces, without masks."
	4.2. Strengthening of ER's teamwork	"It seems like we are comrades in a war with COVID-19. Because we know that we all are suffering due to pandemic, teamwork seems to have increased."
5. Re-illuminating nurses' calling for their occupation	5.1. Nurses' strong sense of responsibility despite strict standards on medical personnel	"Reason why I'm following COVID-19 related protocols is because I am an ER nurse. I don't know what patients I'm going to meet when I'm working, which makes me more responsible in times of pandemic."
	5.2. Nurses' ethical belief in considering others before themselves	"I'm actually more afraid of spreading the virus and becoming the source of infection, rather than catching the virus myself."
6. Planning for the post COVID-19 era	6.1. COVID-19 experience as an empirical asset to nursing career	"This pandemic experience makes me feel that I'm in a historical scene. When all this is over, it would make me feel proud of myself, and my career would be broader."
	6.2. COVID-19 laying a foundation for ER's infectious disease management system	"ER environment would greatly change after COVID-19. Now we don't know whether MERS or COVID-19 or any other infection would come or not."

Methods. This study was conducted at a 2,715-bed tertiary hospital in Seoul, Korea. Using a purposeful sampling method, we recruited 20 nurses who have worked for more than 1 year in the ER and have capacity for independent care for COVID-19 patients. With institutional review board approval, one-on-one individual, in-depth interviews were completed using a semi-structured questionnaire from February 13 to March 25, 2021. After recording and transcribing interviews, the narrative data were analyzed using a thematic analysis method.

Results. The 20 participants were 29.9 years old on average with 69.2 months' clinical experience. The overarching theme was derived as 'COVID-19 highlighted the importance of ER's infection control and ER nurses' professional dedication' covering 6 sub-themes and 16 concepts (Table 1). Sub-themes were 'psychological burden of handling COVID-19 patients directly', 'unprecedented changes for ER's response to the pandemic', 'revealing hospital's lack of support for ER', 'withdrawal from social life as ER nurses', 're-illuminating nurses' calling for their occupation', and 'planning for the post COVID-19 era'.

Conclusion. ER nurses experienced challenges from their drastically changed tasks, received poor compensation from the hospital, and felt pressure from social expectations towards medical personnel. However, nurses showed enough dedication towards their jobs, considered pandemic experience as a valuable asset to their future career, and maintained a positive attitude towards difficulties in ER. Providing comprehensive support for ER nurses is necessary to improve ER infection control to respond to the pandemic.

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421. Effect of SARS-Cov-2 mRNA Vaccination in Healthcare Workers with Household COVID Exposure

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Background. Healthcare workers have experienced a significant burden of COVID-19 disease. COVID mRNA vaccines have shown great efficacy in prevention of severe disease and hospitalization due to COVID infection, but limited data is available about acquisition of infection and asymptomatic viral shedding.

Methods. Fully vaccinated healthcare workers at a tertiary-care academic medical center in Omaha Nebraska who reported a household exposure to COVID-19 infection are eligible for a screening program in which they are serially screened with PCR but allowed to work if negative on initial test and asymptomatic. Serial screening by NP swab was completed every 5-7 days, and workers became excluded from work if testing was positive or became symptomatic.

Results. Of the 94 employees who were fully vaccinated at the time of the household exposure to COVID-19 infection, 78 completed serial testing and were negative. Sixteen were positive on initial or subsequent screening. Vaccine failure rate of 17.0% (16/94).

Healthcare workers exposed to household COVID positive contact

Exposure	Positive	Negative	Total results	Rate
Partner	12	43	55	21.8% (12/55)
Child	1	25	26	3.8% (1/26)
Other	3	11	13	23.0% (3/13)
Total	16	78	94	17.0% (16/94)

Conclusion. High risk household exposures to COVID-19 infection remains a significant potential source of infections in healthcare workers even after workers are fully vaccinated with COVID mRNA vaccines especially those with contact to positive domestic partners.

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422. Sustainability of Improvements to Hand Hygiene Performance Throughout the COVID-19 Pandemic

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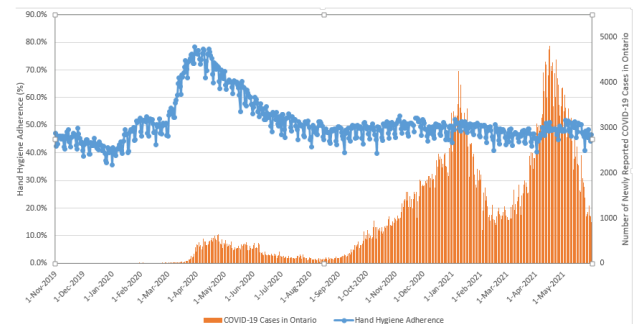
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Background. Hand hygiene (HH) is a standard infection prevention and control precaution to be applied in healthcare settings to prevent transmission of COVID-19. Many healthcare institutions observed significant improvements in HH performance during wave one of the COVID-19 pandemic but the sustainability of this change is unknown. Our aim was to evaluate long-term HH performance throughout subsequent waves of the pandemic across acute care hospitals in Ontario, Canada.

Methods. HH adherence was measured using a previously validated group electronic monitoring system which was installed on all alcohol handrub and sink soap dispensers inside and outside each patient room across 56 inpatient units (35 wards and 21 critical care units) spanning 13 acute care hospitals (6 university and 7 community teaching hospitals) from 1 November 2019 to 31 May 2021. Daily HH adherence was compared with daily COVID-19 case count across Ontario. During this period, weekly performance continued to be reported to units but unit-based quality improvement discussions were inconsistent due to the COVID-19 response.

Results. Figure 1 depicts daily aggregate HH adherence plotted against the new daily COVID-19 case count across Ontario. An elevation in HH adherence was seen prior to the start of the first wave, rising almost to 80% and then remained above 70% for the peak of wave one. During waves two and three, peak COVID-19 case counts were associated with a maximum HH adherence of 51%, only marginally above the pre-pandemic baseline. After the end of wave one (from 1 July 2020 to 31 May 2021) the median HH performance was only 49% (interquartile range 47%-50%).

Figure 1. Hand hygiene adherence across 13 acute care hospitals in comparison to overall new daily COVID-19 cases in Ontario



Conclusion. Initial improvements in HH adherence preceding the start of the COVID-19 pandemic were not sustained, possibly due to increasing comfort and reduced anxiety associated with providing care to COVID-19 patients leading to a perception of reduced COVID-19 transmission risk. These findings highlight the need for HH monitoring to be tied to longitudinal unit-led quality improvement in order to achieve durable changes in practice.

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423. Implementation of a Hierarchy of Controls in a Mobile Health Unit to Safely Care for Inpatients with COVID-19 during Healthcare System Surge

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Background. In April 2021, Sunnybrook Health Sciences Centre opened a Mobile Health Unit (MHU, i.e. medical tents) under the direction of the Ontario Ministry of Health and Long Term Care in response to a surge in hospitalized patients with COVID-19 during wave three of the pandemic. Providing care to patients in non-conventional spaces is not new, however, experience in safely caring for COVID-19 patients in these settings is lacking. Our aim is to describe the implementation of our MHU and associated outcomes of these COVID-19 patients.

Methods. A multidisciplinary clinical and operations team was created to plan, execute and operate a safe environment for COVID-19 patients and healthcare workers within the MHU. Patient selection was restricted to patients with COVID-19 who were clinically recovering from severe COVID-19 pneumonia. Ventilation was optimized with air flow directed away from patient areas, velocity reduced to below 0.25 meters per second, and air exchanges of 24-28 per hour. All healthcare workers working in the MHU were offered COVID-19 vaccine and required to complete mandatory education if they declined (vaccination rate of 87% was achieved among dedicated staff). Universal masking and eye protection was used throughout the MHU with designated areas for donning and doffing personal protective equipment.

Results. In total, 32 patients with COVID-19 were managed in the MHU between 26 April and 21 May, 2021. Table 1 provides the summary of patient characteristics. All patients had a median of one-day of transmission-based precautions remaining in their course and were infected with Alpha variant with exception of one patient with the Gamma variant. Among those patients with genotyping available, all were infected with SARS-CoV-2 carrying the N501Y mutation. Four of the 32 patients required transfer to the main hospital for medical indication while the others were discharged home or to rehabilitation. None of the healthcare workers who worked within the MHU developed COVID-19 infection.

Table 1. Patient characteristics of inpatients with COVID-19 transferred to the Mobile Health Unit (MHU).

Baseline characteristics	N=32
Age in years, median (IQR)	62.5 (16.8)
Sex, n (%)	
Female	15 (46.9)
Male	17 (53.1)
Signs on MHU admission, n (%)	
Fever (Temperature > 38°C)	4 (12.5)
Sore throat	1 (3.1)
Cough	10 (31.3)
Shortness of breath	17 (53.1)
Diarrhea	1 (3.1)
Gastrointestinal symptoms	1 (3.1)
Received 1st dose of COVID-19 vaccine, n (%)	4 (12.5)
Type of COVID-19 variant, n (%)	
N501Y	29 (90.6)
E484K	1 (3.1)
Days of COVID-19 infection on transfer to MHU, median (IQR)	18.5 (12.5)
Required additional precaution on MHU admission, n (%)	27 (84.4)
Duration of precaution, days, median (IQR)	1 (1)
Length of stay in MHU, days, median (IQR)	3.5 (4.3)
Discharge destination, n (%)	
Home	14 (43.8)
Rehabilitation or hospital once capacity available*	14 (43.8)
Transferred to main hospital for medical indication	4 (12.5)

Note: IQR, interquartile range. *5 patients were transferred to acute care in main hospital, due to increased capacity in system

Conclusion. We safely cared for patients recovering from COVID-19 infection in an MHU to support system healthcare capacity. Our experience, including the specific hierarchy of controls implemented, may be helpful for future pandemic planning.

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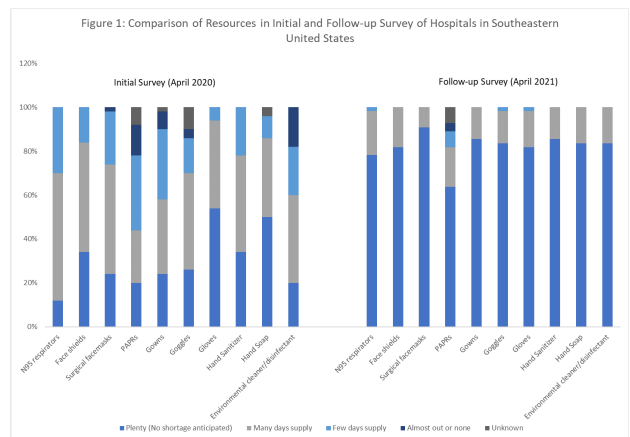
424. The Impact of COVID-19 Response on Infection Prevention Programs and Practices in Southeastern United States

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Background. Early assessments of COVID19 preparedness reported resource shortages, use of crisis capacity strategies, variations in testing, personal protective equipment (PPE), and policies in US hospitals. One year later, we performed a follow-up survey to assess changes in infection prevention practice and policies in our diverse network of community and academic hospitals.

Methods. This was a cross-sectional electronic survey of infection preventionists in 58 hospitals within the Duke Infection Control Outreach Network (community) and Duke/UNC Health systems (academic) in April-May 2021 to follow-up our initial survey from April 2020. The follow-up survey included 26 questions related to resource availability, crisis capacity strategies, procedures, changes to PPE and testing, and staffing challenges.



Results. We received 54 responses (response rate, 93%). Facilities reported significantly fewer PPE and resource shortages in the follow-up survey compared to our initial survey (Figure 1, P < 0.05). Only 32% of respondents were still reprocessing N95 respirators (compared to 73% in initial survey, P < 0.05). All hospitals performed universal masking, universal symptom screening on entry, and 30% required eye protection. In 2020, most hospitals suspended elective surgical procedures in March-April, and restarted in May-June. Approximately 92% reported in-house testing for SARS-CoV-2 by April 2020, at least a third of which had a weekly capacity of >100 tests. Almost 80% performed universal pre-operative testing, while 61% performed universal preadmission testing for SARS-CoV-2. Almost all hospitals switched from test-based to time-based strategy for discontinuing isolation precautions, majority in August-September 2020. Twenty-five percent hospitals reported infection prevention furloughs, staffing cuts, and or reassignments, while 81% reported increased use of agency nursing during the pandemic.

Conclusion. Our follow-up survey reveals improvement in resource availability, evolution of PPE guidance, increase in testing capacity, and burdensome staffing changes. Our serial surveys suggest increasing uniformity in infection prevention policies, but also highlight the increase in staff turnover and infection prevention staffing shortages.

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425. Sustained Control and Prevention of COVID-19 Outbreaks in Detroit Skilled Nursing Facilities

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