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Volume 35, Number 2, Fall 2024

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Canadian Association of Critical Care Nurses

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All critical care nurses provide the highest standard of patient- and family-centred care through an engaging, vibrant, educated and research-driven specialized community.

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We engage and inform Canadian critical care nurses through scholarship, education, and networking providing a strong unified national identity.

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 - Combining compassion and technology to advocate and promote excellence
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 - Accountability and the courage to speak up for our beliefs
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Kara Sealock, EdD, MEd, RN, CNCC(C), CCNE



Dr. Kara Sealock is a tenured Professor (Teaching) and researcher in the Faculty of Nursing at the University of Calgary. She holds a Bachelor of Nursing, a Master of Education and a Doctor of Education degree. She worked bedside in critical care for 14 years and as a research nurse (cardiology and endocrinology) before transitioning to academia. Dr. Sealock continues to inspire and share her passion

for critical care with undergraduate and graduate nursing students. She is a current member of the CACCN Professional Development Committee. She shares her knowledge about innovative pedagogical practices for higher cognitive learning, based on adult learning principles, with the team to create new, dynamic knowledge retention methods. She is a content expert and reviewer for numerous nursing and medical journals, including the *Canadian Journal of Critical Care Nursing* (CJCCN), the *Canadian Medical Association Journal* (CMAJ), and *Quality Advancement in Nursing Education*. Dr. Sealock is published in both national and international journals, has written book chapters, is co-author of *Lilley's Pharmacology for Canadian Health Care Practice* (5th ed.), sole author for *Elsevier's Case Study Practice Review for the Next Generation NCLEX* (1st ed.), and a Next Generation NCLEX-RN® contributing editor in *Canadian Comprehensive Review for the NCLEX-RN Examination*.

Dr. Sealock is excited to be named Chief Editor and serve as a member of the Editorial Management Team.

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Dr. Michelle House Kokan is an adjunct faculty member in the Critical Care Nursing program at BC Institute of Technology, and full-time Faculty Development Lead for the Specialty Nursing Department. A critical care nurse since 1991 and a critical care educator for more than 25 years, Michelle has keen interests in supporting

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The Canadian Council of Cardiovascular Nurses and the Canadian Journal of Critical Care Nurses continue to invite submissions for

A special collaborative theme issue:

Cardiovascular & Critical Care Nursing: Connections to Care

Deadline for submissions: January 31, 2025

The CJCNC & CJCNCN are pleased to announce the extension of the deadline for the call for papers for a special collaborative theme issue on cardiovascular and critical care nursing.

We invite researchers, clinicians, educators, and administrators to consider submitting short reports on novel research projects, clinical/practice, education, or administrative topics related to cardiovascular and critical care.

Criteria for all submissions:

1. Page limit: max 15 double-spaced pages [including title page].
2. Abstract: max 200 words; APA 7th ed. style

For all other submission criteria, follow the Author Guidelines for the CJCNC (<https://cccn.ca/journal>) or CJCNCN (<https://cjccn.ca>) for research and non-research papers (note: specify which guidelines were followed in the cover letter).

Potential topic areas common to cardiovascular and critical care nurses include the following:

- Case reports
- QA projects
- Advanced cardiac assessment
- Advanced/novel arrhythmias
- Advanced organ support
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*Please direct queries/submissions to Dr. Kara Sealock, Chief Editor at cjccneditor@caccn.ca with a copy to CACCNC National Office at caccn@caccn.ca

Implementation of a swallow screening protocol in a tertiary adult intensive care unit: A quality improvement project

BY COURTNEY WEDEMIRE, MS, RD, LARA SAS, MA, RSLP, AND SARAH RUSSELL, BSC, RN

Abstract

Background: Post-extubation dysphagia occurs in 3% to 62% of adults who have received invasive mechanical ventilation in an intensive care unit (ICU). A stepwise approach to identify dysphagia includes a routine swallow screening in patients who are recently extubated followed by a formal assessment by a Speech and Language Pathologist (SLP), in the event of a failed swallow screen, has been suggested. This quality improvement project aimed to implement and evaluate a new post-extubation swallow screening process.

Methods: Using the Model for Improvement framework, a new process that included the Yale Swallow Protocol (YSP) was developed, implemented, and evaluated between July and December 2022 in a 20-bed tertiary ICU. All patients with at least four hours post-extubation were included in the project. Process development included a literature review and feedback from ICU educators, nurses, physicians, SLPs, and Registered

Dietitians (RDs). Education was provided to critical care nurses prior to implementation. Data on patient characteristics, process indicators, and outcomes were collected between September and December 2022 to evaluate the project implementation. Descriptive statistics were used to describe the data and bivariate analyses were used to compare data between patients who passed and failed the YSP.

Results: Fifty-four patients were extubated and evaluated using the new swallow screening process. Post-extubation dysphagia was diagnosed by an SLP in 30.0% of patients. Dysphagia was diagnosed in 90.0% of patients who failed, compared with 8.6% of patients who passed the YSP ($P < 0.001$).

Conclusion: A swallow screening process using the YSP was successfully adopted in a tertiary ICU.

Keywords: dysphagia, swallowing disorders, critical care, mechanical ventilation, quality improvement

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Implications for Nursing

- Consistent application of a simple, standardized swallow screening tool like the Yale Swallow Protocol can lead to collaborative team approaches to patient care, early identification of aspiration and/or dysphagia, prudent use of resources, and timely resumption of oral intake.
- Critical care nurses are in a key position to screen for aspiration risk in the post-extubation population.
- Significant differences in orientation to name, date, and place were found between patients who failed and those who passed the Yale Swallow Protocol indicating a possible relationship between delirium and post-extubation dysphagia.
- Critical care nurses can be confident that a failed Yale Swallow Protocol is highly predictive of dysphagia; therefore, referral to a Speech and Language Pathologist for further investigation is warranted. Multidisciplinary teamwork can result in effective and efficient case management for patients admitted to the Intensive Care Unit.

Background

Post-extubation dysphagia (PED) is reported to occur in 3% to 62% of adults who have received invasive mechanical ventilation in an intensive care unit (ICU; McIntyre, Doeltgen et al., 2021; Skoretz et al., 2010). The prevalence varies due to different study inclusion criteria, dysphagia screening or diagnosis techniques, and study population (McIntyre et

al., 2022; McIntyre et al., 2021; Skoretz et al., 2010). A higher prevalence of dysphagia of up to 84% can be found when the patient selection includes only those seen by a Speech and Language Pathologist (SLP) rather than all patients who have received mechanical ventilation (Macht et al., 2011; McIntyre et al., 2021). Many PED risk factors have been evaluated with 63 being reported as having a statistically significant relationship with PED including, for example, age, patient acuity, and length of intubation (McIntyre et al., 2022). PED is associated with a higher risk of developing hospital-acquired pneumonia, longer hospital length of stay, and greater hospital, 28-day, and 90-day mortality, after adjustments for age, length of mechanical ventilation, and patient acuity (Macht et al., 2011; Schefold et al., 2017).

Studies describing PED, its risk factors, and its associated outcomes have a moderate to high risk of bias and may not consider relevant confounding variables (McIntyre et al., 2022). Dysphagia is considered one consequence of ICU-acquired weakness (ICU-AW) and may co-exist with other characteristics of ICU-AW, such as decreased muscle strength, which is also associated with a longer hospital length of stay and greater mortality (Vanhorebeek et al., 2020). Routine SLP assessment of all patients may not be a good use of resources and access to SLP resources can be limited. Therefore, utility of screening tools to help guide assessment needs to become a necessity (McIntyre et al., 2021; Zuercher et al., 2019).

Alternatively, a stepwise approach has been suggested by several authors, which involves routinely screening for aspiration risk of patients post-extubation followed by SLP assessment for patients who fail a swallow screen (Macht et al., 2014; Zuercher et al., 2019). This approach has the potential to identify patients at risk of complications associated with aspiration, streamline referrals to SLP, and facilitate earlier oral diet initiation (Macht et al., 2014; Zuercher et al., 2019). While this stepwise approach has been suggested by Macht et al. (2014) and Zuercher et al. (2019), PED evaluation practices remain variable (Spronk et al., 2022), and limited literature describes the implementation of a stepwise approach (Scheffold et al., 2017). This paper describes a quality improvement project that aimed to develop, implement, and evaluate a new stepwise swallow screening process in adults who were recently extubated.

Methods

Planning

This quality improvement project occurred in a 20-bed adult tertiary ICU in British Columbia, Canada from July 2022 to December 2022 (Figure 1). This ICU admits approximately 400 patients requiring mechanical ventilation per year with medical, surgical, and trauma diagnoses. Using the Model for Improvement framework, the aims of this project were to have an oral diet started within 12 hours of a passed swallow screen, have SLP referrals entered for all patients with a failed swallow screen, and evaluate the frequency of post-extubation dysphagia using this new process.

In July 2022, a literature review was conducted by a registered dietitian (RD) and SLP who reviewed the databases of CINAHL and Medline using key words “dysphagia,” “swallow*,” “assessment,” “evaluation,” “screening,” “critical care,” and “intensive care unit.” All relevant full-text articles on PED and validated swallow screening tools used in the ICU population were reviewed (Christensen & Trapl, 2018; Johnson et al., 2018; Lynch et al., 2017; Suiter & Leder, 2008). Four swallow screening tools, each comprised of a water swallow test (WST) with or without screening criteria, reported validity measures were evaluated (Christensen & Trapl, 2018; Johnson et al.,

2018; Lynch et al., 2017; Suiter & Leder, 2008). Considering each screening tool’s validity and study sample, a decision was made to implement the Yale Swallow Protocol (YSP; Suiter & Leder, 2008).

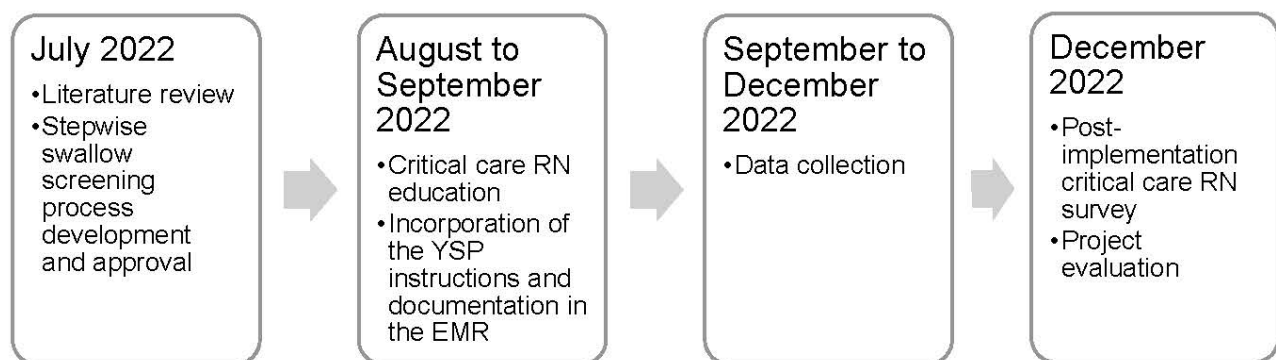
The YSP is a simple aspiration screening tool that incorporates short cognitive and oral mechanism evaluations followed by a 90 ml water swallow test (WST) that must be taken by cup or straw in sequential sips without stopping and without symptoms of aspiration, such as coughing (Leder et al., 2019). When evaluated against fiberoptic endoscopic evaluation of swallowing (FEES), the YSP has a sensitivity of 96.5% to predict aspiration and a specificity of 48.7% in a diverse, clinical population including ICU patients (Suiter & Leder, 2008). In ICU and step-down patients who passed the YSP, an oral diet was successfully started without any overt signs or symptoms of aspiration (Leder et al., 2011b; Leder et al., 2019).

Implementation

Using the YSP, a new process for swallow screening and assessment in post-extubation patients was developed. All patients who were recently extubated were assessed for eligibility by the multidisciplinary ICU healthcare team for the YSP based on the YSP contraindications and timing from extubation (Table 1). Time from extubation to swallow screening varied among existing studies (Leder et al., 2019; Scheffold et al., 2017; See et al., 2016), and there may be no statistically significant difference in dysphagia prevalence when evaluated using any screening or assessment method before or after 24 hours post-extubation (McIntyre et al., 2021). As there is yet no consensus on a timeline, and to consider system pressures such as physician buy-in, nursing duties, and patient access and flow, four hours was set as the minimum duration of time from extubation to swallow screening based on the available evidence (Leder et al., 2019; Scheffold et al., 2017). Leder et al. (2019) described a high YSP pass rate (87.6%) at four hours post-extubation in a heterogeneous ICU population ($n = 202$) with few additional participants passing at 24 hours (91.6%). Scheffold et al. (2017) also reported a high 100-ml WST pass rate at three hours post-extubation (80.2%) in 933 patients admitted to ICU. If the initial YSP failed, it could be repeated at 24 hours or

Figure 1

Implementation and Evaluation Timeline of a Stepwise Swallow Screening Process in a Tertiary Intensive Care Unit



Note. EMR = electronic medical record; RN = Registered Nurse; YSP = Yale Swallow Protocol.

Table 1

Exclusion Criteria for Using the Yale Swallow Protocol in Patients Recently Extubated

-
- Reduced alertness
 - Head of bed restricted to <30 degrees
 - History of dysphagia
 - Presence of tracheostomy
 - Extubated less than 4 hours prior to swallow screening
-

sooner if a patient's clinical condition, such as resolving delirium, had improved according to the bedside registered nurse (RN), intensivist, RD, or SLP's clinical assessment (Leder et al., 2019). This process was reviewed and approved by critical care stakeholders, including the ICU nurse educators, SLPs, RDs, and intensivists. Two critical care RNs, an SLP, and an RD formed the implementation team that led education processes and provided support to RNs during implementation.

Once stakeholder approval was obtained, the SLP and RD provided education to critical care RNs in August and September 2022. Education strategies included short bedside education huddles that occurred over two weeks and the inclusion of the new process in the newsletter sent to all ICU staff. During this time, the YSP was incorporated into the electronic medical record to provide instructions for the YSP and to allow RNs to document the YSP results. Concurrently with education, the YSP was implemented as eligible patients were identified post-extubation. Education with staff was continued on an as-needed basis. Two weeks after the staff education was completed, data collection for the implementation evaluation was started.

Evaluation

From September to December 2022, data were collected to assess both process and outcome indicators of successful implementation. Data were collected on all patients who were extubated, except for patients classified as chronic home mechanical ventilation and those who were on terminal extubation transitioning to end-of-life measures. Pertinent data collected for quality improvement purposes included: participant demographic (age, legal sex), clinical (mechanical ventilation duration, re-intubation, ICU re-admission), nutrition (oral diet order, nasogastric feeding tube use), and dysphagia-related (dysphagia diagnosis, dysphagia assessment method) characteristics. Data collected pertaining to process measures, included: the use and timing (hours) of the YSP in relation to extubation, contraindications to the YSP (reduced alertness, dysphagia history, and tracheostomy), results of the YSP, SLP assessment characteristics and results, the timing (hours) of initiating an oral diet in relation to extubation, and frequency of, and the indication for nasogastric (NG) feeding tube insertion. Orogastric feeding tubes, which are removed on extubation, are more frequently used in this ICU compared to NG tubes. As NG feeding tube placement has a risk of pulmonary placement and epistaxis and exposes patients to radiation from placement confirmation radiographic imaging (Metheny et al., 2019), reducing unnecessary

nasogastric tube placement was an outcome of interest. A dysphagia diagnosis was defined as a diagnosis of oropharyngeal dysphagia on an assessment by an SLP using diagnostic swallow tools, the flexible endoscopic evaluation of swallowing (FEES) or video fluoroscopic swallow study (VFSS), or a clinical bedside exam (BSE). The selection of assessment type was determined by various factors including the patient's mobility status, goals of care, and access or contraindications to FEES or modified barium swallow. A swallow instrumental exam, the FEES or VFSS, is the only means to visualize swallow physiology and confirm or rule out aspiration (Garand et al., 2020). As such, an instrumental exam was considered the preferred assessment type. Data collected indicating clinical outcomes included frequency of re-intubation during the primary ICU admission or ICU re-admission related to an aspiration event per physician documentation.

A post-implementation survey was provided to critical care RNs in a paper format during daytime working hours over two weeks in December 2022. This survey included two questions on their attitudes toward the YSP. The first question asked RNs to rate the ease of use of the YSP on a five-point likert scale from "very easy to use" to "very difficult to use." The second question asked RNs to rate the clarity of the YSP on a five-point likert scale from "very clear" to "very unclear."

Statistical Analysis

Statistical analyses were chosen to describe the patient population, YSP implementation outcomes, and differences in patients who passed and failed the YSP, and based on feedback from critical care RNs, physicians, SLPs, and RDs. These analyses' results were used to determine if the project's aims were met and to inform the implementation of and critical care staff education for the YSP in other ICUs within the regional healthcare system. Patient demographic, clinical, nutrition, and dysphagia-related characteristics were summarized using frequencies (*n*, %) or median (interquartile range). To identify if the project's aims were achieved, the number of hours from a passed YSP to an oral diet start, frequency of SLP referrals, and frequency of a dysphagia diagnosis were described. To understand better which patients may be more likely to fail the YSP, characteristics between patients who passed and failed the YSP were compared using the chi-square test, Fisher's exact test, or Mann-Whitney U test. To understand further how the YSP may identify dysphagia in this site's patient population, the relationship between YSP results and a diagnosis of dysphagia by SLP was analyzed using a chi-square test. The post-implementation survey responses were described using frequencies (*n*, %).

All statistical analyses were conducted using IBM SPSS. This project was conducted as a quality improvement initiative and was exempt from local research ethics board approval.

Results

Fifty-four patients were extubated and evaluated using the new swallow screening process during the data collection timeframe. Patients were a median of 65.0 (51.5, 75.0) years old, and more than half were male (55.6%). Within 24 hours of extubation, 71.7% of patients (*n* = 38) were screened using

Table 2*Characteristics and Outcomes of Adult Patients Who Completed the Yale Swallow Protocol Post-Extubation*

	Passed YSP (<i>n</i> = 35)	<i>n</i> (%) median (IQR)	Failed YSP (<i>n</i> = 12)	<i>n</i> (%) median (IQR)	P
Age, years	65.0	(50.0, 75.0)	67.0	(56.5, 76.0)	0.413
Sex					
Male	18	(51.4)	10	(83.3)	0.087
Female	17	(48.6)	2	(16.7)	
Time from extubation to YSP, hours	4.5	(3.8, 24.8)	25.6	(8.5, 82.6)	0.007
<i>YSP Screening Questions</i>					
Is the patient alert and oriented x 3?					
Yes	23	(71.9)	5	(41.7)	0.002
No	9	(28.1)	7	(58.3)	
Can the patient follow 1-step commands?					
Yes	30	(93.8)	11	(91.7)	0.233
No	2	(6.3)	1	(8.3)	
Can the patient stick out and move their tongue side to side?					
Yes	29	(90.6)	12	(100.0)	1.000
No	3	(9.4)	0	(0.0)	
Is the patient's face symmetrical?					
Yes	32	(100.0)	11	(91.7)	1.000
No	0	(0.0)	1	(8.3)	
NG tube insertion	21	(60.0)	8	(66.7)	0.744
NG tube indication					
YSP contraindication	9	(42.9)	6	(75.0)	0.886
Failed YSP	6	(28.6)	2	(25.0)	
Ongoing medication or nutrition delivery	3	(14.3)	0	(0.0)	
Unknown or no indication	3	(14.3)	0	(0.0)	
Time from extubation to oral diet start, hours	23.0	(5.1, 70.1)	88.8	(56.6, 211.6)	0.003
Time from YSP to oral diet start, hours	3.0	(0.8, 32.2)	69.1	(46.8, 113.0)	0.002
SLP Assessment					
FEES	0	0.0	5	(50.0)	0.095
VFSS	1	(14.3)	1	(10.0)	
BSE	2	(28.6)	3	(30.0)	
YSP	4	(57.1)	1	(10.0)	
Dysphagia					
No	32	(91.4)	1	(10.0)	<0.001
Yes	3	(8.6)	9	(90.0)	
Length of MV, hours	79.8	(48.4, 110.8)	97.8	(51.5, 167.9)	0.294
Re-intubation	3	(8.6)	1	(9.1)	1.000
ICU re-admission ^a	0	(0.0)	0	(0.0)	

Note. ^a with a diagnosis of aspiration pneumonia.

YSP = Yale Swallow Protocol; IQR = interquartile range (expressed as Q1, Q3); NG = nasogastric; SLP = speech and language pathologist; FEES = fiberoptic endoscopic evaluation of swallowing; VFSS = videofluoroscopic swallow study; BSE = bedside swallow examination; MV = mechanical ventilation; ICU = intensive care unit.

the YSP. Fifteen patients were ineligible during the first 24 hours post-extubation due to reduced alertness ($n = 10$), history of dysphagia ($n = 2$), and need for a tracheostomy ($n = 3$). One patient received a different swallow screen. Patients with reduced alertness were screened once their level of consciousness improved. The median time from extubation to the first YSP attempt was 7.1 (4.0, 27.1) hours for all patients ($n = 46$) evaluated using the YSP. On the first YSP attempt, 51.1% of patients ($n = 24$) successfully completed the YSP. Ninety-one percent received a repeat attempt and, of these patients, a further 13 patients (61.9%) successfully completed the YSP.

Sixty-five percent of patients had an NG or nasogastric feeding tube placed peri-extubation. Indications for a feeding tube included contraindication to the YSP at the time of extubation ($n = 21$), unsuccessful YSP ($n = 8$), need for ongoing medication or nutrition delivery ($n = 3$), and unknown or no indication ($n = 3$). Among all patients that started an oral diet ($n = 47$), the median time from extubation to starting an oral diet was 28.9 (7.3, 92.5) hours.

All patients who failed the YSP were referred to SLP, an additional aim of this quality improvement project. An SLP swallowing assessment was completed on 21 patients after an initial failed YSP. Of these assessments, a FEES was conducted on 38.1% of patients, followed by a BSE (23.8%) and a repeat YSP (23.8%). A VFSS was done in the remaining 14.3% of patients.

Patients required mechanical ventilation for a median of 87.8 (56.0, 142.5) hours, and 7.7% required re-intubation during the primary ICU admission. One patient was re-admitted to ICU with a diagnosis of aspiration pneumonia. However, this patient never received a YSP, SLP assessment, or started an oral diet prior to re-admission.

Patients who passed the YSP were compared to patients who failed the YSP (Table 1). There were significant differences in the timing of the YSP and the YSP screening question results between groups. Patients who failed the YSP received the screen significantly later post-extubation (25.6 hours) compared to patients who passed the YSP (4.5 hours, $P = 0.007$). Patients who failed the YSP were also less-frequently alert and oriented to name, date, and place (41.7%) compared to patients who passed the YSP (71.9%, $P = 0.002$). Patients who failed the YSP had significantly longer median durations in time from extubation to oral diet start (88.8 hours) and time from the initial YSP to oral diet start (69.1 hours) compared to those who passed the YSP (23.0 hours, $P = 0.003$ and 3.0 hours, $P = 0.002$, respectively). A median of three hours from a passed YSP to starting an oral diet was within the project aim, which was oral diet initiation within 12 hours from a passed YSP.

Dysphagia was diagnosed by SLP in 90.0% of patients who failed the YSP while dysphagia was ultimately diagnosed in 8.6% of patients who initially passed the YSP ($P < 0.001$). The prevalence of dysphagia was 30.0% among patients who were evaluated by the YSP or by SLP ($n = 50$) including patients with a tracheostomy and with a history of dysphagia. The remaining four patients had persistently reduced alertness during the project and were not evaluated for dysphagia.

The new stepwise swallow screening process using the YSP was well received by the critical care RNs. In the post-implementation survey ($n = 18$), 100% of RNs reported that the YSP was moderately to very easy to use and that the YSP was moderately to very clear.

Discussion

We have described the implementation of a stepwise swallow screening process using the YSP for all recently extubated patients. Few studies and implementation projects to date have been published that describe the use of a swallow screening tool in clinical practice and explore variables that may assist with clinical decision-making and implementation in other ICUs (Schefold et al., 2017).

The aims of the quality improvement project were successfully achieved, and the stepwise swallow screening process using the YSP was well-accepted by critical care RNs who administered the YSP in recently extubated patients. This project has led to the permanent adoption of this stepwise swallow screening process in this ICU. The results informed further local critical care RN education about how the YSP may be repeated and how the YSP screening questions may alert RNs to patients that are more likely to fail the YSP. In addition, further work has been undertaken to expand the use of the YSP to other ICUs in the regional healthcare system.

The prevalence of dysphagia in this project's sample is within the previously reported range of 3% to 62%, although less than the reported weighted mean of 41% (McIntyre et al., 2021). This may be related to the inclusion of all patients receiving mechanical ventilation in the ICU for this project rather than limiting it to patients with a length of mechanical ventilation of more than 48 hours or excluding patients based on other criteria such as a neurological diagnosis. Identifying a 30.0% dysphagia prevalence in this site's ICU population highlighted the need to have a formal, stepwise process to identify dysphagia in a timely manner while facilitating an oral diet initiation in patients without dysphagia.

In this quality improvement project, the use of the YSP was highly predictive of a dysphagia diagnosis with 90% of patients who failed the YSP subsequently being diagnosed (by FEES or VFSS) with dysphagia or deemed highly suspicious following BSE. This result is limited by the small sample size, quality improvement design, and variable timelines for instrumental dysphagia evaluation, but it suggests that a stepwise approach to identifying PED may identify patients that benefit from an SLP swallowing assessment. These results are consistent with other studies that use a pragmatic WST in patients who were recently extubated (Mukdad et al., 2019; Schefold et al., 2017). Mukdad et al. (2019) reported that 90% of post-operative liver transplant patients who failed a WST post-extubation were diagnosed with dysphagia using FEES. In a prospective observational study in mixed adult ICU patients, dysphagia was confirmed by a specialist in 87.3% of patients who failed a WST (Schefold et al., 2017). This approach may effectively use hospital resources while minimizing risks associated with PED and warrants further investigation with experimental study designs.

While few studies have described PED as a barrier to starting oral intake or adequacy of oral intake (Chapple et al., 2016; Moisey et al., 2021; Peterson et al., 2010; Ridley et al., 2019), even fewer have described how quickly an oral diet is started post-extubation (Leder et al., 2011b). While Leder et al. (2011b) reported that patients who passed the YSP were consuming an oral diet within 12 to 24 hours, we confirmed that patients who passed the YSP were able to start an oral diet a median of three hours after passing the YSP and a median of 23 hours post-extubation. This reflects the use of repeated YSP for some patients, as the first YSP attempt was done at a median of 4.5 hours post-extubation for patients who passed. In comparison to patients who passed the YSP, patients who failed the YSP were screened significantly later post-extubation and started an oral diet significantly later. This finding corroborates that PED is a barrier to oral diet initiation post-extubation and these patients should receive an alternative nutrition support therapy, such as enteral nutrition, to ensure adequate intake post-extubation. This stepwise approach to post-extubation nutrition support decision-making has been suggested by Massanet et al. (2015). These authors suggested using nutrition support in patients with a contraindication to oral intake or who failed a WST, but otherwise attempting to maximize oral intake prior to implementing supplemental nutrition support.

One of the main barriers to using the YSP within 24 hours of extubation was reduced alertness. We also identified patients who failed the YSP were screened after a longer duration post-extubation compared to patients who passed the YSP, suggesting that reduced alertness persisted for longer in the patients who failed the YSP. This data, together with lower levels of orientation to name, date, and place in patients who failed the YSP, suggests that a variable, such as delirium, may play a larger role in dysphagia prevalence post-extubation. While this quality improvement project was not designed to evaluate this relationship, delirium is prevalent in the ICU and may be a risk factor for PED (Bode et al., 2020; Kotfis et al., 2022). This has resulted in a heightened awareness and further discussion among critical care RNs, physicians, SLPs, and RDs in this ICU and the local healthcare region about how delirium and PED may be related. As highlighted in a recent ICU research agenda on ICU-AW, the relationship between delirium, duration of mechanical ventilation, and ICU-AW (including dysphagia) has not been well explored (Latronico et al., 2017).

One limitation of this project is the limited validation and reliability measures for any PED evaluation process or aspiration screening tools. While the decision to use the YSP was based on its high sensitivity across a heterogeneous population and its documented use in the ICU population (Leder et al., 2011b; Leder et al., 2019; Suiter & Leder, 2008), the YSP requires further validation in the post-extubation population, particularly at longer durations of mechanical ventilation. The possibility of silent aspiration among patients who passed the YSP is another potential limitation. Silent aspiration may occur in 36% of patients with PED (McIntyre et al., 2021). However, it is suggested that silent aspiration is volume dependent and that patients who silently aspirate on small volumes will trigger symptoms of aspiration with larger water volumes (Leder et al.,

2011a). This is a strength of the YSP, which requires patients to drink the 90 ml WST without stopping, and this may reduce the risk of not identifying patients who aspirate (Leder et al., 2011a). This project's results are also limited by the small sample at a single tertiary ICU, as they may not be generalizable to all patients admitted to ICU.

Conclusions

A stepwise swallow screening process using the YSP was adopted successfully in a tertiary ICU and resulted in the timely identification of PED risk, referral to SLP, and oral diet initiation. Reduced alertness and disorientation may be a barrier to swallow screening and risk factors for PED, although this finding is limited by this project's quality improvement design and warrants further research. This suggests a relationship between post-extubation delirium and dysphagia, which should be explored in future research. Future research should continue to evaluate the validity of swallow screening tools, including the YSP, in the ICU population post-extubation and identify the optimal PED identification, treatment, and monitoring process.

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Nursing geography as space and place: Providing critical care in Canada's northern context

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Abstract

Background: While there is a growing body of knowledge specific to understanding the experiences of nurses who work in various contexts in Canada's northern territories, there continues to be a dearth of research specific to the care of critically ill patients and their families.

Purpose: The purpose of this study was to further expand our understanding of how critical care nursing is experienced in the northern context. This study explored nurses' experiences of providing critical care in all settings from purpose-built intensive care unit to community health centres.

Study design: An interpretive descriptive approach was used.

Methods: Telephone interviews were conducted with nine registered nurses currently employed in various settings, and three additional telephone interviews were used from an earlier pilot study. Interviews were transcribed and thematically coded.

Findings: The following themes emerged: Always the Nurse; Working in Community; Must Haves and Managing Resources; Working Together – Even if We're Not Together; and A Paradigm Shift: Working Up North.

Conclusions: This study highlights the need to consider how nursing geography impacts nursing identity and how to best support nurses who provide critical care but, appropriately, may not identify as critical care nurses due to the expansive roles and responsibilities that some assume in nursing work outside of intensive care units. It also provides a strong incentive to establish relationships with those expanding our understanding of the northern context and what is required of nurses in this context to provide optimal care to patients, families and communities when and wherever critical illness is experienced.

Keywords: critical care nursing, qualitative, interviews, nursing geography, northern

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Implications for Nursing

- Provides an understanding of the provision of critical care in remote and northern contexts in Canada
- Challenges the traditional understanding of where critical care is provided
- Provides a way forward to expand our understanding of this important nursing geography

Background

Limited research has specifically explored the experiences of nurses in Canada's north, north of the 60th parallel (Yukon, Northwest Territories, and Nunavut) and how this care intersects with the specialty practice of critical care nursing and/or the provision of critical interventions. A pilot qualitative study was conducted in an intensive care unit (ICU) setting in Canada's north (Vanderspank-Wright & McMillan, 2016). Findings reported that critical care nurses encounter and work through challenges unique to the northern context, such as limited resources, the impact of a vast geographical range and working within an expanded role (Vanderspank-Wright & McMillan, 2016). This study was important in providing exploratory insights into critical care nurses' experiences in the north.

There are nurses working in the northern context who may care for critically ill or unstable patients, but not necessarily within the physical space of an ICU. While there are dedicated critical care beds for critically ill patients, they are limited in

number (Fowler et al., 2015). For example, Fowler et al. (2015) reported that at that time, there were three hospitals with ventilation capacity and six beds for invasive ventilation. Recent data from an internet search of hospitals in the north identified the number of dedicated ICU beds to be Whitehorse, Yukon ($n = 4$); Yellowknife (Yukon Hospitals, n.d.). In a Canadian Institute for Health Information (CIHI; 2022) document, there are no reported ICU beds for the Northwest Territories (NWT) and Nunavut. However, a general internet search identifies the number of beds to be four for NWT. Due to the northern geography and population patterns of the territories, it is possible that individuals who are not within the immediate proximity of an ICU will initially require stabilizing and critical care interventions in other clinical settings (i.e., nursing stations or community health centres). There are, at minimum, 24 identified community health centres in Nunavut (<https://www.gov.nu.ca/en/health/community-health-centres>); 17 in the Yukon (<https://yukon.ca/en/health-and-wellness/find-hospital-or-health-centre>); and approximately 29 in the NWT (<https://www.hss.gov.nt.ca/en/hospitals-and-health-centres>). Detailed statistics are difficult to locate and, as a result, reported demographics are reported based on general internet resources and should be interpreted with caution. Nurses in this context may provide stabilizing and/or critical care interventions as a bridge to transfer, but they may not 1) identify as a critical care nurse based on their primary nursing role (i.e., community

health nurse), and 2) may not work within a critical care setting. Therefore, this current study proposed to expand inclusion criteria of the previous pilot study (Vanderspank-Wright & McMillan, 2016) to explore further the experiences of registered nurses (RNs) who have provided care to a patient experiencing, or at high risk of critical illness outside of ICUs, while also capturing experiences of critical care nurses working within traditional ICU settings.

A growing body of knowledge exists specific to remote and rural nursing practice in Canada (e.g., Andrews et al., 2010; Pitblado, 2005; Mackinnon & Moffitt, 2014; MacLeod et al., 2017). Initial research initiatives, including those of the Rural and Northern Practice Research team of investigators at the University of Northern British Columbia (UNBC), aimed “to better understand the nursing workforce and nursing practice in rural and remote Canada” (Rural and Northern Practice Research, 2014). Current research initiatives, including the Nursing Practice in Rural and Remote Canada II study, provide an even more robust understanding of this important Canadian nursing practice context. Recent work, primarily authored by Dr. Martha MacLeod, Co-Leader of the UNBC Health Research Institute has expanded this area of research significantly.

Specific to nursing in the north, Andrews et al. (2010) identified that often “[n]orthern nursing is commonly associated with expanded ‘generalist’ practice roles and functions” (p.57). It is possible, for example, that patients who are not within the immediate proximity of an ICU will initially require critical care by an RN working with expanded practice roles and functions, but not necessarily holding additional critical care knowledge and skills. Other prominent themes related to rural and northern contexts have been identified and include professional isolation (Andrews et al., 2010), as well as an understanding of the social determinants of health in northern communities, and a need for resilient, culturally competent practitioners (MacLeod et al., 2018). Professional isolation impacts continuing education opportunities, as well as the opportunity to collaborate with other healthcare providers. However, the context of northern nursing roles requires “nurses need to be available to attend a variety of issues” (Andrews et al., 2010, p.68), which, albeit demanding at times, offers enhanced autonomy. Limitations related to the availability of resources (including human resources) are identified challenges related to northern nursing practice (MacLeod et al., 2004; Vanderspank-Wright & McMillan, 2016).

Theoretical considerations

Nursing geography is a body of literature and theoretical orientation that reconstructs the discipline’s concept of environment in an effort to explore how nursing practice intersects with spaces and places (Andrews & Shaw, 2008). Space has often been conceptualized in terms of the spatial dynamics in nurse-patient relationships, and the social constructions of healthcare (Bender, et al., 2009; Malone, 2003). The concept of place is traditionally understood as geographical locations with social meaning influencing peoples’ interactions, relationships and identities (Andrews & Shaw, 2008). Nursing geography

facilitates an exploration of how spaces and places foster and partially influence the creation of clinical specialties in nursing (Andrew & Shaw, 2008). Bender et al. (2009) articulated how the geographical location (or place) of a community shaped the responsibilities of community health nurses and their relationships with individuals or families. The authors provided an example of the place of home and how it differed from the place of a hospital, as community health nurses were often seen as guests entering the home (Bender et al., 2009). The place of home created a unique space between the community health nurses and the individual or family, where there were more “egalitarian partnerships” (Bender et al., 2009, p.135). Similarly, the northern context can be seen as an overall place that influences the construction of nurses’ specific roles and skills, as well as their care experiences. The exploration of nurses’ experiences north of the 60th parallel can allow for an understanding of how the northern context might be considered a specific nursing geography. For the purpose of this current study, “northern” has been defined according to the Canadian Institutes of Health Research Audience Controlled Vocabulary as “north of the 60th parallel” (Canadian Institutes of Health Research, 2014).

Prior to beginning this study, a literature search was conducted using the following terms: ‘nurse’, ‘critical care’, ‘Yukon, Northwest Territories, Nunavut’, and ‘northern nursing’ and it yielded minimal results. One of the results, however, was the pilot study published by Vanderspank-Wright & McMillan (2016). This study provided a beginning exploration of realities – i.e., the challenges, as well as the positive aspects that critical care nurses experienced while working in the northern context. Further research is merited to broaden our understanding of nursing experiences in Canada’s north, particularly as their experiences intersect with patients and families experiencing critical illness outside of the traditional boundaries of the ICU.

The aim of the study was to use a qualitative research design to describe the experiences of nurses who provide critical care to patients and their families in Canada’s territories with consideration of how the northern context shapes nurses’ provision of care, both within and beyond purpose-built critical care units. Understanding these experiences is key to expanding our view of where critical care is provided, how nurses experience the care of critically ill patients outside of traditional contexts, particularly if they are not in a critical care nursing role, and how we can best support nurses working outside of ICUs to provide optimal critical care to patients and families anywhere in Canada. Please note this study was conducted in 2017 and closed in 2020. Its publication was delayed due to priorities created by the COVID-19 pandemic – this is addressed in the limitations sections.

Methods

Methodology

Interpretive Description (ID; Thorne, 2016), a qualitative methodology, was used in this study. In an ID approach, the researcher acknowledges a constructivist ontology whereby individuals’ experiences are subjective and are influenced by social interactions and relationships (Guba & Lincoln, 1994).

For example, nurses' experiences with providing critical care to patients and families vary and are subjectively influenced by a number of factors, such as nurses' personal beliefs, the situations they encounter, the space and place that they occupy (Cypress, 2010; Olausson et al., 2014). In ICU, the researcher is actively engaged through reciprocal dialogue with the participants to explore their subjective experiences of providing critical care. ID studies "[seek] to discover associations, relationships and patterns within the phenomenon that has been described" (Thorne, 2008, p.50), and serve to provide practice-relevant knowledge for clinical nursing.

Setting

The study setting was purposefully broad in that it encompassed any setting in the three Canadian Territories: Yukon, Northwest Territories, and Nunavut where critical care was provided (i.e., ICUs of hospitals, nursing stations, community health centres, and other settings where a participant may have provided critical care to a patient and their family).

Sample

The following inclusion criteria were established: 1) RNs with experience in providing care to patients who are critically ill; characterized as 'unstable' with symptoms including, but not limited to, low blood pressure, dizziness, acute shortness of breath; needing temporizing measures, like high-flow oxygen or BiPAP; or requiring consultation with other health care professionals for urgent transfer to a hospital with critical care capacity; 2) RNs currently employed in any of the three territories: Yukon, Northwest, and Nunavut; and 3) English speaking.

Recruitment

Recruitment included two mechanisms: 1) social media via "Facebook" and 2) email communication. A recruitment poster was shared on various nurse's associations' "Facebook" pages, such as "Yukon Registered Nurses Association", and "Registered Nurses Association of the Northwest Territories and Nunavut," as well as the researcher's professional page. The poster was shared with other online groups and through various individuals' social networks, which constituted a snowball sampling technique (Sadler et al., 2010). Interested individuals were invited to contact the primary researcher. Email communication included working collaboratively with the Yukon Registered Nurses Association and the Registered Nurses Association of the Northwest Territories and Nunavut. An email script and recruitment poster were sent on behalf of the researchers to RNs of the associations. Again, interested individuals were invited to contact the researcher regarding participation in the study.

Data collection

Telephone interviews were conducted with participants. Interviews were audio-recorded using a digital, password-protected device. Interviews were transcribed verbatim and assigned an interview number. All identifiers were removed to ensure participant anonymity. Interviews were conducted using a semi-structured approach. The interview guide included questions like: *Please describe briefly the setting of your work. Can you tell me of a time when you provided care to a critically ill patient? What are some challenges that you've encountered*

while providing care to the critically ill patients? What are some of the positive aspects of caring for a critically ill patient? Were there previous experiences that prepared you for caring for a critically ill patient? And, what are some things (or resources) in your workplace that would assist you in providing care to critically patients?

Interviews lasted between 60 and 90 minutes on average. We conducted interviews until commonalities were evident in the data and no substantive new data emerged. The research team also ensured there was representation from all three territories and from a variety of clinical contexts (i.e., ICUs, community health centres). Demographic data was also collected during the telephone interviews. Given previous pilot data collected by the principal investigators and congruence with the study questions, interviews from the pilot study were included in the data set for this current study following the submission of an amendment to the institutional research ethics board.

Data analysis

Data analysis was an iterative and inductive process that occurred throughout the collection of data through to the conceptualization of findings (Thorne, 2016). The process began with the research team immersing themselves in the data by reading the transcripts and by generically coding certain key phrases and words (Thorne, 2016). After this initial process, the researchers looked for patterns and relationships within the data (Thorne, 2016). As patterns and relationships were identified, the research team organized the findings into the final product, which constituted a thematic summary (Thorne, 2016). The thematic summary extends beyond surface-level description of themes and provides a new perspective on the way the themes were presented in the larger context of the phenomenon (Thorne, 2016).

Ensuring methodological credibility

Credibility was established by adherence to Thorne's (2016) four criteria: epistemological integrity, representative credibility, analytic logic, and interpretive authority. Epistemological integrity was maintained through decisional strategies that respect the epistemological position of constructivism in the research process. Representative credibility (application of a sampling strategy that is reflective of the phenomena under study; Thorne, 2016), was achieved through a diverse and deliberate sample of participants, including the use of original pilot data. Analytic logic was supported through the creation of an audit trail and explicit reasoning pathways by all members of the research team (Thorne, 2016). Analytic logic also was supported through grounding themes in descriptive, verbatim language, which have been elicited in the findings described in this paper. Respecting that all knowledge is subjective and contextual is fundamental in achieving interpretive authority, and as such, researchers made explicit their own biases and assumptions (Thorne, 2016) and reflected on such throughout their engagement in the research process.

Ethical approval was received from the institutional research ethics board with the following certificate # H-01-18-271.

The Consolidated Criteria for Reporting Qualitative Research

(COREQ) checklist was employed for describing the study methods and in reporting the findings of this qualitative study (Tong et al., 2007). The research team had expertise in qualitative research methodology and critical care nursing.

Findings

In total, 12 interviews are included in the analysis. Representation from all three territories was obtained. Demographic data were not reported given the potential to identify participants based on the context of the northern nursing landscape. We can state that all participants identified as female. Findings are presented thematically first through an introduction to excerpts from critical illness stories and then through more in-depth descriptions of the following overarching themes: Always the Nurse; Working in Community; Must Haves and Managing Resources; Working Together – Even if We’re Not Together; and A Paradigm Shift: Working Up North.

Critical illness stories

Stories of critical illness provide important context to understand and engage with the findings of this qualitative study. Similar to what may be expected in hearing stories specific to individuals and families who experience critical illness, the sudden and unexpected nature of these situations resonates. However, what is unique to these stories is the important and necessary consideration of the geographical elements within which they occur. The following excerpts are notable. In the first, we are confronted with the experience of a nurse describing the care of a patient who is significantly compromised and wherein necessary resources – for example, medications and a large healthcare team are unavailable. The nurse uses what is available and waits for help to arrive. In the second, we experience another frequently recounted experience – being called out into the community to respond to a critical situation. In both instances, details are modified for the purposes of anonymity.

“[They drove themselves] to the health centre and walked through the door...[they were] grey and diaphoretic and mottled and... had cold extremities... chest pressure... [were] burping... dizzy... had thready pulses and [their] heart rate was [over 200]... so...I establish an IV and began to give [them] a normal saline bolus...I got [them] to try some vagal manoeuvres, because I realized [they were] in a narrow complex VT on the monitor... that didn’t help... we are very limited in medication...I didn’t have any adenosine. I didn’t have any verapamil. I didn’t have any IV metoprolol. So, I initiated medivac, but there was just one plane available, and it was an hour away...so I tried to call the emergency department in [redacted for anonymity], but the phone lines and computer lines were down...all I could do was wait...”

“I was the nurse on call... It was a [person] screaming and crying saying my [spouse] is not breathing you have to come to my house quick. I don’t know who I am talking to, I don’t know where in the community these people live, because I have just arrived... I ran across the hall as I am pulling all my clothes. Knocked on the other nurses’ apartment, I said we got something big...”

Always the Nurse

Always the Nurse describes the complexity of the nursing role in this clinical and geographic context. The varied geographies within which nursing care is provided (i.e., designated ICUs, community health centres, nursing stations), and the scope of practice, while similar with respect to regulatory body standards, is remarkably different. Participants frequently described assuming multiple roles that would normally be distributed across an interdisciplinary team (i.e., respiratory therapists, social workers). Participants also described the need to be flexible and ‘think on your feet’ in situations requiring immense problem-solving, often in the absence of an interdisciplinary team.

Within hospital settings, additional responsibilities were frequently assumed by nurses who would not be part of the nursing role in larger urban and even community settings across the southern provinces. In designated ICU settings, critical care nurses could be required to take on mechanical ventilator setup, management, and monitoring of oxygenation status (i.e., blood gas procurement). In community health centres, the role was notably expanded. While some participants described themselves as generalists, the definition of generalist in this context merits elaboration. Nurses would be responsible for anything – from public health mandates to labour and delivery to trauma care. One participant described:

“I’m responsible for...staffing, ordering supplies, ordering medications, inpatient care... we do clinics every morning... anytime we’re closed there’s only the nurse on call. We are classified as a two-nurse station. So, it means... you’re on call every second day. But, as a professional courtesy, you make yourself available on your off day as well, because if there is a trauma or a critical incident of any type and you need backup, you need to be sure that the other nurses are available...”

This same participant elaborated on the scope of the role:

“So, the clinic every morning, we take appointments where people walk in for a plethora of complaints, issues, illnesses and injuries... every afternoon we do public health clinics, so... things like well adult care, well child care, well baby and immunizations, pre- and post-natal, and chronic disease management. We do X-rays. We’ve pulled blood and spin it or we send it to the closest hospital depending on which testing needs to be done. We do EKG, we suture... we do... public health... sometimes people come in because they just want to talk...”

Participants found themselves in situations requiring quick thinking and creativity. Being in such situations (e.g., lacking human or material resources), while not ideal, were not described as overtly negative. A participant described: *“That is one of the positive things about working here and I really quite enjoy it... our scope is quite large. You know, we have a wide variety of things that we have to figure out how to do and practise doing and it doesn’t get narrow very easily. But it’s also scary, because you’re like ‘man, I wish I had an expert, you know, like a respiratory therapist to help me out’... this would be awesome.”* Another added: *“...you do the best you can with the resources you have access to. And oftentimes,*

you become very attuned to figuring out different ways of doing things, because stuff breaks. You have to be really resourceful and figure out how to jimmy-rig things to do what you need them to do."

Nurses who worked in community health centres in more remote areas across the territories placed emphasis on *always being the nurse*. Like hospitals, the community health centres were designated as essential services and were accessible 24 hours per day. A participant expanded: "...you don't get sleep and you don't um, get to do really anything else, um, besides that. And usually everybody's up, so it's not just gonna be you that's going to be, it's going to be everybody that's tired. So, the health centre doesn't really shut...it's an essential service...". Another participant was able to contrast the difference between working within the northern context and urban experiences in the 'south'. Northern nursing requires nurses to not only adjust to the 24-hour nature of the health centre delivery, but also to being known in the community. She remarked:

"When I'm in the south, I don't have to worry about that. At seven o'clock my shift is done, I can go chill out... the north is very unique... because you always have to kind of be on alert, if you will... people [in the south] generally (chuckles) don't come up to me in the grocery store and ask me about their health concerns or make comments about their health problems. In the north, due to the... small community that you have, the close-knit ties that you have with the community... you do experience the unique interactions with people in the grocery store."

Working 'In Community'

In engaging with the concept of community, we are introduced not only to the ways in which nurses in this study worked within their designated nursing roles, but also to the ways 'community' intersected with belonging, managing an 'outsider' perspective, the importance of establishing relationships, and even how news traveled within the community.

A participant eloquently provides a necessary example of how these nurses "work in community" – that is, as closely-knit groups with shared experiences. She described:

"When something... happens in these communities, because they are very small, close-knit communities. Our waiting room is packed. Nothing travels faster than bad news... you can possibly open the door and have 30 to 40 people come in..."

In reflecting on a death, the participant added,

"... because there are no funeral homes... Often, family might be there for hours and hours. Because this is their last time, and so people would bring in trays of food or bring in coffee. We always try to provide coffee and tea. That is kind of like a funeral home visitation... the family comes and bathes the body, family dress the body. That is considered to be quite an honour and they gather around the bed, they will sing and there will be prayers. Other than the emergencies, the services at the health centre kind of cease for that day. And then I am sitting there till midnight with the family because they are waiting for someone to come from somewhere else. But it's what you do. It's part of being in a community."

Further, participants described becoming part of the community:

"...it's such a small community, everybody knows everybody... I've been here now for [REDACTED FOR ANONYMITY] years, so most of the people in the community... know me, and I've worked with them at some point, so there's a lot of trust... they're just fairly comfortable with speaking with us, and being open with us, and us being open with them, and understanding what we're doing."

"...down South... you see so many people, you never see them again in your life, you never know what happens to them, what happens to their family... the North is a small community, you get to know everyone. A lot of people become like family..."

In contrast, a participant who hadn't been working long in the north self-identified as an outsider in her remark, *"I'm still an outsider here."* The latter emphasized the unique relational aspects of the northern context that may not transfer to 'southern' ICU contexts. Based on other participant accounts, this subsided over time, with experience and continued presence in the north.

Must haves and Managing Resources

Participants often spoke of "needing extra hands", but, unlike in the "south," where extra hands often refer to extra-trained health professionals, these nurses spoke of the need for any and all hands. These nurses were grateful for the hands of "admin assistants... RCMP, EMS, volunteer EMS."

Participants also described how high turnover rates in the north made consistent human resourcing, including both support staff and healthcare staff very difficult. Other non-traditional helping hands bridged access gaps. For example, one nurse describes being in a community that does not have ambulance services, so transport to a health facility becomes the responsibility of the patient and/or family, and if personal transport is not available, a taxi service must be used, which has a cost:

"We don't have an official ambulance service in our community... [We've] just got a taxi service there, it's on a pay basis... but they don't do emergency calls. So, usually it's up to the family to get the patients to the health centre."

Participants collectively curated a running list of "must haves" that could facilitate care delivery in their northern work environments. For example, access to critical care medications across all settings was important:

"[Northern healthcare centres] don't carry the full complement of the medication that the hospital does. They only carry certain antibiotics, certain oral medications. So, you have to get used to your formulary to find out what you have... with the sepsis, the doc was like, 'okay, well, I want to use this pressor,' and I'm like, 'no, we don't have that here.' [They were] like, 'well okay, let's use this one', and I'm like 'we don't have that.' [They were] like, 'okay well, so what do you have?', and I think I had two pressors.... well I don't have anything else that you want. This is our only option... So, we need to figure out how to do it if we need to do it."

Access to enhanced critical care training and supports were also a must have, but were not always available:

“Education opportunities suck in the North, because it’s so expensive for the hospital to try to bring an educator up to teach us. But then, for us to try to get out [of the North] for education is super expensive. It’s really frustrating.”

The importance of the relationship between enhanced critical care training and supports and the unique contexts are highlighted:

“You can work around the limited resources that you have, but you cannot work around your lack of education. If you have the education, you can find a way to deal with something, you can manage the situation, you can find a way to do it. But if you don’t know how to deal with what you’re seeing and what you’re trying to treat, you’re already at a disadvantage.”

These quotes highlight the vast complexities of resource management and how nursing work is mediated by these complexities.

Working Together – Even if We’re Not Together

Participants spoke to the strong teamwork they experienced. Teamwork crossed disciplinary and geographical spaces. Nurses would, for example, call out to other community health centres to get a health history and critical patient information should the patient be unable to communicate the information:

“Because we knew the community that [patient] was from, we have the clerk call that Health Centre for... the med list... allergies, and the most up-to-date immunization record. So, they can just fax that list to us... Because [the patient] was from a neighboring community, I was able to call the nurse in charge from that community, in a professional capacity, and just say have you heard anything [about the patient and their recent health]?”

Nurses also described working with physicians either in person, via phone and telehealth, and quickly establishing rapport and trust, which was in fact a precursor to team functioning – even if the team was not physically proximal:

“You really get to know your team... You need to know your team. You are working so closely in situations that are really scary and so you really build trust. You get to figure out who people are and how they work really quickly.”

A participant added:

“Although the physician isn’t in the room with us, it’s [phone access] as good as we can get. Because they are on the phone and they are listening, and they are paying attention and they are communicating. When we have a critical patient, it’s very much a team effort. Soon as the clerk knows that we are both going to be tied up with something for a while, she will actually call people and cancel the appointment or postpone them and then she serves as a runner – do you have anything you need faxed off to the doctor? The whole staff – because it’s a small staff, they all do their part, so the nurse can stay with the patient 100%.”

Teamwork was also integral in determining whether transfer and medivac were required. Transfers between settings in the north, as well as ‘southern hospitals’, was a frequent occurrence

and not without its own challenges – geography, weather, patient deterioration and a need for prompt, clear and coordinated communication. In these situations, reliance on other care providers was essential. A participant described:

“...[they] quickly deteriorated to the point where [they were] unresponsive... we couldn’t keep [their] blood pressure up no matter what we did... we had the doc on the phone...[they] had to be medivac’d to our tertiary care centre... we had to wait for a plane to come, which was kind of scary, because you know they are coming, but because of our location, anything is possible. If the winds come up, if the ceiling drops, if it gets foggy... That means we are responsible for the patient’s care until the team gets there. And we don’t have a bottomless supply of anything... I can’t say less than good things about our flight medics, because they come in and take over... You just hope and pray the whole time that the plane can make it.”

A Paradigm Shift: Working Up North

Participants’ account of their northern roles extended from initially reconciling differences between practice settings (i.e., working in southern acute care contexts in contrast with their northern role) – referred to as a paradigm shift, to the allure of the north that was described as the people and the geography. Participants explained:

“...it definitely was a big paradigm shift... I had to spend a lot of time... reflecting about the differences in the two jobs and what the expectations were... and not feel panicky that I didn’t have this extensive drug kit and the ability to do all these things... on an intellectual level, I knew the difference, but the reality of it was it took me a little bit to get my mind around the different role, and to really embrace the role that I have as a community health nurse...”

And,

“I was challenged more than I had ever been challenged ever in my career thus far. And there were times that I, that I felt I wouldn’t be able to do the job. It was just too much. But that being said, I loved it, I got a lot of satisfaction from it.”

Lastly, related to the allure of the north, one participant expressed,

“The north is very beautiful; the people are very lovely.”

Another added:

“I think it’s the lifestyle of living in the North... work is secondary... they’re really living here in the North because of the lifestyle... it’s a great place to raise a family, it’s a great place to enjoy wilderness. A lot of people are here because of the outdoor activities...”

Discussion

Critical care nursing can be described as nurses providing “specialized care to patients experiencing a life-threatening or potentially life-threatening illness” (Critical Care Services of Ontario [CCSO], 2012, p.3). In Canada, critical care nurses typically work in ICUs of community and tertiary care hospitals (Canadian Institute for Health Information [CIHI], 2016). Critical care nurses provide care to these patients by

monitoring, and carrying out life-sustaining treatments, such as mechanical ventilation, inotropic medications, dialysis, and cardiopulmonary resuscitation, to manage their illness (Adhakari et al., 2010; Prendergast et al., 1998). Existing literature specific to critical care nursing has highlighted many challenges and rewards regarding the experiences of nurses providing care to patients and families in ICUs – many of these same challenges are reflected in the experiences of these nurses working within a northern context – albeit on a potentially magnified scale. In considering the findings of the study, what is potentially most interesting is professional identity. While these nurses readily and intensely provide critical care, we do see a shift in role identity – particularly in more rural and remote contexts like community health centres. In these contexts, nurses did not preface a critical care identity, they identified as community health nurses. This brings into focus the influence of nursing geography and its centrality to nursing identity. Even in instances where participants had previous critical care experience, those shifting their practice context outside of northern ICUs – their professional nursing identities shifted.

The findings from this current study were similar to those described in the pilot study. However, they offer significantly more detail and move our understanding beyond the ICU, which is likely more consistent with the northern experience, given the limited number of critical care beds available. This current study has implications for how, as a Canadian critical care community, we might (re)consider our critical care identity and the limitations rigid geographical boundaries of what constitutes critical care can have on resource allocation, educational needs, building partnerships to promote high-quality critical care across a multitude of care settings. It also provides a strong incentive to establish relationships with those expanding our understanding of the northern context and what is required of nurses in this context to provide optimal care to patients, families, and communities when and wherever critical illness is experienced.

Strengths and Limitations

Strengths of this study include the expanded contextual understanding of critical care provision across multiple settings. Our understanding of critical care beyond purposefully built intensive care units allowed nurses not traditionally viewed as critical care nurses to describe in a more fulsome way the ways in which critical care takes many shapes and forms in Canada's North. By the same account, the ambiguity of what defines a critical care nurse in Canada's North may mean that some nurses in community or public health may not have felt they provided enough critical care to participate in this study. Further exploration is merited. Reporting of this study's finding was delayed by the COVID-19 pandemic. It is possible that the context has been impacted by both the pandemic years and the nursing shortage.

Conclusion

RNs working in Canada's North provide care to patients experiencing or who are at risk of critical illness across a variety of

settings. The nursing role is complex, not just from a practice perspective, but also from an identity perspective. This early work sheds light on ways critical care identity and geographical boundaries may be reconsidered in an effort to support nurses working in “non-traditional” critical care contexts, as well as promoting high-quality critical care in essentially any setting.

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A rapid scoping review of barriers and facilitators of implementing delirium prevention practices in adult critical care

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Abstract

Background: Delirium is a serious complication of critical care that can have lasting effects on the patient's life. Much of the work to date about delirium has been focused on identifying delirium risk factors, developing tools for screening and recognizing delirium, and testing interventions to treat those diagnosed with delirium. Despite evidence, implementing known delirium prevention and management strategies remains abysmal. This review aimed to identify and summarize literature reporting on the barriers and facilitators of implementing delirium prevention and management practices in adult critical care.

Methods: A rapid scoping review of the literature was conducted. The databases CINAHL and Ovid Medline were searched, and forward and backward reference checking was completed. Data abstraction and analysis were performed by one reviewer and verified by a second reviewer.

Results: After review of 74 full-text papers, 32 articles were included in the review. The articles were published between 2008

and 2022, with the majority conducted in the United States (53%). The barriers and facilitators of delirium prevention and management practices described in the reviewed articles were categorized as patient-level, clinician-level, and organization-level factors.

Conclusion: The review found consistency among the published results. However, opportunities to continue to grow research in this area remain; specifically in examining the opportunity to understand better the decision-making process surrounding how care is prioritized when taking into consideration the present barriers and facilitators and the opportunity to use implementation science to create and sustain change in the practice of delirium prevention and management strategies.

Keywords: delirium, facilitators, barriers, critical care, nursing

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Implications for nursing

- This rapid scoping review summarizes the facilitators and barriers to implementing delirium prevention related practices into critical care, which will equip critical care nurses better to improve care outcomes for patients at risk for or experiencing delirium.
- The summary of facilitators and barriers equips critical care leaders and teams to implement delirium prevention practices.
- This review also highlights the ongoing need for a focus on improving delirium in critical care.

Background

Delirium is a serious complication associated with hospitalization and, particularly, with a critical care stay (Collet et al., 2018). In Canada, there are approximately three million hospitalizations annually, roughly 11% of which include a stay in critical care (Canadian Institute for Health Information [CIHI], 2016). The incidence of delirium in hospitalized adults ranges from 20%–30% (Collet et al., 2018; Piao et al., 2018). However, delirium rates in critical care are significantly higher, particularly in those who receive mechanical ventilation, wherein incidence can be as high as 80% (Collet et al., 2018; Piao et al., 2018). Delirium is a syndrome characterized by an acute disturbance in consciousness and changes in cognition

that fluctuates during the day with three subtypes identified – hyperactive, hypoactive, and mixed hyper- and hypoactive (Collet et al., 2018; Piao et al., 2018). Delirium-associated complications are profound for patients and the healthcare system and include prolonged length of stay in critical care and hospital and increased mortality and morbidity (Chaplin & Mcliskey, 2020; Fowler, 2019). In a meta-analysis of 28 studies comparing delirious versus non-delirious patients, those with delirium had a higher severity of illness, a longer length of stay in critical care (risk ratio 1.38), and a greater overall risk of death (risk ratio 2.19; Salluh et al., 2015). Long-term health outcomes were also worse, with delirious patients having poorer global cognition at 3 and 12 months post-hospital discharge (Salluh et al., 2015).

Delirium is a significant complication, and researchers have focused on identifying delirium risk factors, developing tools for screening and recognizing delirium, and testing interventions to treat those diagnosed with delirium (Collet et al., 2018; Fowler, 2019; Birge & Aydin, 2017; Devlin et al., 2018; Martinez et al., 2017). Multiple risk factors have been associated with increased risk for developing delirium. These risk factors include sepsis, shock, blood glucose fluctuation, hypoxia, and electrolyte imbalances, as well as untreated pain, agitation, and previous history of delirium (Barr & Pandharipande, 2013). Adverse drug reactions and environmental factors also increased the risk of

delirium (Barr & Pandharipande, 2013). Consistent screening for delirium using a validated tool and a bundled approach to implementing delirium prevention and management practices has been shown to improve patient outcomes (Pun et al., 2019). Delirium prevention and management practices that have been proven effective include assessing, preventing, and adequately treating pain, use of spontaneous breathing trials to evaluate the need for mechanical ventilation, appropriate choice of analgesic and sedative agents, delirium screening, early mobilization, and family engagement (Sosnowski et al., 2023). These items comprise the ABCDEF bundle (Pun et al., 2019; Sosnowski et al., 2023). Implementing the ABCDEF bundle has shown meaningful improvements in patient outcomes related to delirium (Pun et al., 2019; Sosnowski et al., 2023).

Despite evidence that delirium prevention and management strategies are effective, such as the ABCDEF bundle, maintenance of a day-night routine, and sensory and orientation support, their implementation remains low. Hospitals implementing multicomponent processes for preventing, assessing, and treating delirium have reduced delirium incidence (Collinsworth et al., 2016). However, few critical care units in Canada have consistently adopted these practices (Collinsworth et al., 2016). Implementation of delirium prevention and management practices depends on nurses prioritizing and integrating these strategies within the context of multiple competing care demands and established critical care practices and routines. Evidence to support nurses in prioritizing delirium prevention and management strategies needs to be more robust, as does evidence to identify barriers and facilitators to inform changes in critical care work environments that would make delirium prioritization possible.

This rapid scoping review identified and synthesized literature reporting on the barriers and facilitators to implementing delirium prevention and management practices in adult critical care environments. The findings of this review will inform research examining how critical care nurses prioritize patient care and the relation to delirium prevention and management.

Methodology and review design

Scoping reviews are a popular method for conducting knowledge synthesis, “which incorporate a range of study designs to comprehensively summarize and synthesize evidence with the aim of informing practice, programs, and policy, and providing direction to future research priorities” (Colquhoun et al., 2014, p. 1291). Rapid reviews are a form of review in which some of the traditional review processes are simplified or omitted to yield information quickly (Tricco et al., 2015). Rapid scoping reviews are generally conducted in a shorter timeframe to answer context-specific clinical questions (Tricco et al., 2015; Colquhoun et al., 2014). For this project, a rapid scoping review process was chosen as it met the project’s needs, and due to the limitation of funding and time.

Search

A search strategy was developed in consultation with a hospital librarian to locate recent literature reporting on barriers and facilitators of delirium prevention and management practices in adult critical care settings. The search strategy was applied

to the databases CINAHL and Ovid Medline only due to the rapid nature of this review. Initially, a comprehensive search was conducted to identify articles published from 1946 to 2023, then narrowed to 2000 to 2023 to reflect the period when the importance of delirium in critical care emerged. The search was limited to publications in English. Table 1 describes the inclusion and exclusion criteria, while Table 2 provides an outline of the search strategy. A grey literature search was not conducted.

Screening

Citations were downloaded for screening. Because this was a rapid review, the initial screening was done by one author (C.S.) to eliminate duplicates, followed by a title and abstract review to determine if the inclusion/exclusion criteria were met. Following this initial review, 74 full-text manuscripts were reviewed to determine if they met inclusion criteria, with

Table 1

Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
- Delirium - Critical Care Adult Context, including ICU and ICU stepdown / High acuity units - Facilitators of Delirium prevention or management - Barriers of Delirium prevention or management - Qualitative, quantitative, and quality improvement publications	- All non-adult critical care settings - Delirium prevention and management practices not related to barriers or facilitators - Dementia

Table 2

Search Strategy

Databases Searched:

CINAHL
Medline – Ovid

Terms searched:

MeSH:
Delirium
Emergence Delirium

CINAHL:
Delirium
ICU Psychosis

Keywords:
Barrier*
Facilitat*

1. Critical care and/or Intensive Care and Delirium (89,948)
2. 1 and Adult (78,956)
3. 2 and Date range: 2000 to 2023 (25,889)
4. 3 and Full text (13,844)
5. 4 and Delirium (506)
6. 4 and/or 5 and Emergence Delirium (356)
7. 4 and/or 5 Delirium psychosis (298)
8. 6 and 7 and Barrier* and/or Facilitat* (178)

a resulting 23 manuscripts being included. Using forward and backward reference checking, the reference lists of 23 manuscripts were also reviewed to identify relevant articles not captured in the database searches. A subsequent review of the reference titles and abstracts was conducted. Nine additional articles were included from this secondary search (see Figure 1 for PRISMA Flow Diagram).

Data Extraction

A data extraction template was created using Microsoft Word. The primary author extracted data from each of the included

articles, including the year of publication, study location, research methodology, and identified barriers and facilitators.

Results

A total of 32 articles were included in this scoping review (see supplemental Table). The articles reported on published work from 2008 to 2022 (see Figure 2), conducted in the United States ($n = 17$), Australia ($n = 6$), United Kingdom ($n = 3$), Canada ($n = 2$), Netherlands ($n = 1$), Italy ($n = 1$), China ($n = 1$), and Thailand ($n = 1$); and used a variety of research methodologies (qualitative and quantitative) and quality improvement projects.

Figure 1

PRISMA Scoping Review Flow Diagram

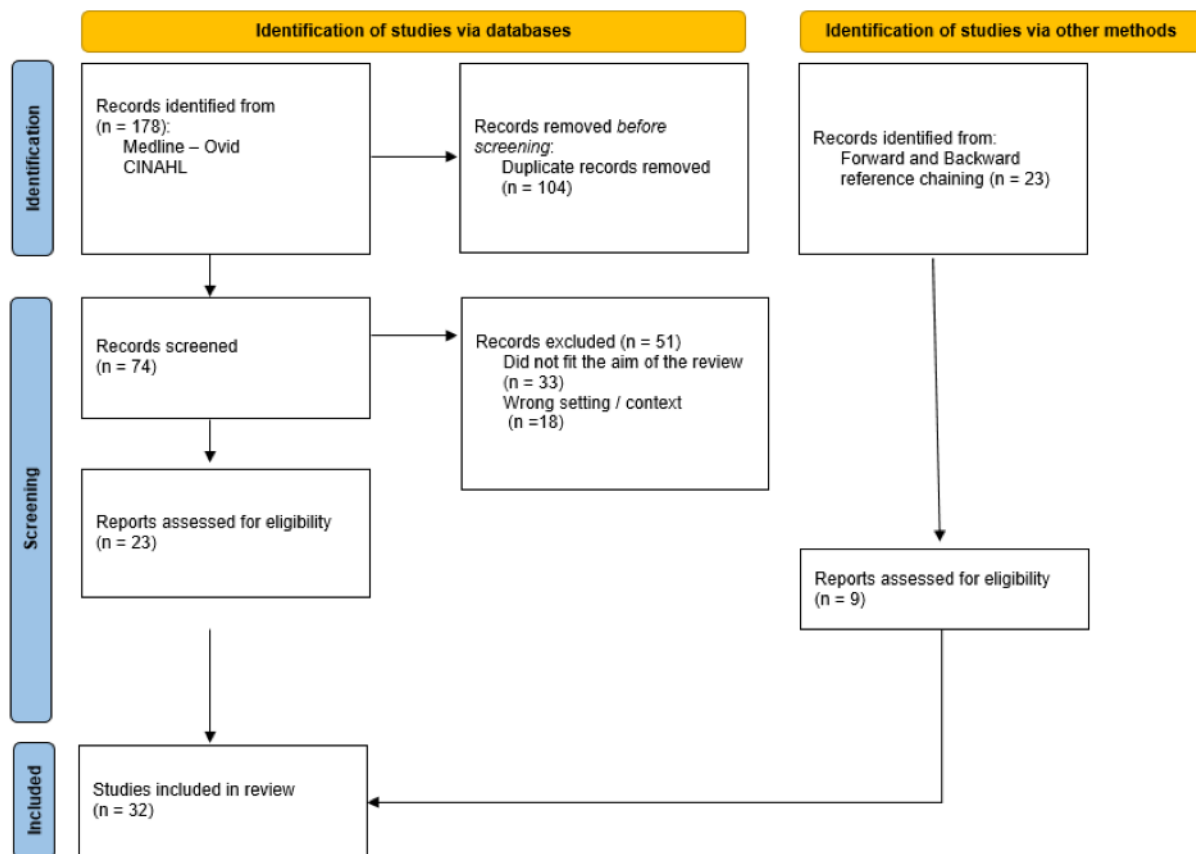
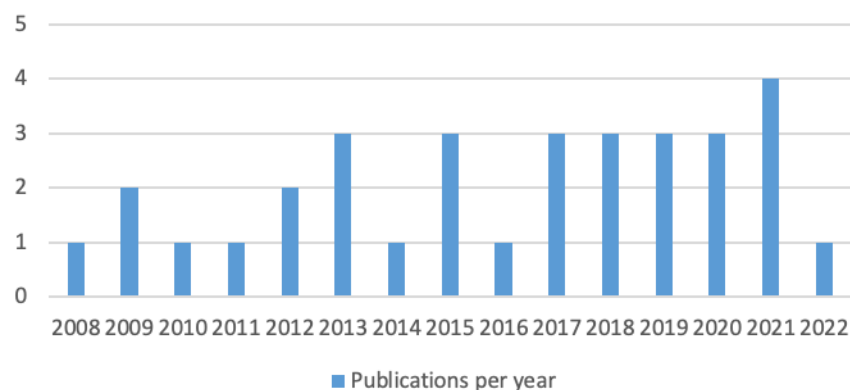


Figure 2

Publications per Year



The barriers and facilitators of implementing delirium prevention and management practices evident in the reviewed articles were categorized as patient-level, clinician-level, and organizational-level factors.

Patient-Level Factors

Patient-level factors impacting implementation of delirium-related prevention and management practices had to do with the

patient's acuity level and potential for deterioration, existing delirium, and physical characteristics (Table 3). According to the articles, increasing patient complexity resulted in greater barriers to implementing delirium-related practices (Anekwe et al., 2019; Balas, 2019; Brock et al., 2018; Costa et al., 2017; Davis & MacLulich, 2009; Devlin et al., 2008; Dubb et al., 2016; Lin et al., 2020; Parker et al., 2021; Parry et al., 2017; Potter et

Table 3

Barriers and Facilitators of Implementing Delirium Practices

		Barriers	Facilitators
Patient-Level Factors	• Acuity level	• Medical or hemodynamic instability	• Stable vital signs / hemodynamics
	• Presence of delirium	• Delirious patients who are uncooperative, agitated, or disengaged and unable to participate or follow directions	• Declining vasoactive drug support
	• Physical characteristics	• Devices and equipment that impede mobilization and sleep	• Cooperative / engaged patients who are able to follow instructions and participate in care
Clinician-Level Factors		• Pain	• Male sex
		• Obesity	
	• Beliefs	• Delirium is perceived as a low priority	• High level of perceived importance of early mobility
		• Delirium is perceived as a benign and/or an inevitable part of critical illness	
	• Safety concerns	• Delirium prevention and management practices perceived as being unsafe to self or patient	
		• Perceived risk of musculoskeletal injury to self or patient	
	• Personal factors	• Lack of training or knowledge including being unable to recognize delirium	• Confidence
		• Poor interpersonal communication skills among team members	• Autonomy
		• Low individual morale	• Feeling supported or valued by colleagues
		• Lack of time	
		• Increased workload	
		• General stress	
Organizational-Level Factors	• Resources	• Insufficiently skilled staffing and availability of functional equipment	• Sustained diverse educational and training efforts
		• Difficult to use delirium screening tool or cumbersome protocol (too time consuming)	• Implementation and maintenance of delirium bundle
		• Time constraints and workload burden	
	• Culture	• Excessive staff turnover	
		• Unit or organizational culture is not supportive	• Engagement of key implementation leaders and team members that value delirium prevention
		• No accountability for delirium practices	• Incorporate delirium into daily rounds using a validated screening tool
	• Leadership	• Physician disengagement	• Interdisciplinary team of delirium champions
		• Lack of awareness and value about delirium	• Strong leadership and prioritization of mobility by all staff

Note. Anekwe et al., 2019; Balas, 2019; Balas et al., 2013; Barber et al., 2015; Boehm et al., 2020; Brock et al., 2018; Brummel et al., 2013; Carrothers et al., 2013; Collinsworth et al., 2021; Costa et al., 2017; Dafeo et al., 2015; Davis & MacLulich, 2009; Devlin et al., 2008; Devlin et al., 2011; Dubb et al., 2016; Elliot, 2014; Fowler, 2019; Goddard et al., 2018; Law et al., 2012; Lin et al., 2020; Negro et al., 2022; Parker et al., 2021; Parry et al., 2017; Potter et al., 2021; Riekerk et al., 2009; Rowley-Conwy, 2018; Sinvani et al., 2021; Wang et al., 2020; Weber et al., 2017; Winkelman & Peereboom, 2010.

al., 2021; Weber et al., 2017; Winkelman & Peereboom, 2010). It was reported that it was easier to deliver delirium prevention or care practices to more awake, cooperative, and stable patients (Brock et al., 2018; Winkelman & Peereboom, 2010). Existing delirium was reported in 13 articles to be a barrier to delirium-related practices (Anekwe et al., 2019; Balas, 2019; Brock et al., 2018; Costa et al., 2017; Davis & MacLulich, 2009; Devlin et al., 2008; Dubb et al., 2016; Lin et al., 2020; Parker et al., 2021; Parry et al., 2017; Potter et al., 2021; Weber et al., 2017; Winkelman & Peereboom, 2010).

Clinician-Level Factors

This category includes information about facilitators and barriers to delirium prevention and management practices that are related to clinician capacity (see Table 3 for summary). According to 14 articles, clinician lack of training or knowledge coupled with delirium perceived as a low priority was highlighted as a significant barrier to implementing delirium practices (Anekwe et al., 2019; Balas, 2019; Costa et al., 2017; Dafoe et al., 2015; Devlin et al., 2008; Fowler, 2019; Goddard et al., 2018; Law et al., 2012; Lin et al., 2020; Parker et al., 2021; Parry et al., 2017; Riekerk et al., 2009; Rowley-Conwy, 2018; Sinvani et al., 2021). Six articles identified that nurses reported concerns about personal musculoskeletal injury, increased workload, and general work stress to be barriers to implementing delirium practices (Balas et al., 2013; Carrothers et al., 2013; Collinsworth et al., 2021; Costa et al., 2017; Lin et al., 2020; Negro et al., 2022). Feeling supported and autonomous in practice was also identified in three articles as a facilitator of delirium practices (Boehm et al., 2020; Collinsworth et al., 2021; Costa et al., 2017).

Organization-Level Factors

Among the factors influencing the implementation of delirium-related practices, the functionality of interdisciplinary teams emerged as a critical element. As observed across the reviewed literature (see Table 3 for summary), the collaborative efforts of healthcare providers from diverse disciplines play a pivotal role in delirium care. The effectiveness of these teams hinges on the availability of organizational resources, such as equipment and technology, as well as the presence of skilled staff (Anekwe et al., 2019; Balas, 2019; Balas et al., 2013; Barber et al., 2015; Boehm et al., 2020; Brummel et al., 2013; Carrothers et al., 2013; Collinsworth et al., 2021; Costa et al., 2017; Dafoe et al., 2015; Davis & MacLulich, 2009; Devlin et al., 2011; Dubb et al., 2016; Elliot, 2014; Fowler, 2019; Goddard et al., 2018; Law et al., 2012; Lin et al., 2020; Negro et al., 2022; Parker et al., 2021; Parry et al., 2017; Riekerk et al., 2009; Rowley-Conwy, 2018; Sinvani et al., 2021; Wang et al., 2020; Weber et al., 2017). However, a lack of cohesion within these teams, compounded by high patient acuity and workload, presents a significant barrier to effective delirium management (Barber et al., 2015; Negro et al., 2022; Parry et al., 2017). Additionally, organizational or unit culture plays a crucial role, with a supportive environment being conducive to the adoption of delirium-related practices (Balas, 2019; Barber et al., 2015; Brummel et al., 2013; Carrothers et al., 2013; Collinsworth et al., 2021; Costa et al., 2017; Dubb et al., 2016; Goddard et al., 2018; Parker et al., 2021; Weber et al., 2017). Organizations fostering a culture of quality improvement

or research demonstrate higher levels of implementation success (Lin et al., 2020; Negro et al., 2022; Parker et al., 2021), often driven by engaged leadership that recognizes the significance of delirium management and prevention (Lin et al., 2020; Negro et al., 2022; Parker et al., 2021). Thus, acknowledging and fostering the functionality of interdisciplinary teams within supportive organizational cultures are essential steps toward enhancing delirium care practices.

Discussion

There is a wealth of evidence demonstrating the adverse effects of delirium on patient outcomes in critical care settings (Balas, 2019; Devlin et al., 2018). Consequently, the implementation of effective delirium prevention and management practices is paramount for ensuring optimal care for critically ill patients. Research identifying the barriers and facilitators to delirium prevention and management practices in adult critical care is foundational to developing successful implementation strategies.

Across the 32 studies included in our scoping review, various factors at different levels were found to be facilitators or barriers to the implementation of delirium prevention and management practices. Patient-level factors primarily focused on the patient's acuity of illness, physical characteristics, and clinical behaviours, including the presence of delirium itself (Anekwe et al., 2019; Balas, 2019; Brock et al., 2018; Costa et al., 2017; Davis & MacLulich, 2009; Devlin et al., 2008; Dubb et al., 2016; Lin et al., 2020; Parker et al., 2021; Parry et al., 2017; Potter et al., 2021; Weber et al., 2017; Winkelman & Peereboom, 2010). These patient-level factors often intersect with clinician-level barriers, such as personal beliefs that delirium was not a priority, safety concerns over the ability to implement delirium mitigation strategies (e.g., mobilizing critically ill patients), and inadequate training, which further compound the challenges of delirium care (Anekwe et al., 2019; Balas, 2019; Balas et al., 2013; Boehm et al., 2020; Carrothers et al., 2013; Collinsworth et al., 2021; Costa et al., 2017; Dafoe et al., 2015; Devlin et al., 2008; Fowler, 2019; Goddard et al., 2018; Law et al., 2012; Lin et al., 2020; Negro et al., 2022; Parker et al., 2021; Parry et al., 2017; Riekerk et al., 2009; Rowley-Conwy, 2018; Sinvani et al., 2021).

Furthermore, organizational-level factors, including unit culture and resource availability, significantly shape the environment for delirium care (Anekwe et al., 2019; Balas, 2019; Balas et al., 2013; Barber et al., 2015; Boehm et al., 2020; Brummel et al., 2013; Carrothers et al., 2013; Collinsworth et al., 2021; Costa et al., 2017; Dafoe et al., 2015; Davis & MacLulich, 2009; Devlin et al., 2011; Dubb et al., 2016; Elliot, 2014; Fowler, 2019; Goddard et al., 2018; Law et al., 2012; Lin et al., 2020; Negro et al., 2022; Parker et al., 2021; Parry et al., 2017; Riekerk et al., 2009; Rowley-Conwy, 2018; Sinvani et al., 2021; Wang et al., 2020; Weber et al., 2017). Although the numerous barriers and facilitators to implementing delirium-related practices were categorized into three overarching factors, the interconnectedness among these factors and the impact on guideline uptake should not be discounted.

It is important to describe how barriers at all levels interact with each other. Clinicians often report difficulty in adhering

to recommended strategies outlined in guidelines due to safety concerns associated with managing hyperactive delirium (Anekwe et al., 2019; Devlin et al., 2011). These safety concerns may stem from organizational barriers, such as inadequate staffing or poor collaboration among interdisciplinary team members (Fowler, 2019; Negro et al., 2022). Furthermore, the relationship between clinician-level and organizational-level barriers can exacerbate the challenges of guideline implementation. For instance, clinicians' perceptions of inadequate support from their organizations may deter them from prioritizing delirium care, leading to suboptimal adherence to guidelines (Fowler, 2019; Negro et al., 2022). Conversely, organizational initiatives aimed at fostering a culture of safety and providing adequate resources can facilitate guideline uptake among clinicians (Negro et al., 2022; Parker et al., 2021).

The interconnectedness among these factors underscores the complexity of implementing delirium-related practices. While patient-level factors may influence the feasibility and appropriateness of implementing recommended interventions, clinician-level barriers can lead to suboptimal adherence to guidelines. Similarly, organizational factors, such as resource constraints and cultural norms, may impede the integration of best practices into routine care. Addressing these barriers necessitates a comprehensive approach that acknowledges their multifaceted nature and considers strategies at all levels. Interventions aimed at improving clinician education, fostering a supportive organizational culture, and optimizing resource allocation are essential for enhancing guideline uptake and improving delirium care in critical care settings.

This review highlights the need for comprehensive strategies to overcome the barriers to implementing delirium prevention and management practices in critical care. By addressing patient, clinician, and organizational-level factors, healthcare systems can enhance the quality of care and improve patient outcomes in this vulnerable population. Understanding the complexity of delirium prevention and management in critical care and the associated literature surrounding barriers and facilitators makes it evident that an integrated knowledge translation framework is needed to create and sustain a change of practice successfully. The Society of Critical Care Medicine (2022) has completed work to improve delirium in critical care and advocated for the use of knowledge translation frameworks to assist in the implementation and sustainment of delirium practices. The integrated Promoting Action on Research Implementation in Health Services (i-PARIHS) framework is designed explicitly for knowledge translation in complex healthcare systems and utilizes four key domains (Harvey & Kitson, 2016; Hunter et al., 2020; Roberts et al., 2021; Rycroft-Malone, 2004). While not specifically used for delirium-related practice changes, the i-PARIHS framework has previously been utilized successfully in complex critical care environments to implement other evidence-based practice changes (Alostaz et al., 2022; Qin et al., 2020; Steffan et al., 2021). The core domains of the i-PARIHS framework include facilitation, innovation, context and recipients (Roberts et al., 2021). The i-PARIHS differs from the original PARIHS by using facilitators to adapt and mould the innovative change in such a way that the new

practice fits the contextual uniqueness as a result of feedback from the recipients involved in the implementation, which can aid in the consideration and planning to help address identified barriers (Harvey & Kitson, 2016; Roberts et al., 2021). This framework would be practical due to the innate flexibility provided, the consideration for contextual factors, and the inclusion of internal facilitator roles that act as change agents, which are embedded in the practice area to promote adaptation and encourage sustainment through ongoing engagement (Harvey & Kitson, 2016; Hunter et al., 2020).

Strengths/Limitations

Due to the rapid nature of this scoping review, which was chosen due to time constraints and a single reviewer conducting the review, there are potential limitations in the search strategy. However, forward and backward reference checking was completed, and the extracted data demonstrated consistent findings aligned with the identified themes. Another limitation was that the search included only English-language publications and the lack of a grey literature search.

Conclusion

This rapid scoping review describes the barriers and facilitators of delirium prevention and management practices in adult critical care. While our findings provide a comprehensive overview of the factors influencing the implementation of delirium-related practices, it's crucial to acknowledge the limited exploration of nurses' decision-making processes in managing delirium. Understanding the specific barriers experienced by nurses and other healthcare providers, and how these barriers influence decision-making, warrants further investigation. By delving deeper into the challenges faced by frontline caregivers, we can tailor interventions better to address their needs and enhance the implementation of evidence-based delirium prevention and management strategies. This represents an important avenue for future research, bridging the gap between research findings and clinical practice to optimize patient care in critical care settings.

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Supplemental Table

Literature Summary

Author and Publication Date	Country	Setting	Participants (N)	Participant Type	Study Type / Methodology
Anekwe et al., 2019	Canada	University-affiliated teaching hospital Intensive care units (ICU)	138	Physicians Physiotherapists Nurses Respiratory Therapist	Cross-sectional survey
Balas, 2019	USA	Critical care units in rural and urban academic, community and federal hospitals		Interdisciplinary teams	Quality Improvement
Balas et al., 2013	USA	Academic medical centre ICU	328	Interprofessional ICU team members	Prospective, before-after, mixed methods study
Barber et al., 2015	Australia	Quaternary hospital ICU	25	Physician Nursing Physiotherapy	Qualitative descriptive study
Boehm et al., 2020	USA	ICU	1,661	Nurses	Cross-sectional study
Brock et al., 2018	Australia	Mixed medical, surgical, trauma ICU	202	Patients	Prospective study
Brummel et al., 2013	USA			Review of screening tools and expert opinions	Quality improvement
Carrothers et al., 2013	USA	ICU	4 hospitals	Patients	Pilot study
Collinsworth et al., 2021	USA	ICU	84	Nurses Physicians Therapists	Mixed method (interview and survey)
Costa et al., 2017	USA				Systematic Review
Dafoe et al., 2015	Australia	Tertiary hospital ICU	321	Physicians Nurses Physiotherapist	Quality Improvement
Davis & MacLulich, 2009	United Kingdom	Acute care hospitals including critical care units	784	Trainee physicians	Questionnaire-based survey
Devlin et al., 2008	USA	Critical care units	331	Nurses	Paper/Web based survey
Devlin et al., 2011	USA	Critical care units	250	Pharmacists	Survey
Dubb et al., 2016	USA		40		Data Synthesis
Elliott, 2014	United Kingdom	ICU	149	Nurses Medical staff	Survey

continued...

Fowler, 2019	USA	ICU		Nurses	Quality Improvement
Goddard, et al., 2018	Canada	ICU	40	Nurses Physicians Respiratory therapists Occupational therapists	Qualitative interview
Law et al., 2012	USA	Acute care units providing critical care	84	Nurses	Survey
Lin et al., 2020	Australia	Tertiary I	82	Nurses Physicians Physiotherapist	Prospective questionnaire
Negro et al., 2022	Italy	ICU	28	Nurses Physicians	Survey
Panitchote et al., 2015	Thailand	ICU	102	Nurses	Observational study
Parker et al., 2021	USA	Medical ICU	23	Nurses	Qualitative Quality Improvement
Parry et al 2017	Australia	ICU	26	Nurses Physicians Physiotherapist	Qualitative Interview study
Potter, Miller, & Newman, 2021	USA		38		Integrative review
Riekerk et al., 2009	Netherlands	University affiliated hospital ICU		Nurses Physicians Residents	Quality Improvement
Rowley-Conwy, 2018	United Kingdom				Literature review
Sinvani et al., 2021	USA	ICUs	65	Nurses	Quality Improvement
Wang et al., 2020	China	ICU	227	Nurses	Descriptive and cross-sectional design
Weber et al., 2017	USA	ICU	600	Nurses Physicians	Quality Improvement
Wells, 2012	Australia				Literature review
Winkelman 2010	USA	ICU	33	Nurses	Descriptive study

Precepting in critical care: Communication and collaboration

By MICHELLE HOUSE-KOKAN, EdD, MSN, RN, CNCC(C), CCNE AND RAMESH VENKATESA PERUMAL, PhD, RN, CCNE, CNCC(C), CCSNE

Abstract

Well-honed interpersonal and communication skills are essential in an effective preceptorship. Preceptors not only facilitate and develop positive interpersonal relationships between themselves, the preceptee, the patient and family, and the healthcare team, but they have a responsibility to foster and develop the preceptee's interpersonal and communication skills as well. Doing so is even more important and more challenging in the complex, busy, and often overwhelming critical care environment. This article is the third in a series that aims to support new and experienced critical care nurse preceptors, as they guide those who will become the future of critical care nursing.

Effective interpersonal and communication skills are essential to establish any constructive professional relationship in nursing

practice, but even more so in the critical care environment due to its fast-paced, highly acute and complex nature. Effective communication skills help build trusting relationships, foster a caring environment, allow greater accuracy and understanding of information and, ultimately, lead to safer patient- and family-centred care (Arnold & Boggs, 2020). Strong interpersonal and communication skills can assist preceptors to be more effective personally and even more so in their role guiding preceptees (Hardie et al., 2022). At the same time, preceptees may have limited experience with communication in clinical practice, particularly in the high-pressure context of an intensive care unit (ICU), and it is the preceptor's responsibility to assist their preceptees in developing these skills.

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Foundations of Communication

An effective learning environment requires the development of a constructive professional relationship in nursing practice, and interpersonal and communication skills such as recognizing others' uniqueness, listening to, empathizing, and empowering others, and building trust are the mechanisms for developing such relationships (Jetha & House-Kokan, 2024; O'Toole, 2020). The following is an overview of some of the foundations of communication essential for preceptor success, as well as some tips on how to enact them in practice (Noone & Gubrud, 2023; Perry, 2022).

Starting on the right foot

Earlier in this series, the importance of getting to know your preceptee was highlighted (House-Kokan & Kalan, 2023; Jetha & House-Kokan, 2024). The unique communication style, cultural influences, learning preferences, and life experiences that preceptees bring to the table have a direct impact on their capacity to build productive working relationships. Recognizing and capitalizing on the personal experiences and strengths of your preceptee enhances their learning (Hardie et al., 2022).

Clarity

Developing goals collaboratively sets the ground for clarity in both your own and your preceptee's expectations and helps to avoid misunderstandings and conflicts. To do so, ensure you communicate what you mean to say. Your message should be clear and easily understood by the preceptee, because unclear or vague messages can be misunderstood or misinterpreted, potentially causing avoidable errors or conflicts. Take a moment to think about and review important messages before sharing them, and ensure your body language and tone of voice match

your message. Importantly, check to ensure your preceptee has not only heard your words, but also the intention of your message. Similarly, if your preceptee is communicating with you, be sure to listen actively and ask clarifying questions to ensure that you fully understand your preceptee's message. If a conflict or misunderstanding does occur, address and resolve it early!

Consideration and compassion

Be mindful of the circumstances in which you are communicating. For example, be aware of your preceptee's level of understanding and knowledge before using technical jargon they may not yet know. Keep in mind that many experiences will be new for your preceptee and that can be intimidating or even upsetting. For example, your preceptee may have just experienced their first code blue: try to imagine yourself in their position and how they may be feeling. Often, a comment or inquiry that allows the other to sense your caring can help calm the situation and open constructive dialogue. This strategy is also helpful to role model for your preceptee if you encounter a challenging circumstance yourself, such as being confronted by an angry or upset family member.

Acknowledgement and empowerment

As a preceptor, you are in a position of relative power with preceptees: you have both knowledge and experience in critical care and a place within the unit's community. Your words have impact. Well-timed words of encouragement or acknowledgment can significantly impact the preceptee's confidence, self-determination, and competence (Bjekič et al., 2020). Active listening is also an important strategy; showing engagement in a conversation conveys that you value what the preceptee has to say.

Emotions, sensitivity and connection

While it is always important to maintain a professional tone, displaying emotions and feelings appropriately during interactions is a key part of effective education. Similarly, active listening and being sensitive to both the verbal and non-verbal messages that others communicate is also part of truly effective education. Sharing your humanity in certain situations builds a connection between you and your preceptee (Gillespie, 2005). It can also role model important lessons. For example, shedding tears with a family member who has just lost a loved one during a code blue role models compassion for both the family and the preceptee.

Speaking Up: Advocating and Assertive Communication

Critical care nurses are expected to be advocates for their patients, but preceptees may struggle with assertive communication or “speaking up.” Speaking up requires confidence that a preceptee may not have developed yet. Further, advocating and speaking up are skills that require practice, so even if preceptees have studied communication skills, they need multiple opportunities in the clinical setting to apply and practice them (Crowe et al., 2018). One interaction that is frequently anxiety-producing for preceptees is presenting their patient assessment during critical care rounds. Having the preceptee write down their assessment and requested actions and orders beforehand can help them organize their thoughts and provide a point of reference while they speak. It can also be helpful to have the preceptee practise their presentation with you, as preceptor.

The critical nature of the patients and potential for rapid deterioration in the ICU requires concise and clear communication when advocating for patients. Using communication tools, such as the SBAR technique, supports a preceptee’s development of these skills (Crowe et al., 2018; Thomas et al., 2009). SBAR is an acronym for Situation, Background, Assessment, Recommendation (Institute for Healthcare Improvement, n.d.). As the preceptor, you can have your preceptee routinely use the SBAR technique in communication with the critical care team. You even can have the preceptee practise using the tool when discussing patient care between yourselves (Figure 1).

Speaking up can also be difficult for a preceptee when dealing with other critical care team members, especially if they have limited experience. Preceptors are a key source of support, mediation, and role modeling in these circumstances. Assisting preceptees to develop strategies and practise them in real-time in the unit, fosters their readiness to practise (Mansour & Mattukoyya, 2019). One strategy is to apply the DESC model for assertive communication (Clark, 2015). DESC stands for Describing the situation, Expressing concerns, State alternatives, and Consequences (Figure 2). This model can be used in a variety of situations, including in conflict; however, it does require practice. It can be helpful for you, as the preceptor, to assist your preceptee in developing assertive communication skills by debriefing an interaction and applying this model after the fact.

Conclusion

Effective interpersonal and communication skills are core clinical skills in the critical care environment, which must be learned and practised. Preceptors not only have a crucial role in developing and fostering these skills with their preceptees, but also, they have a responsibility to hone their own interpersonal and communication skills in order to provide effective education. Doing so will help build a trusting learning relationship and environment, allow accuracy in understanding information and, consequently, ensure safer patient care.

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Figure 1

Adapted SBAR Tool with Example

SBAR Report to ICU Physician About Clinical Deterioration	
S	Situation: <i>Brief overview of the problem</i> I have Ms. X in Bed 7, a 63 year old woman whose MAP and O2 sats are falling.
B	Background: <i>Pertinent information related to the current problem</i> - She is a multi-trauma patient from single vehicle MVA who was admitted 48 hours ago direct from OR after ORIF of right femur fracture, pelvic fracture, and CT placement for hemopneumothorax - She has a history of hypertension - She's currently ventilated on PSV 15, FiO2 .30, CPAP 8 and her O2 sats are now 90%, down from 96-99%. Her RR has increased from 18 to 24, and her volumes are decreasing from around 300 mL to around 200 mL. Suctioned for increasing amounts purulent-looking sputum. - Vital signs 90/48, MAP down to 60 from 70 two hours ago, HR 115 up from 95, temp 38
A	Assessment: <i>Nurse's assessment of the problem</i> I think she's developing pneumonia, but we can't rule out another source of sepsis.
R	Recommendation: <i>Nurse's conclusion and what the nurse is requesting</i> I'd like to send a sputum sample for C&S and start sepsis workup, and I need for you to come evaluate her right away.

Source: Adapted from the Institute for Healthcare Improvement (n.d.).

Note. ICU = intensive care unit; MAP = mean arterial pressure; O2 sats = oxygen saturation; MVA = motor vehicle accident; OR = operating room; ORIF = open reduction and internal fixation; CT = chest tube; PSV = pressure support ventilation; FiO2 = fraction of inspired oxygen; CPAP = continuous positive airway pressure; RR = respiratory rate; HR = heart rate; C&S = culture and sensitivity.

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Figure 2

Adapted DESC Model with Example

DESC Conversation with Colleague	
D	Describe: <i>the specific situation objectively</i> I know you want to get your patient bathed before your break, but I am still finishing my morning assessment and meds.
E	Express: <i>your concerns or feelings</i> I don't think I can get my assessment finished and my meds administered in a timely fashion if I stop to help you bathe the patient now.
S	State: <i>other alternatives you would prefer to happen</i> I can help you in about 20 minutes.
C	Consequences: <i>specify both positive and negative consequences as applicable</i> That way I can finish what I need to do on time, but still help you get to your break on time.

Source: Adapted from Clark, C. (2015). *Conversations to inspire and promote a more civil workplace*. *American Nurse*, 10(11), 1–6. <https://www.myamericannurse.com>

PRACTICE PEARLS

Assessment of facial sensation

BY BRENDA LYNN MORGAN, MSc, RN, CNCC(C)

How is facial sensation perceived?

Facial sensation is interpreted via the CN V (Trigeminal Nerve, Figure 1). CN V is a mixed motor and sensory nerve. The left and right CN V nerve roots divide quickly into three (“tri”) divisions: V1 (ophthalmic), V2 (maxillary), and V3 (mandibular). Figure 2 shows the distribution of ipsilateral touch, temperature, and pain sensation. V3 also contains the motor component of CN V, responsible for innervating the muscles (chewing) and the tensor tympani muscle (which connects the malleus bone in the auditory canal to muffle the amplitude of sound). Recall that the muscles for facial expression, eyelid closure, lacrimation, and salivation are innervated by CN VII (facial).

Sensory input is carried to the contralateral thalamus and relayed until it is interpreted in the contralateral sensory strip (located in the anterior parietal lobe). A stroke involving the trigeminal nerve pathway (including middle cerebral artery stroke) can cause sensory loss in the contralateral side of the face. All CN V motor and sensory fibres enter the brainstem at the level of the pons, but some CN V sensory fibres extend to the medulla and even the spinal cord. A unilateral CN V lesion can produce a loss of one or more sensory modalities on the same side of the lesion. If damage occurs in the lateral medulla, an unusual pattern of pain and temperature loss in the ipsilateral face and contralateral body can be present (Wallenberg Syndrome, often due to occlusion of the posterior inferior cerebellar artery or PICA). Loss of contralateral body sensation occurs because ascending pain signals that normally cross below this point cannot reach the contralateral sensory strip.

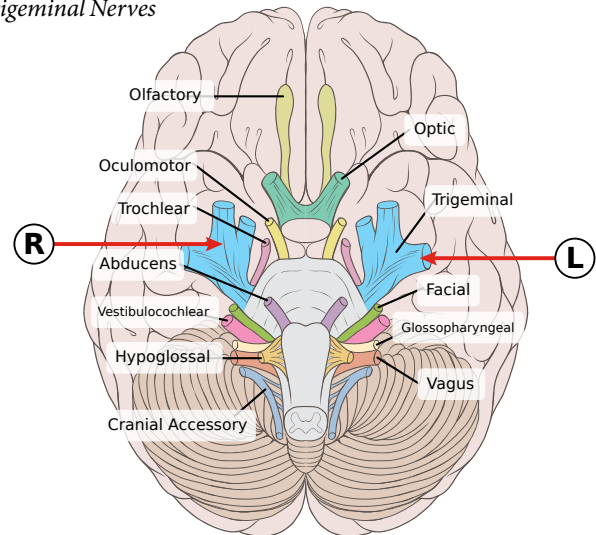
Motor dysfunction is rarely seen in stroke because all of the muscles that control biting, chewing, and swallowing are simultaneously innervated by a message from either side of the brain. A unilateral lesion affecting CN V can cause ipsilateral sensory and motor loss that may include impaired hearing, weakness of the muscles of mastication with a deviation of the mandible toward the affected side (the strong side pushes toward the weak side), and loss of corneal reflex. Trismus (lockjaw) and spasms of mastication muscles can occur in some conditions.

Corneal Reflex

The corneal reflex is a protective response for the eyes. Any stimulus to the eye (foreign body or touching of the cornea) will cause eyelid closure and tearing. Like all reflex arcs, the response can be elicited in conscious or unconscious states. It is achieved by stimulating the V1 branch of CN V, which immediately activates the motor component of CN VII to cause eye blinking and tearing. Stimulation of either cornea causes bilateral eyelid blink (consensual and direct response). The

Figure 1

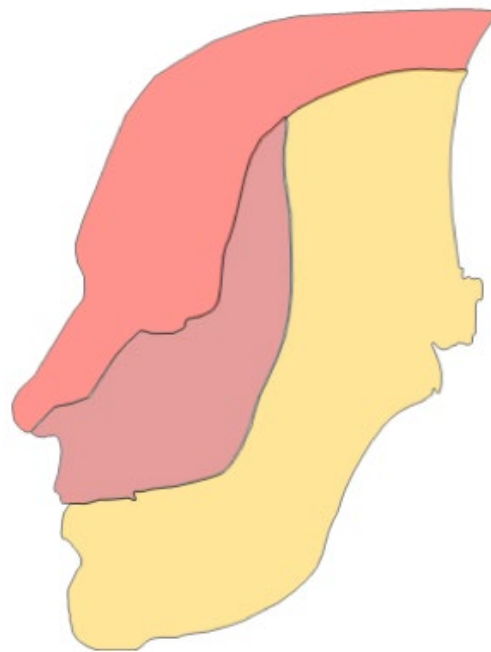
Trigeminal Nerves



Patrick J. Lynch, 2011

Figure 2

Sensory distribution



V1 V2, V3, Madhero88, Wikimedia

response can be diminished in contact lens wearers and absent with deep sedation. Visual and auditory threats will also stimulate a protective blink reflex. If the patient “sees you coming” toward their eye, they may blink due to a CN II and VII reflex. Loud noises can also stimulate a blink response (including V3, CN VIII, and CN VII). Stimulation of nasal mucosa can induce blinking, tearing, wrinkling of the nose, or sneezing due to reflex stimulation of CN VII, IX, and X.

Trigeminal Neuralgia (tic douloureux)

Trigeminal neuralgia is face pain due to CN V pathology. It typically follows the V2 or V3 distribution unilaterally. It can be idiopathic or due to compression or other nerve injury. The pain can be debilitating and cause repetitive grimacing (or tics). Facial neuralgia (CN VII) causes facial muscle spasms; if both trigeminal and facial neuralgia are present, a tumour, aneurysm, or other causes of concurrent compression should be ruled out.

Corneal Reflex Testing

1. If able, ask patient to look to the opposite side.
2. Lightly touch the cornea with a thin strand of sterile cotton. Touch over the lateral aspect (white of eye), avoiding the iris and pupil.
3. Ask patient to tell you if they feel your touch.
4. Observe for bilateral blink and tearing.
5. Repeat test by touching the cornea of the opposite eye.
6. Do not test if deeply sedated or on neuromuscular blocking agents. The test should not be performed more often than once every 12 or 24 hours (or more).
7. Blinking in response to eyedrop instillation may be observed.

TEST CN V (Responsive Patient)

1. Have patient close their eyes.
2. Wipe a cotton fluff or tissue lightly over the left forehead (V1). Ask patient to tell you if they feel soft or sharp. Repeat on the right forehead.
3. Repeat #2 test in the mid cheek (V2) and mandible (V3) regions.
4. Repeat V1, V2, and V3 testing using a blunt needle.
5. To test motor function (V3), ask patient to clench their teeth and observe symmetry.
6. Ask patient to open their mouth. Lift the patient's lower jaw with your hand to assess ability to resist.

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MEDICATION SAFETY PRACTICE CORNER

A Push for IV Medication Safety

By LYNN RILEY, RN, MARY HARBER, RN, AND DOROTHY TSCHENG, RPh

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Report a med error

In this regular column, ISMP Canada will feature a critical care-related medication story and share practical learning for critical care nurses.

Approximately 90% of hospitalized patients receive medications by intravenous (IV) route (Dorn et al., 2023). Administering medications via IV push poses a higher risk for preventable patient harm. Reasons include the following (Malik et al., 2022):

- immediate bioavailability of the medication,
- narrow therapeutic window of the medications administered, and
- challenges related to the reversal of any undesired pharmacological effects.

Additional risks exist when ready-to-use formats are not available, requiring nurses to dilute and/or prepare the medication.

Reported Incident Examples

ISMP Canada regularly receives reports of incidents involving IV push medications. Examples are provided below:

- **HYDROMORPHONE** 2 mg IV push was given instead of 0.2 mg IV push.
- **MORPHINE** 2 mg dose was ordered, prepared by the nurse to be given IV push. A second nurse administered the dose. It was later discovered that the syringe had been prepared using a 10 mg/mL vial, not a 2 mg/mL vial of morphine.
- **PHENYTOIN** 100 mg daily by IV push was ordered for an older patient in a critical care unit. The phenytoin was administered at a rate of 50 mg/min, faster than the recommended rate for older adults. The patient experienced an episode of ventricular standstill, requiring immediate treatment to stabilize their heart rate and blood pressure.

Discussion

A variety of contributing factors lead to IV push errors. They include (Institute for Safe Medication Practices [ISMP], 2023):

- insufficient instruction in nursing educational programs,
- limited standardization of order sets and protocols for the administration of IV push medications,
- lack of IV push competency assessment in clinical settings, and
- a need for increased awareness of the heightened risks related to IV push medications.

Barriers to full implementation of evidence-based IV push guidelines include insufficient time or access to appropriate resources, conflicting drug resources, and sharing of incorrect information among nurses based on previous practice and opinions (Dorn et al., 2023). The lack of standardization

(Spader, 2020) contributes to the variability in practice between healthcare facilities and within individual organizations.

A recent review of several medication error reports related to IV push medications revealed that dose preparation and dose administration were vulnerable steps in the medication-use process.

Dose preparation

A lack of ready-to-administer (RTA) dose-specific syringes increases the frequency with which nurses calculate and dilute doses from commercially available products. Unlabelled or incorrectly labelled medication syringes, when prepared outside the pharmacy, are an established contributing factor to medication error (Lenz et al., 2017). In the HYDROMORPHONE and morphine examples provided above, the medications were diluted in a syringe before being administered. The practice of dilution is often not standardized, leading individual nurses to make assumptions about medications prepared by another nurse.

ISMP Canada continues to receive error reports associated with the dilution of medications before administration, leading to incorrect concentration of doses prepared and incorrect doses administered. The resulting patient harm is often greater when medications are given IV push—concentrated formulations can have catastrophic effects, while overdiluted solutions can lead to suboptimal effects.

Dose administration

The other vulnerable step in IV push medication delivery is dose administration. The rate of administration is of particular concern. In the phenytoin example, the nurse was supported by a drug manual with a phenytoin monograph. However, the implications of administering phenytoin to an older adult at a rate exceeding 25 mg/min were not considered at the time of administration.

Key practice tips

For Nursing Leadership

- Work with a multi-disciplinary team to create/enhance leading-practice strategies and standardized reference materials (e.g., drug manual) that include the following:
 - definitions of IV push terminology (e.g., IV push, IV bolus, slow IV push),
 - unit-specific preparation and administration procedures, including clear instructions for dilution, the correct diluent to be used, proper rate of administration, and port of injection (Spader, 2020),

- monitoring parameters, and
- use of reversal agents, rescue agents, or antidotes in case of overdose (e.g., naloxone for opioid overdose).
- Develop and implement an IV push medication skill lab competency checklist that includes steps in preparing medications safely, performing double checks for high-alert medication dose calculations, safe labelling of syringes, and recommended IV push technique.
- Advocate for RTA syringes to enhance patient safety. These syringes reduce the need for manual calculations and dose preparation, reduce the risk of contamination when drawing medication out of a vial in the clinical setting, and eliminate risks associated with manual labelling (ISMP, 2015).
- Promote error and near miss reporting related to IV push medications for the purposes of learning and quality improvement. Review these reports with staff during safety huddles.

For Frontline Nurses

- When an IV push medication is needed, consult your organizational IV drug references/guidelines to determine the following:
 - the need for dilution of an IV push medication and the appropriate diluent,
 - Note: never dilute a medication using a commercially prefilled flush syringe of 0.9% sodium chloride (ISMP Canada, 2012). Without relabelling, the syringe now containing a medication could be mistaken for a syringe containing saline.
 - safe administration rates; use a clock/watch that counts seconds to support the process accurately (Paparella & Mandrack, 2016),
 - frequency of required monitoring parameters for adverse effects and signs of toxicity, and
 - appropriate reversal agents to facilitate timely administration if needed.
- Request and provide independent double-checks for dose calculations of high-alert medications.
- Follow organizational policies if preparation of medication in syringes is required for future administration (e.g., emergency situations). Label these syringes with the patient's name, generic drug name, dose in mg/mL, rate of administration, and your initials (Spader, 2020).

Conclusion

Critical care nurses play a key role in developing, implementing, and evaluating leading practices for the safe preparation and administration of IV push medications. Incorporation of foundational knowledge and clinical skills into educational nursing programs, standardization of preparation and administration processes, ongoing organizational support for accessible unit-specific IV push resources, and mentoring and competency assessments, will all contribute to safe IV push medication delivery.

Additional learning about IV push medication administration incidents is available in previously published safety bulletins:

https://ismpcanada.ca/wp-content/uploads/ISMPCSB2013-01_Intravenous_Phenytoin.pdf
https://ismpcanada.ca/wp-content/uploads/ISMPCSB2014-4_Epinephrine.pdf
https://ismpcanada.ca/wp-content/uploads/ISMPCSB2014-3_HospitalOpioidSafetyForChildren.pdf

Shared learning leads to quality improvement. Every report to ISMP Canada's Individual Practitioner Reporting program provides an opportunity to learn and share improvement strategies to strengthen IV push medication safety.

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